CHAPTER

3

Achieving Competitive Advantage with Information Systems

LEARNING OBJECTIVES

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

3-1 How do Porter's competitive forces model, the value chain model, synergies, core competencies, and network-based strategies help companies use information systems for competitive advantage?

3-2 How do information systems help businesses compete globally?

3-3 How do information systems help businesses compete using quality and design?

3-4 What is the role of business process management (BPM) in enhancing competitiveness?

3-5 How will MIS help my career?

CHAPTER CASES

- N26: A Bank Without Branches
- Singapore as a Smart Nation
- Strategic Information Systems at Hong Kong Disneyland
- Offline, Online, and Back: The Evolution of the UK Grocery Market

VIDEO CASES

- GE Becomes a Digital Firm: The Emerging Industrial Internet
- National Basketball Association: Competing on Global Delivery with Akamai OS Streaming

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- Discussion Questions: 3-5, 3-6, 3-7
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N26: A BANK WITHOUT BRANCHES

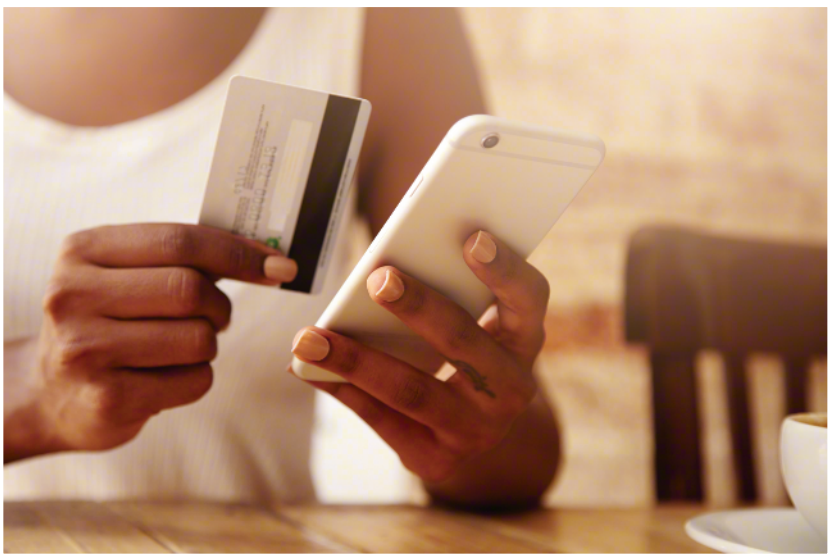
N26, a mobile bank, was founded in 2013 by Valentin Stalf and Maximilian Tayenthal. Since its launch in January 2015, N26 has built a network of 3.5 million customers in 24 European countries. In total, N26 has raised over $500 million from investors and, with a market value of over $3 billion, it is the most valuable FinTech startup in Europe. N26 is one of the few FinTech banks that is hosted entirely in the cloud on a single system.

Banks have always been an attractive target for criminals, and their IT systems get more than their fair share of cyber-attacks. To limit the damage in the event of an attack, a bank's systems are designed as a distributed IT landscape. Banks operate numerous self-developed software applications, but many of these are only partially adaptable to changing processes and needs. An online bank, however, has the scope to optimally design its IT landscape and customer interaction processes based on current needs—such as compatibility with a mobile app—without having to take legacy systems into consideration. In the modern mobile economy, this can be an important competitive advantage.

Stalf and Tayenthal conceived N26 as offering simplicity and customer-centric processes that could be used anywhere in the world. Based on this philosophy, all of the bank's processes can be carried out completely online, from identification via video chat to opening an account. In its advertising, N26 boasts that an account can be opened within 8 minutes.

As a mobile bank, N26 has encountered peculiar challenges that it did not anticipate. In 2016, there was a spate of account closures after a number of customers made one withdrawal too many—N26 offered no reason for the closure, causing even more confusion. The company was widely criticized for their handling of the situation, prompting them to introduce guidelines and limit the number of free withdrawals.

N26 also introduced Cash26 to further improve their services in cash-based operations. This service allows customers to deposit or withdraw cash at checkout across a network of partner companies: the N26 app generates a barcode that controls the withdrawal or deposit, and this is simply scanned at the partner company's checkout to complete the transaction.



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A common problem in online banking is phishing, and N26 has been a target as well: many of its customers have found themselves locked out of their accounts as a result of this. Individual phishing attacks led to widespread coverage in

the media as customers demanded compensation from N26. In response, the company is investing heavily in the further development of security systems. Customers had also complained about a lack of support, so the number of customer service personnel was increased to over 600 people. Meanwhile, N26 is also looking into the ways AI can be integrated into its security.

Sources: N26 Corporation, "The N26 History," n26.com, accessed September 11, 2019; Jürgen Stüber, "Onlinebank Revolut greift mit Bitcoin-Handel N26 an," Gründerszene, December 7, 2019; Christian Gattringer,"Die Online Bank N26 ist mit Gratiskonten zum Milliardenwert geworden—bald kommt sie in die Schweiz," Neue Zürcher Zeitung, July 18, 2019; Jauernig Henning, "Phishing-Attacken und schlechter Service bei N26," Spiegel Online, March 28, 2019; Horst von Buttlar, "N26 wird gefeiert, die Deutsche Bank bedauert," Capital, January 12, 2019; OTS, "N26 gibt Finanzierungsrunde in Höhe von 300 Millionen US-Dollar bekannt," APA-OTS, January 10, 2019; Raj Saxena, "Tech at N26—The Bank in the Cloud," medium.com, May 22, 2018; Andreas Dörnfelder, "Seine Bank gewinnt gerade Kunden wie kaum eine zweite in Europa," Orange by Handelsblatt, https://orange.handelsblatt.com, March 20, 2018; Emilie Rauschütz, "Ein Meilenstein bei N26—500 Angestellte," N26 Magazine, October 16, 2018; Jan Schulze-Siebert, "N26 Erfahrungen," Youtube.com, August 8, 2017.

Case contributed by Bernd Schenk, University of Liechtenstein

N26 is a good example of disruption across an entire industry. The banking sector is changing slowly compared to others, with many traditional services and processes that have yet to be virtualized. However, as cash balances and cash flows are increasingly mapped as data across the world, information systems are becoming vital to the banking sector and beginning to represent a core area of the organization. Banks in particular are relied upon to allow no mistakes and to ensure that their clients' money is protected in the best possible way. This contradicts the idea of the average start-up company, which usually has the scope to take risks, try out many things, offer new services, transform rapidly, and secure a good competitive position through speed and agility.

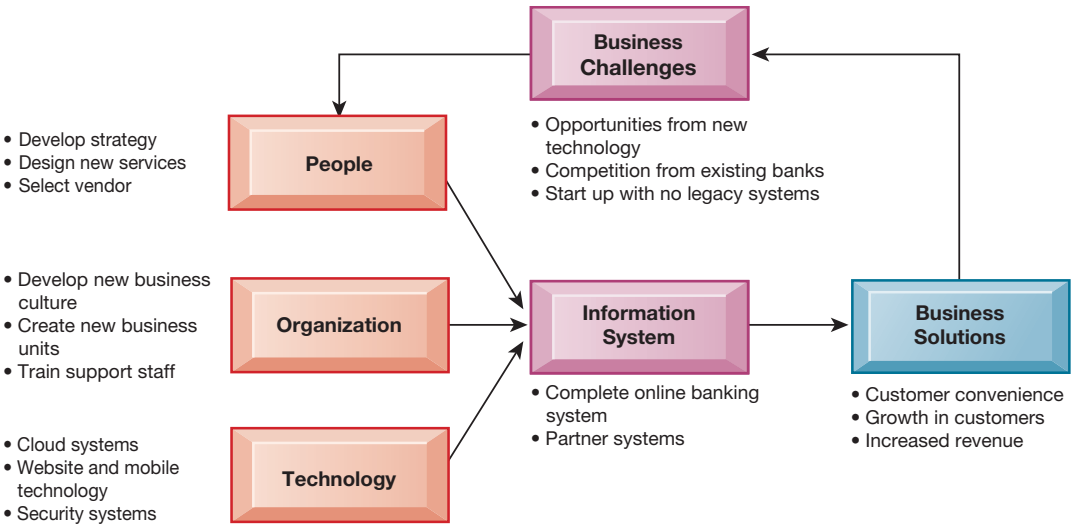
The chapter-opening diagram calls attention to important points raised by this case and this chapter. N26 is a pure-virtual player that decided at the outset that it would not open physical branches. The virtualization of the service is therefore a strategic decision. At the same time, the application is under constant development. N26's behavior is characterized by rapid learning and quick implementation of measures while continuously improving its services. AI is being used to further improve the security of N26's systems, while the mobile app uses the latest security technology, such as face recognition, to keep the app as user-friendly as possible.

Here are some questions to think about: What is N26's business strategy? What types of technology does N26 use to impress customers and differentiate itself from its competitors?

3-1 How do Porter's competitive forces model, the value chain model, synergies, core competencies, and network-based strategies help companies use information systems for competitive advantage?

In almost every industry you examine, you will find that some firms do better than most others do. There's almost always a standout firm. In pure online retail, Amazon is the leader; in offline retail, Walmart, the largest retailer on earth, has been the leader. In web search, Google is considered the leader.

Firms that do better than others are said to have a competitive advantage. They either have access to special resources that others do not, or they use commonly available resources more efficiently—usually because of superior knowledge and information assets. In any event, they do better in terms of revenue growth, profitability, or



productivity growth (efficiency), all of which ultimately translate into higher stock market valuations than their competitors.

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

PORTER'S COMPETITIVE FORCES MODEL

Arguably, the most widely used model for understanding competitive advantage is Michael Porter's **competitive forces model** (see Figure 3.1). This model provides a general view of the firm, its competitors, and the firm's environment. Recall that in Chapter 2 we described the importance of a firm's environment and the dependence of firms on environments. Porter's model is all about the firm's general business environment. In this model, five competitive forces shape the fate of the firm.

Traditional Competitors

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

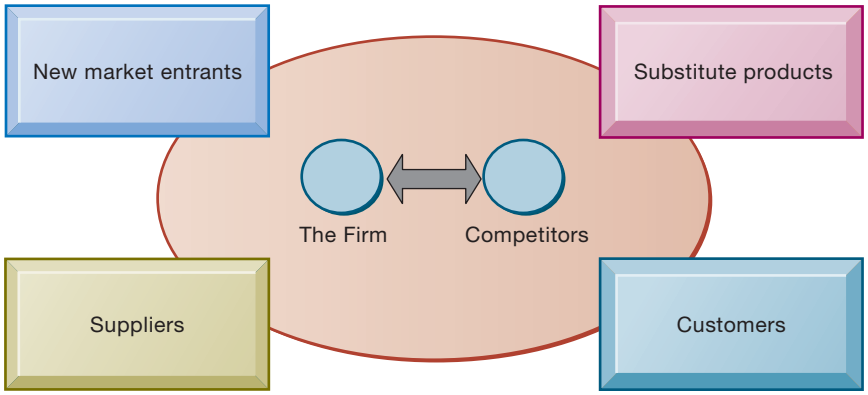


Figure 3.1
Porter's Competitive Forces Model.
In Porter's competitive forces model, the strategic position of the firm and its strategies are determined not only by competition with its traditional direct competitors but also by four forces in the industry's environment: new market entrants, substitute products, customers, and suppliers.

New Market Entrants

In a free economy with mobile labor and financial resources, new companies are always entering the marketplace. In some industries, there are very low barriers to entry, whereas in other industries, entry is very difficult. For instance, it is fairly easy to start a pizza business or just about any small retail business, but it is much more expensive and difficult to enter the computer chip business, which has very high capital costs and requires significant expertise and knowledge that is hard to obtain. New companies have several possible advantages. They are not locked into old plants and equipment, they often hire younger workers who are less expensive and perhaps more innovative, they are not encumbered by old worn-out brand names, and they are more hungry (more highly motivated) than traditional occupants of an industry. These advantages are also their weaknesses. They depend on outside financing for new plants and equipment, which can be expensive; they have a less-experienced workforce; and they have little brand recognition.

Substitute Products and Services

In just about every industry, there are substitutes that your customers might use if your prices become too high. New technologies create new substitutes all the time. Ethanol can substitute for gasoline in cars; vegetable oil for diesel fuel in trucks; and wind, solar, and hydropower for coal, oil, and gas electricity generation. Likewise, Internet telephone service has substituted for traditional telephone service, and streaming Internet music services for CDs, music stores, and digital download sites like iTunes. The more substitute products and services in your industry, the less you can control pricing and the lower your profit margins.

Customers

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

Suppliers

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

INFORMATION SYSTEM STRATEGIES FOR DEALING WITH COMPETITIVE FORCES

What is a firm to do when faced with all these competitive forces? How can the firm use information systems to counteract some of these forces? How do you prevent substitutes and inhibit new market entrants? How do you become the most successful firm in an industry in terms of profit and share price (two measures of success)?

Basic Strategy 101: Align the IT with the Business Objectives

The basic principle of IT strategy for a business is to ensure that the technology serves the business and not the other way around. The research on IT and business performance has found that (a) the more successfully a firm can align its IT with its business goals, the more profitable it will be, and (b) only about one-quarter of firms

achieve alignment of IT with business. About half of a business firm's profits can be explained by alignment of IT with business (Luftman, 2003; Weill and Aral, 2005). Instead of taking an active role in shaping IT to the enterprise, most businesses ignore it, claim not to understand IT, and tolerate failure in the IT area as just a nuisance to work around. Such firms pay a hefty price in poor performance. Successful firms and managers understand what IT can do and how it works, take an active role in shaping its use, and measure its impact on revenues and profits.

So how do you as a manager achieve this alignment of IT with business? In the following sections, we discuss some basic ways to do this, but here's a summary:

- Identify your business strategy and goals.
- Break these strategic goals down into concrete activities and processes.
- Identify how you will measure progress toward the business goals (e.g., by using metrics).
- Ask yourself, "How can information technology help me achieve progress toward our business goals, and how will it improve our business processes and activities?"
- Measure actual performance. Let the numbers speak.

Let's see how this works out in practice. There are four generic strategies, each of which often is enabled by using information technology and systems: low-cost leadership, product differentiation, focus on market niche, and strengthening customer and supplier intimacy.

Low-Cost Leadership

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

Because the system replenishes inventory with lightning speed, Walmart does not need to spend much money on maintaining large inventories of goods in its own warehouses. The system also enables Walmart to adjust the items stocked in its stores to meet customer demands. By using systems to keep operating costs low, Walmart can charge less for its products than competitors yet reap higher profits.

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

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

Product Differentiation

Use information systems to provide new products and services or greatly change the customer convenience in using your existing products and services. For instance, Google continuously introduces new and unique digital services, such as Google Pay peer payments, and improvements in Google Photos and Google Assistant in 2018. Apple has continued to differentiate its handheld computing products with nearly annual introductions of new iPhone and iPad models. Crayola is creating new digital products and services such as Lights, Camera, Color!, which allows children to turn their favorite photos into digital coloring book pages.

Manufacturers and retailers are using information systems to create products and services that are customized and personalized to fit the precise specifications of individual customers. For example, Nike sells customized sneakers through its NIKE BY YOU program on its website. Customers can select the type of shoe, colors, material, outsoles, and laces. Nike transmits the orders by computers to specially equipped plants in China and Korea. The sneakers take only about three weeks to reach the customer. This ability to offer individually tailored products or services using the same production resources as mass production is called **mass customization**.

Table 3.1 lists a number of companies that have developed IS-based products and services that other firms have found difficult to copy.

Focus on Market Niche

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

The data come from a range of sources—credit card transactions, demographic data, purchase data from checkout counter scanners at supermarkets and retail stores, and data collected when people access and interact with websites. Sophisticated software tools find patterns in these large pools of data and infer rules from them that can be used to guide decision making. Analysis of such data drives one-to-one marketing by which personal messages can be created based on individualized preferences. For example, Hilton Hotels' OnQ system analyzes detailed data collected on active guests in all of its properties to determine the preferences of each guest and each guest's profitability. Hilton uses this information to give its most profitable customers additional privileges, such as late checkouts. Contemporary customer relationship management (CRM) systems feature analytical capabilities for this type of intensive data analysis (see Chapters 2 and 9).

TABLE 3.1

IS-Enabled New Products and Services Providing Competitive Advantage

Amazon: One-click shopping	Amazon holds a patent on one-click shopping that it licenses to other online retailers.
Online music: Apple Music	Apple sells music from an online library of 50 million songs.
Golf club customization: Ping	Customers can select from more than 1 million golf club options; a build-to-order system ships their customized clubs within 48 hours.
Online person-to-person payment: PayPal.com	PayPal enables transfer of money between individual bank accounts and between bank accounts and credit card accounts.

TABLE 3.2

Four Basic Competitive Strategies

Strategy	Description	Example
Low-cost leadership	Use information systems to produce products and services at a lower price than competitors while enhancing quality and level of service.	Walmart
Product differentiation	Use information systems to differentiate products and provide new services and products.	Uber, Nike, Apple, Starbucks
Focus on market niche	Use information systems to enable a focused strategy on a single market niche; specialize.	Hilton Hotels, Harrah's
Customer and supplier intimacy	Use information systems to develop strong ties and loyalty with customers and suppliers.	Toyota Corporation, Amazon

Strengthen Customer and Supplier Intimacy

Use information systems to tighten linkages with suppliers and develop intimacy with customers. Toyota, Ford, and other automobile manufacturers have information systems that give their suppliers direct access to their production schedules, enabling suppliers to decide how and when to ship supplies to the plants where cars are assembled. This allows suppliers more lead time in producing goods. On the customer side, Amazon.com keeps track of user preferences for all the products it sells, including book and music purchases and can recommend titles purchased by others to its customers. Strong linkages to customers and suppliers increase **switching costs** (the cost of switching from one product or service to a competitor) and loyalty to your firm. Table 3.2 summarizes the competitive strategies we have just described.

As shown by the cases throughout this book, successfully using information systems to achieve a competitive advantage requires a precise coordination of technology, organizations, and people. Indeed, as many have noted with regard to Walmart, Apple, and Amazon, the ability to implement information systems successfully is not equally distributed, and some firms are much better at it than others are.

THE INTERNET'S IMPACT ON COMPETITIVE ADVANTAGE

Because of the Internet, the traditional competitive forces are still at work, but competitive rivalry has become much more intense (Porter, 2001). Internet technology is based on universal standards that any company can use, making it easier for rivals to compete on price alone and for new competitors to enter the market. Because information is available to everyone, the Internet raises the bargaining power of customers, who can quickly find the lowest-cost provider on the web. Profits have often been dampened as a result of increased competition. Table 3.3 summarizes some of the potentially negative impacts of the Internet on business firms Porter has identified.

The Internet has nearly destroyed some industries and has severely threatened others. For instance, the printed encyclopedia industry and the travel agency industry have been nearly decimated by the availability of substitutes over the Internet. Likewise, the Internet has had a significant impact on the retail, music, book, retail brokerage, software, and telecommunications industries. However, the Internet has also created entirely new markets, formed the basis for thousands of new products, services, and business models, and provided new opportunities for building brands with very large and loyal customer bases. Amazon, eBay, iTunes, YouTube, Facebook, Uber, and Google are examples. In this sense, the Internet is transforming entire industries, forcing firms to change how they do business.

Smart Products and the Internet of Things

The growing use of Internet-linked sensors in industrial and consumer products, often called the Internet of Things (IoT), is an excellent example of how the Internet is changing competition within industries and creating new products and services.

TABLE 3.3

Impact of the Internet on Competitive Forces and Industry Structure

Competitive Force	Impact of the Internet
Substitute products or services	Enables new substitutes to emerge with new approaches to meeting needs and performing functions
Customers' bargaining power	Shifts bargaining power to customers due to the availability of global price and product information
Suppliers' bargaining power	Tends to raise bargaining power over suppliers in procuring products and services; however, suppliers can benefit from reduced barriers to entry and from the elimination of distributors and other intermediaries standing between them and their users
Threat of new entrants	Reduces barriers to entry, such as the need for a sales force, access to channels, and physical assets; provides a technology for driving business processes that makes other things easier to do
Positioning and rivalry among existing competitors	Widens the geographic market, increasing the number of competitors and reducing differences among competitors; makes it more difficult to sustain operational advantages; puts pressure to compete on price

Nike, Under Armour, and other sports and fitness companies are pouring money into wearable health trackers and fitness equipment that use sensors to report users' activities to remote computing centers where the data can be analyzed. Farm tractors are loaded with field radar, GPS transceivers, and hundreds of sensors keeping track of the equipment. GE created a new business out of helping its aircraft and wind turbine clients improve operations by examining the data generated from the many thousands of sensors in the equipment. The result is what's referred to as smart products—products that are a part of a larger set of information services sold by firms (Iansiti and Lakhani, 2014; Porter and Heppelmann, 2014; Gandhi and Gervet, 2016)

The impact of smart, Internet-connected products is just now being understood. Smart products offer new functionality, greater reliability, and more intense use of products. They expand opportunities for product and service differentiation, while providing opportunities for improving both the product and the customer experience. When you buy a wearable digital health product, you not only get the product itself, you also get a host of services available from the manufacturer's cloud servers. Smart products generally inhibit new entrants to a market simply because existing customers are enmeshed in the dominant firm's software environment. Finally, smart products may decrease the power of suppliers of industrial components if, as many believe, the physical product becomes less important than the software and hardware that make it run.

THE BUSINESS VALUE CHAIN MODEL

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

The **value chain model** highlights specific activities in the business where competitive strategies can best be applied (Porter, 1985) and where information systems are most likely to have a strategic impact. This model identifies specific, critical advantage points at which a firm can use information technology most effectively to enhance its competitive position. The value chain model views the firm as a series or chain of basic activities that add a margin of value to a firm's products or services. These activities can be categorized as either primary activities or support activities (see Figure 3.2).

Singapore as a Smart Nation

Singapore is a small island at the southern tip of the Malay Peninsula with a population of 5.7 million. Over the second half of the last century, this tiny dot on the map has been well-known to the world for its astonishing economic development—it is now one of the countries with the highest GDP per capita in the world.

Singapore aims to transform itself into a smart nation by using information technology to reinvent itself. A smart nation or city uses electronic data collection sensors, large scale data centers, and analytic software for initiatives that address a variety of urban challenges. In November 2014, Singapore's Prime Minister Lee Hsien Loong announced the Smart Nation initiative to make Singapore a sustainable, modern city, countering the pressures of increasing urban density and an aging population. Recently, Singapore has launched a national AI strategy, which its government has identified as a key step in the development of its smart nation program.

As one of the smallest countries in the world, Singapore does not have much room to expand its transport infrastructure. The Singapore government announces traffic-related indexes, traffic alerts, and traffic snapshots in national and regional views by consolidating data provided by the weather and the transport departments, collected by surveillance cameras on traffic hotspots, sensors on vehicles, commuters' fare cards, and the Electronic Road Pricing System (Singapore's electronic toll collection scheme for alleviating traffic jams). Before travelers hit the road, they can now consult the Realtime Singapore Traffic Watch website or third-party mobile apps for traffic conditions and trends such as bus arrival timings.

Virtual Singapore is a dynamic 3D city model and data hub available to the general public, government bureaus, businesses, and research institutes to conduct long-term planning and virtual experiments. One of its applications is housing planning. Located one degree north of the Equator, the small and integrated city-state is consistently sunny, hot, and humid all year round. Virtual Singapore allows simulation of residential area planning that takes into consideration microclimate conditions for designing a comfortable living environment balancing the needs of a large population in a limited space: ventilation, energy conservation, and sufficient public open spaces. Pilot schemes have been rolled out in some public housing projects. Smart Towns will be equipped with solar energy panels and smart lights, which light up or dim depending on whether they detect passers-by, thus saving energy. The Automated Meter Reading scheme will allow residents to access water usage data with just a few taps on their smartphones. The Pneumatic Waste Conveyance System aims to deliver household waste to sealed containers through underground vacuum tunnels and adjust the service cycle of trash collection trucks through sensors.

Patients in Singapore may seek medical advice from healthcare professionals without leaving home through the Smart Health Video Consultation system. This is possible thanks to the wide coverage of stable, high-speed household Internet connections and the high smartphone penetration of the city. Patients in Singapore may also perform their rehabilitation exercises anytime and anywhere under the remote, asynchronous monitoring of a therapist using the TeleRehab kit. To keep its senior citizens healthy and active, Singapore introduced RoboCoach, a robot fitness trainer that replicates human movements, gives instructions in one of four languages or dialects, and uses motion-sensor technology.

There are other infrastructural projects in progress, such as CODEX (a data exchange architecture that enables internal data-sharing among government agencies, coupled with a suite of shared software components and infrastructure that enables more efficient development of digital applications), NDI (a digital identification program of citizens and businesses that allows pre-filled form information to be shared with authorized public or private parties, intended to become fully operational in 2020), Moments of Life (a mobile app providing a one-stop portal for parents to register the birth of their child, as well as a new Active Ageing module catering to seniors), and the Smart Nation Sensor Platform (a platform that collects different types of data, such as air quality, on a territory-wide scale). The private sector, research institutions, and individuals are encouraged to contribute ideas and launch their projects. These have included e-payment tools and Smart Urban Mobility (a testing of on-demand driverless vehicles).

Smart cities and smart nations are not without their issues and critics. Critics point out that in the last ten years smart city and nation projects have failed to deliver on many of their objectives, such as reducing urban automobile congestion and pollution despite grand promises with budgets to match. They also take many years to implement the technology, let

alone the solutions. The initiatives are often ignored by citizens who fail to see the benefits in their daily lives, especially for poor, elderly, and less tech-savvy citizens, and they pose extraordinary privacy security issues as well.

Sources: Integrated Health Information Systems Ihis.com.sg, accessed January 8, 2020; Smart Nation Singapore, "Smart Nation Initiatives/ Strategic National Projects," Smartnation.sg, accessed January 8, 2020; Eileen Yu, "Singapore Wants Widespread AI Use in Smart Nation Drive," Zdnet.com, November 14, 2019; Tham Yuen-C, "Signapore Population Grows at Slower Pace to Hit 5.7 Million," Straitstime.com, September 25, 2019; "What Is Codex? The Tech Behind Singapore's Smart Nation," Govinsider.asia, April 24, 2019; Kevin McSpadden, "Critics of SG Smart City and All Smart Cities Worldwide —5 Critiques of the Smart City Push," Yahoo News, September 2018; "Finance and Policy AP: Can Investment of $100m in AI Get Singapore's 'Smart Nation' Vision Back on Track?" Smartcitiesworldforums.com, May 8, 2017; Kevin Kwang, "Commentary: Singapore's Smart Nation Vision Blurry Without a Success Story," Channel News Asia, August 15, 2017; Maros Krivy, "Towards a Critique of Cybernetic Urbanism: The Smart City and the Society of Control," *Journal of Planning Theory*, April 27, 2016.

CASE STUDY QUESTIONS

1. What are the factors driving the Smart Nation initiative?
2. What are the possible downsides of the Smart Nation projects?
3. Describe the smart city initiatives of an urban center in your country or region.

Case contributed by Joyce Chan, City University of Hong Kong

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

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

You can ask at each stage of the value chain, "How can we use information systems to improve operational efficiency and improve customer and supplier intimacy?" This will force you to examine critically how you perform value-adding activities at each stage and how the business processes might be improved. For example, value chain analysis points to opportunities for further development for N26, as described in the chapter-opening case. The bank should focus on Operations to further improve services by focusing on customers' needs and improve Sales and Marketing by initiating customer referral campaigns. In Technology, they could take advantage of complementary existing technologies (such as wearables) that customers already own and are familiar with.

You can also begin to ask how information systems can be used to improve the relationship with customers and with suppliers who lie outside the firm's value chain but belong to the firm's extended value chain where they are absolutely critical to your success. Here, supply chain management systems that coordinate the flow of resources into your firm, and customer relationship management systems that coordinate your sales and support employees with customers, are two of the most common system applications that result from a business value chain analysis. We discuss these enterprise applications in detail in Chapter 9.

Using the business value chain model will also encourage you to consider benchmarking your business processes against your competitors or others in related industries and identifying industry best practices. **Benchmarking** involves comparing the efficiency and effectiveness of your business processes against

strict standards and then measuring performance against those standards. Industry **best practices** are usually identified by consulting companies, research organizations, government agencies, and industry associations as the most successful solutions or problem-solving methods for consistently and effectively achieving a business objective.

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

Extending the Value Chain: the Value Web

Figure 3.2 shows that a firm's value chain is linked to the value chains of its suppliers, distributors, and customers. After all, the performance of most firms depends not only on what goes on inside a firm but also on how well the firm coordinates with direct and indirect suppliers, delivery firms (logistics partners, such as FedEx or UPS), and, of course, customers.

How can information systems be used to achieve strategic advantage at the industry level? By working with other firms, industry participants can use information technology to develop industry-wide standards for exchanging information or business

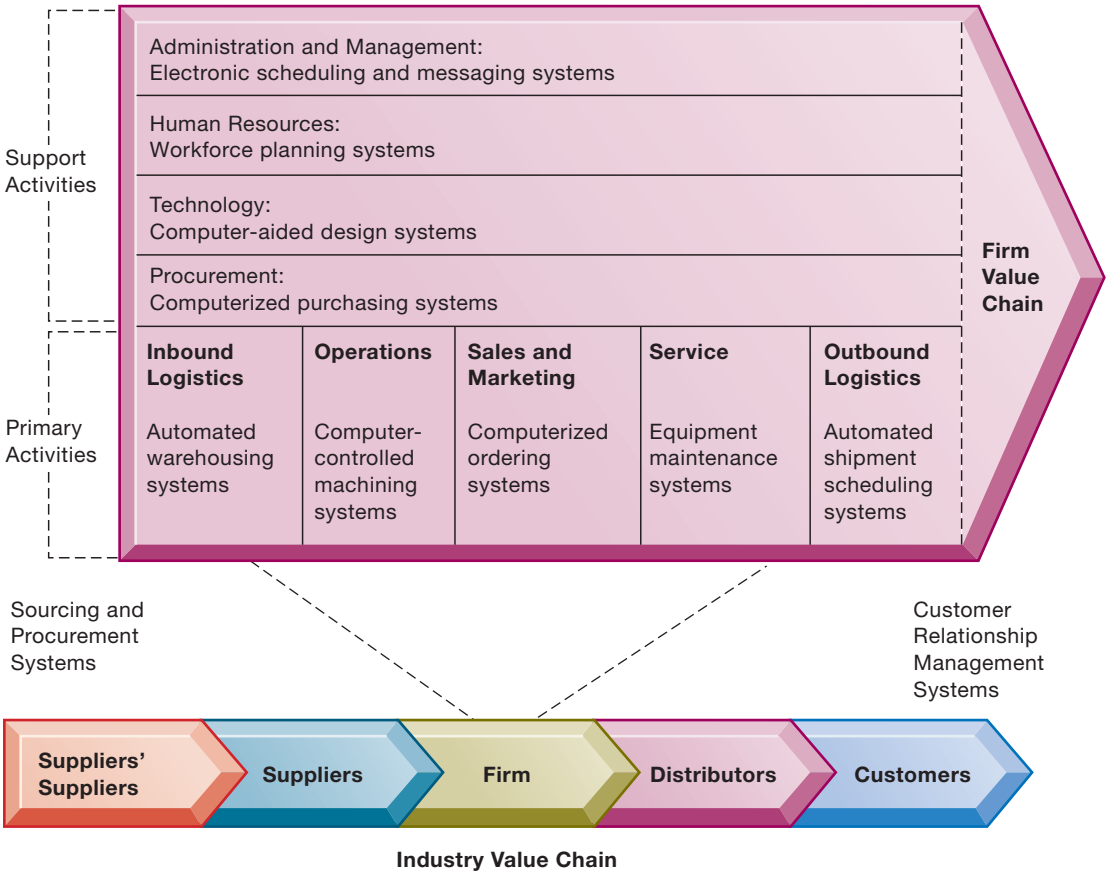


Figure 3.2
The Value Chain Model.
This figure provides examples of systems for both primary and support activities of a firm and of its value partners that would add a margin of value to a firm's products or services.

transactions electronically, which force all market participants to subscribe to similar standards. Such efforts increase efficiency, making product substitution less likely and perhaps raising entry costs—thus discouraging new entrants. Moreover, industry members can build industrywide, IT-supported consortia, symposia, and communications networks to coordinate activities concerning government agencies, foreign competition, and competing industries.

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

- make it easy for suppliers to display goods and open stores on the Amazon site.
- make it easy for customers to search for goods.
- make it easy for customers to order and pay for goods.
- track and coordinate the shipment of goods to customers.

In fact, this is exactly what Amazon has done to make it one of the web's most satisfying online retail shopping sites.

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

Figure 3.3 shows that this value web synchronizes the business processes of customers, suppliers, and trading partners among different companies in an industry or in related industries. These value webs are flexible and adaptive to changes in supply and demand. Relationships can be bundled or unbundled in response to changing market conditions. Firms will accelerate time to market and to customers by optimizing their value web relationships to make quick decisions on who can deliver the required products or services at the right price and location.

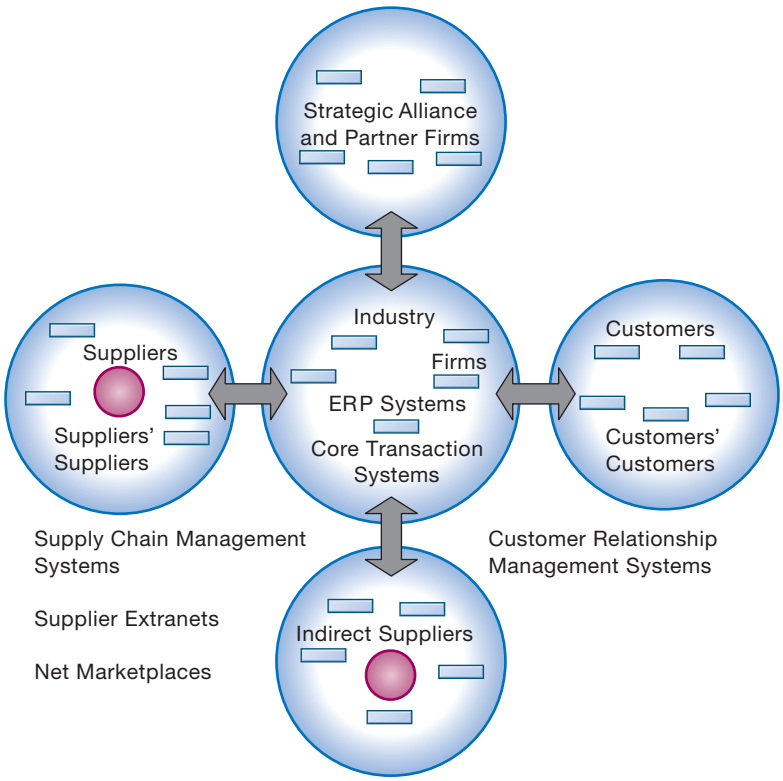


Figure 3.3
The Value Web.
The value web is a networked system that can synchronize the value chains of business partners within an industry to respond rapidly to changes in supply and demand.

SYNERGIES, CORE COMPETENCIES, AND NETWORK-BASED STRATEGIES

A large corporation is typically a collection of businesses. Often, the firm is organized financially as a collection of strategic business units, and the returns to the firm are directly tied to the performance of all the units. For instance, General Electric—one of the largest industrial firms in the world—is a collection of aerospace, heavy manufacturing, energy management, medical imaging, electronics, and software services firms called *business units*. Information systems can improve the overall performance of these business units by promoting communication, synergies, and core competencies among the units.

Synergies

Synergies develop when the output of some units can be used as inputs to other units, or two organizations can pool markets and expertise, and these relationships lower costs and generate profits. Information technology in these synergy situations can help tie together the operations of disparate business units so that they can act as a whole. For example, when large national banks acquire mortgage originating firms, they are able to tap into a large pool of new customers who might be interested in their credit card, consumer banking, and other financial products. Information systems help the merged companies consolidate operations, lower retailing costs, and increase cross-marketing of financial products.

Enhancing Core Competencies

Another use of information systems for competitive advantage is to think about ways that systems can enhance core competencies. The argument is that the performance of all business units can increase insofar as these business units develop, or create, a central core of competencies. A **core competency** is an activity for which a firm is an industry leader, best in class leader. Core competencies may involve being the best miniature parts designer, the best package delivery service, or the best thin-film manufacturer. In general, a core competency relies on knowledge that is gained over many years of experience and a first-class research organization or, simply, key people who follow the literature and stay abreast of new external knowledge.

Any information system that encourages the sharing of knowledge across business units enhances competency (see Chapter 2). Such systems might encourage or enhance existing competencies and help employees become aware of new external knowledge; such systems might also help a business take advantage of existing competencies to related markets. For example, Procter & Gamble (P&G), a world leader in brand management and consumer product innovation, uses a series of systems to help people working on similar problems share ideas and expertise. Employees working in research and development (R&D), engineering, purchasing, marketing, legal affairs, and business information systems around the world have online access to documents, reports, charts, videos, and other data from various sources. These systems also enable users to locate subject matter experts within the company as well as external research scientists and entrepreneurs who are searching for new, innovative products worldwide.

Network-Based Strategies

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

A **virtual company** uses networks to link people, assets, and ideas, enabling it to ally with other companies to create and distribute products and services without being limited by traditional organizational boundaries or physical locations. The virtual company model is useful when a company finds it cheaper to acquire

products, services, or capabilities from an external vendor or when it needs to move quickly to exploit new market opportunities and lacks the time and resources to respond on its own.

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

Business models based on a network may help firms strategically by taking advantage of **network economics**. In traditional economics—the economics of factories and agriculture—production experiences diminishing returns. The more any given resource is applied to production, the lower the marginal gain in output, until a point is reached when the additional inputs produce no additional outputs. This is the law of diminishing returns, and it is one foundation of modern economics.

In some situations, the law of diminishing returns does not work. For instance, in a network, the marginal costs of adding another participant are about zero, whereas the marginal gain is much larger. The larger the number of subscribers in a telephone system or the Internet, the greater the value to all participants because each user can interact with more people. It is no more expensive to operate a television station with 1,000 subscribers than with 10 million subscribers. The value of a community of people grows as the number of participants increases, whereas the cost of adding new members is inconsequential. This is referred to as a "network effect."

From this network economics perspective, information technology can be strategically useful. Firms can use Internet sites to build communities of like-minded customers who want to share their experiences. EBay, the giant online auction and retail site, is an example. This business is based on a network of millions of users and has built an online community by using the Internet. The more people offering products on eBay, the more valuable the eBay site is to everyone because more products are listed, and more competition among suppliers lowers prices. Network economics also provide strategic benefits to commercial software vendors such as Microsoft. The value of their software and complementary software products increases as more people use them, and there is a larger installed base to justify continued use of the product and vendor support.

Business Ecosystems and Platforms Instead of participating in a single industry, some of today's firms participate in industry sets—collections of industries that provide related services and products that deliver value to the customer. **Business ecosystem** is another term for these loosely coupled but interdependent networks of suppliers, distributors, outsourcing firms, transportation service firms, and technology manufacturers (Iansiti and Levien, 2004). Information technology plays an important role in enabling a dense network of interactions among the participating firms.

Business ecosystems typically have one or a few keystone firms that dominate the ecosystem and create the **platforms** used by other niche firms. For instance, both Microsoft and Facebook provide platforms composed of information systems, technologies, and services that thousands of other firms in different industries use to enhance their own capabilities (Van Alstyne et al., 2016). Facebook is a platform used by billions of people and millions of businesses to interact and share information as well as to buy, market, and sell numerous products and services. More firms are trying to use information systems to develop into keystone firms by building IT-based platforms that other firms can use. Alternatively, firms should consider how their information systems will enable them to become profitable niche players in the larger ecosystems created by keystone firms.

DISRUPTIVE TECHNOLOGIES: RIDING THE WAVE

Sometimes a technology and resulting business innovation comes along to change the business landscape and environment radically. These innovations are loosely called *disruptive* (Christensen, 2003). In some cases, **disruptive technologies** are substitute products that perform as well or better than anything currently produced. The automobile substituted for the horse-drawn carriage, the Apple iPod for portable CD players, digital photography for process film photography, and on-demand services like Uber for dispatched taxis. In these cases, entire industries are put out of business or significantly challenged.

In other cases, disruptive technologies simply extend the market, usually with less functionality and much less cost, than existing products. Eventually they turn into low-cost competitors for whatever was sold before. Disk drives are an example. Small hard-disk drives used in PCs extended the market for computer disk drives by offering cheap digital storage for small files on small computers.

Some firms can create these technologies and ride the wave to profits, whereas others learn quickly and adapt their business; still others are obliterated because their products, services, and business models become obsolete. There are also cases when no firms benefit, and all gains go to consumers (firms fail to capture any profits). Table 3.4 provides examples of some disruptive technologies.

Disruptive technologies are tricky. Firms that invent disruptive technologies as first movers do not always benefit. The MITS Altair 8800 is widely regarded as the first PC, but its inventors did not take advantage of their first-mover status. Second movers, so-called fast followers such as IBM and Microsoft, reaped the rewards. Citibank's ATMs revolutionized retail banking, but other banks copied them. Now all banks use ATMs, and the benefits go mostly to the consumers.

TABLE 3.4

Disruptive Technologies: Winners and Losers

Technology	Description	Winners and Losers
Microprocessor chips (1971)	Thousands and eventually millions of transistors on a silicon chip	Microprocessor firms win (Intel, Texas Instruments); transistor firms (GE) decline
Personal computers (1975)	Small, inexpensive, but fully functional desktop computers	PC manufacturers (HP, Apple, IBM) and chip manufacturers prosper (Intel); mainframe (IBM) and minicomputer (DEC) firms lose
Digital photography 1975	Using charge-coupled device (CCD) image sensor chips to record images	CCD manufacturers and smartphone companies win, manufacturers of film products lose
World Wide Web (1989)	A global database of digital files and pages instantly available	E-commerce online stores benefit; small retailers and shopping malls lose
Internet music, video, TV services	Repositories of downloadable music, video, TV broadcasts on the web	Owners of Internet platforms, telecommunications providers owning Internet backbone (AT&T, Verizon), Internet service providers win; content owners and physical retailers lose (Tower Records, Blockbuster)
PageRank algorithm	A method for ranking web pages in terms of their popularity to supplement web search by key terms	Google is the winner (it owns the patent); traditional keyword search engines (Alta Vista) lose
Software as web service	Using the Internet to provide remote access to online software	Online software services companies (Salesforce.com) win; traditional boxed software companies (Microsoft, SAP, Oracle) lose

3-2 How do information systems help businesses compete globally?

Look closely at your jeans or sneakers. Even if they have a US label, they were probably designed in California and stitched together in Hong Kong or Guatemala, using materials from China or India. Call Microsoft Support, or Vodafone Support, and chances might speak to a customer service representative located in India.

Consider the path to market for an iPhone, which is illustrated in Figure 3.4. The iPhone was designed by Apple engineers in the United States, sourced with more than 200 high-tech components from around the world, and primarily assembled in China. Companies in Taiwan, South Korea, Japan, France, Italy, Germany, and the United States provided components such as the case, camera, processor, accelerator, gyroscope, electronic compass, power management chip, touch screen controller, and high-definition display screen. Foxconn, a Chinese division of Taiwan's Hon Hai Group, is in charge of manufacturing and assembly.

Firms pursuing a global strategy benefit from economies of scale and resource cost reduction (usually wage cost reduction). For example, Apple spread design, sourcing, and production for its iPhone over multiple countries overseas to reduce tariffs and labor costs.

THE INTERNET AND GLOBALIZATION

Until the mid-1990s, huge multinational firms, such as General Electric, Siemens, Toyota, and IBM, dominated competion on a global scale. These large firms could afford huge investments in factories, warehouses, and distribution centers in foreign countries and proprietary networks and systems that could operate on a global scale. The emergence of the Internet into a full-blown international communications system has drastically reduced the costs of operating on a global scale, enlarging the possibilities for large companies and simultaneously creating many opportunities for small and medium-sized firms.

The global Internet, along with internal information systems, puts manufacturing firms in nearly instant contact with their suppliers. Internet telephony (see Chapter 7) permits millions of service calls to US companies to be answered in India and Jamaica just as easily and cheaply as if the help desk were in New Jersey or California.

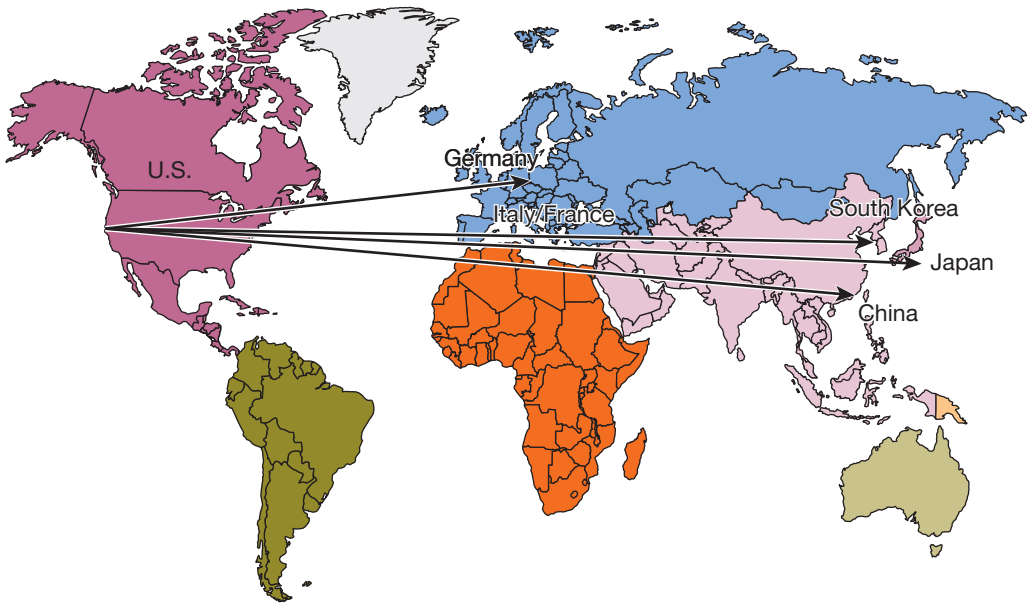


Figure 3.4
Apple iPhone's Global Supply Chain.
Apple designs the iPhone in the United States and relies on suppliers in the United States, Germany, Italy, France, Japan,and South Korea for parts. Much of the final assembly occurs in China.

Likewise, the Internet makes it possible to move very large computer files with hundreds of graphics, or complex industrial designs, across the globe in seconds.

GLOBAL BUSINESS AND SYSTEM STRATEGIES

There are four main ways of organizing businesses internationally: domestic exporter, multinational, franchiser, and transnational, each with different patterns of organizational structure or governance. In each type of global business organization, business functions may be centralized (in the home country), decentralized (to local foreign units), and coordinated (all units participate as equals).

The **domestic exporter** strategy is characterized by heavy centralization of corporate activities in the home country of origin. Production, finance/accounting, sales/marketing, human resources, and strategic management are set up to optimize resources in the home country. International sales are sometimes dispersed using agency agreements or subsidiaries, but foreign marketing still relies completely on the domestic home base for marketing themes and strategies. Caterpillar Corporation and other heavy capital equipment manufacturers fall into this category of firm.

A **multinational** strategy concentrates financial management and control out of a central home base while decentralizing production, sales, and marketing operations to units in other countries. The products and services on sale in different countries are adapted to suit local market conditions. The organization becomes a far-flung confederation of production and marketing facilities operating in different countries. Many financial service firms, along with a host of manufacturers, such as Ford Motor Co. and Intel Corporation, fit this pattern.

Franchisers have the product created, designed, financed, and initially produced in the home country but rely heavily on foreign personnel for further production, marketing, and human resources. Food franchisers, such as McDonald's and Starbucks, fit this pattern. McDonald's created a new form of fast-food chain in the United States and continues to rely largely on the United States for inspiration of new products, strategic management, and financing. Nevertheless, local production of some items, local marketing, and local recruitment of personnel are required.

Transnational firms have no single national headquarters but instead have many regional headquarters and perhaps a world headquarters. In a **transnational** strategy, nearly all the value-adding activities are managed from a global perspective without reference to national borders, optimizing sources of supply and demand wherever they appear and taking advantage of any local competitive advantages. There is a strong central management core of decision making but considerable dispersal of power and financial muscle throughout the global divisions. Many *Fortune* 500 companies are transnational.

Nestlé S.A., the largest food and beverage company in the world, is one of the world's most globalized companies, with 308,000 employees at 413 facilities in 85 countries. Nestlé launched a $2.4 billion initiative to adopt a single set of business processes and systems for procurement, distribution, and sales management using SAP enterprise software. All of Nestlé's worldwide business units use the same processes and systems for making sales commitments, establishing factory production schedules, billing customers, compiling management reports, and reporting financial results. Nestlé has learned how to operate as a single unit on a global scale.

GLOBAL SYSTEM CONFIGURATION

Figure 3.5 depicts four types of systems configurations for global business organizations. *Centralized systems* are those in which systems development and operation occur totally at the domestic home base. *Duplicated systems* are those in which development occurs at the home base, but operations are handed over to autonomous units in foreign locations. *Decentralized systems* are those in which each foreign unit designs its own unique solutions and systems. *Networked systems* are those in which

SYSTEM CONFIGURATION	STRATEGY			
	Domestic Exporter	Multinational	Franchiser	Transnational
Centralized	X			
Duplicated			X	
Decentralized	x	X	x	
Networked		x		X

Figure 3.5 Global Business Organization and Systems Configurations. *The large Xs show the dominant patterns, and the small Xs show the emerging patterns. For instance, domestic exporters rely predominantly on centralized systems, but there is continual pressure and some development of decentralized systems in local marketing regions.*

systems development and operations occur in an integrated and coordinated fashion across all units.

As can be seen in Figure 3.5, domestic exporters tend to have highly centralized systems in which a single domestic systems development staff develops worldwide applications. Multinationals allow foreign units to devise their own systems solutions based on local needs with few, if any, applications in common with headquarters (the exceptions being financial reporting and some telecommunications applications). Franchisers typically develop a single system, usually at the home base, and then replicate it around the world. Each unit, no matter where it is located, has identical applications. Firms such as Nestlé, organized along transnational lines, use networked systems that span multiple countries, using powerful telecommunications networks and a shared management culture that crosses cultural barriers.

3-3 How do information systems help businesses compete using quality and design?

Quality has developed from a business buzzword into a serious goal for many companies. Quality is a form of differentiation. Companies with reputations for high quality, such as Lexus or Intel, can charge premium prices for their products and services. Information systems have a major contribution to make in this drive for quality. In the services industries in particular, superior information systems and services generally enable quality strategies.

WHAT IS QUALITY?

Quality can be defined from both producer and customer perspectives. From the perspective of the producer, quality signifies conformance to specifications or the absence of variation from those specifications. The specifications for a smartphone might include one that states the strength of the phone should not be weakened if the phone is dropped from a four-foot height onto a concrete floor.

A customer definition of quality is much broader. First, customers are concerned with the quality of the physical product—its durability, safety, ease of use, and installation. Second, customers are concerned with the quality of service, by which they mean the accuracy and truthfulness of advertising, responsiveness to warranties, and ongoing product support. Finally, customer concepts of quality include psychological aspects: the company's knowledge of its products, the courtesy and sensitivity of sales and support staff, and the reputation of the product. Today, as the quality movement in business progresses, the definition of quality is increasingly from the perspective of the customer.

Many companies have embraced the concept of **total quality management (TQM)**. TQM makes quality the responsibility of all people and functions within an organization. TQM holds that the achievement of quality control is an end in itself. Everyone is expected to contribute to the overall improvement of quality—the engineer who avoids design errors, the production worker who spots defects, the sales representative

who presents the product properly to potential customers, and even the secretary who avoids typing mistakes. TQM derives from quality management concepts that American quality experts such as W. Edwards Deming and Joseph Juran developed, but the Japanese popularized it.

Another quality concept that is widely implemented today is Six Sigma, which Amazon.com used to reduce errors in order fulfillment. **Six Sigma** is a specific measure of quality, representing 3.4 defects per million opportunities. Most companies cannot achieve this level of quality but use Six Sigma as a goal to implement a set of methodologies and techniques for improving quality and reducing costs. Studies have repeatedly shown that the earlier in the business cycle a problem is eliminated, the less it costs the company. Thus, quality improvements not only raise the level of product and service quality but can also lower costs.

HOW INFORMATION SYSTEMS IMPROVE QUALITY

Let's examine some of the ways companies face the challenge of improving quality to see how information systems can be part of the process.

Reduce Cycle Time and Simplify the Production Process

Studies have shown that one of the best ways to reduce quality problems is to reduce **cycle time**, which refers to the total elapsed time from the beginning of a process to its end. Shorter cycle times mean that problems are caught earlier in the process, often before the production of a defective product is completed, saving some of the hidden production costs. Finally, finding ways to reduce cycle time often means finding ways to simplify production steps. The fewer steps in a process, the less time and opportunity for an error to occur. Information systems help eliminate steps in a process and critical time delays.

1-800-Flowers, a multimillion-dollar company selling flowers over the web, used to be a much smaller company that had difficulty retaining its customers. It had poor service, inconsistent quality, and a cumbersome manual order-taking process. Telephone representatives had to write each order, obtain credit card approval, determine which participating florist was closest to the delivery location, select a floral arrangement, and forward the order to the florist. Each step in the manual process increased the chance of human error, and the whole process took at least half an hour. A new information system now downloads orders taken over the web to a central computer and electronically transmits them to local florists. Orders are more accurate and arrive at the florist within two minutes.

Benchmark

Companies achieve quality by using benchmarking to set standards for products, services, and other activities and then measuring performance against those standards. Companies may use external industry standards, standards other companies set, internally developed standards, or some combination of the three. L.L. Bean, the Freeport, Maine, clothing company, used benchmarking to achieve an order-shipping accuracy of 99.9 percent. Its old batch order fulfillment system could not handle the surging volume and variety of items to be shipped. After studying German and Scandinavian companies with leading-edge order fulfillment operations, L.L. Bean carefully redesigned its order fulfillment process and information systems so that orders could be processed as soon as they were received, and shipped within 24 hours.

Use Customer Demands to Improve Products and Services

Improving customer service, and making customer service the number-one priority, will improve the quality of the product itself. Delta Airlines decided to focus on its customers, installing a customer care system at its airport gates. For each flight, the airplane seating chart, reservations, check-in information, and boarding data are linked in a central database. Airline personnel can track which passengers are on

board regardless of where they checked in and use this information to help passengers reach their destination quickly, even if delays cause them to miss connecting flights.

Improve Design Quality and Precision

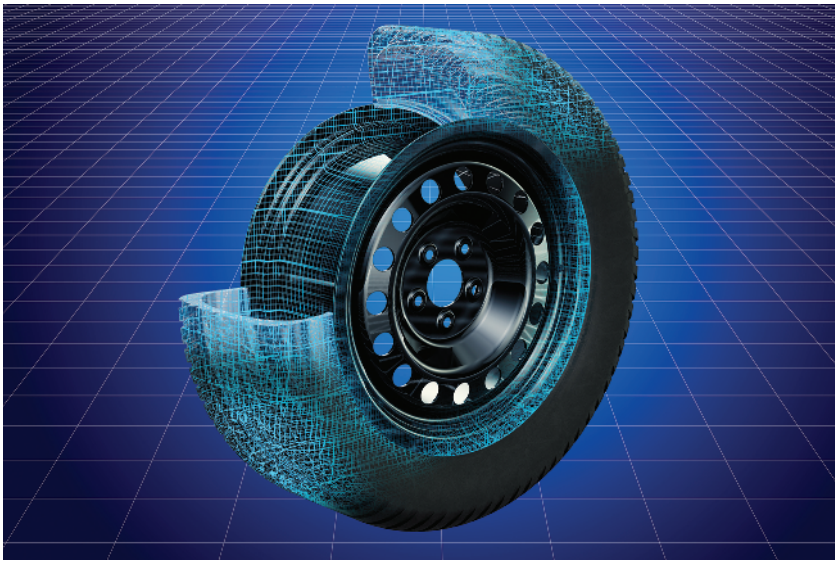
Computer-aided design software has made a major contribution to quality improvements in many companies, from producers of automobiles to producers of razor blades. A **computer-aided design (CAD) system** automates the creation and revision of designs, using computers and sophisticated graphics software. The software enables users to create a digital model of a part, a product, or a structure and make changes to the design on the computer without having to build physical prototypes.

For example, Ford Motor Company used a computer simulation that came up with the most efficient design possible for an engine cylinder. Engineers altered that design to account for manufacturing constraints and tested the revised design on the computer, using models with decades of data on material properties and engine performance. Ford then created the physical mold to make a real part that could be bolted onto an engine for further testing. The entire process took days instead of months and cost thousands of dollars instead of millions.

CAD systems can supply data for **3-D printing**, also known as additive manufacturing, which uses machines to make solid objects, layer by layer, from specifications in a digital file. Unlike traditional techniques, by which objects are cut or drilled from molds, resulting in some wasted materials, 3-D printing lets workers model an object on a computer and print it out with plastic, metal, or composite materials. 3-D printing is currently being used for prototyping, custom manufacturing, and fashioning items with small production runs. Today's 3-D printers can handle materials including plastic, titanium, and human cartilage and produce fully functional components for specialized applications, including batteries, transistors, prosthetic devices, and LEDs. 3-D printing services are now available on the web.

Improve Production Precision and Tighten Production Tolerances

For many products, quality can be enhanced by making the production process more precise, thereby decreasing the amount of variation from one part to another. CAD software often produces design specifications for tooling and manufacturing processes, saving additional time and money while producing a manufacturing process with far fewer problems. The user of this software can design a more precise production system, a system with tighter tolerances, than could ever be done manually.



Computer-aided design (CAD) systems improve the quality and precision of product design by performing much of the design and testing work on the computer. This is a 3-D CAD model of a car wheel.

3-4 What is the role of business process management (BPM) in enhancing competitiveness?

Technology alone is often not enough to make organizations more competitive, efficient, or quality-oriented. The organization itself needs to be changed to take advantage of the power of information technology. These changes may require minor adjustments in work activities, but, often, entire business processes will need to be redesigned. Business process management (BPM) addresses these needs.

WHAT IS BUSINESS PROCESS MANAGEMENT?

Business process management (BPM) is an approach to business that aims to improve business processes continuously. BPM uses a variety of tools and methodologies to understand existing processes, design new processes, and optimize those processes. BPM is never concluded because continuous improvement requires continual change. Companies practicing business process management need to go through the following steps.

1. **Identify processes for change:** One of the most important strategic decisions that a firm can make is not deciding how to use computers to improve business processes but, rather, understanding which business processes need improvement. When systems are used to strengthen the wrong business model or business processes, the business can become more efficient at doing what it should not do. As a result, the firm becomes vulnerable to competitors who may have discovered the right business model. Considerable time and cost may also be spent improving business processes that have little impact on overall firm performance and revenue. Managers need to determine which business processes are the most important and how improving these processes will help business performance.
2. **Analyze existing processes:** Existing business processes should be modeled and documented, noting inputs, outputs, resources, and the sequence of activities. The process design team identifies redundant steps, paper-intensive tasks, bottlenecks, and other inefficiencies.

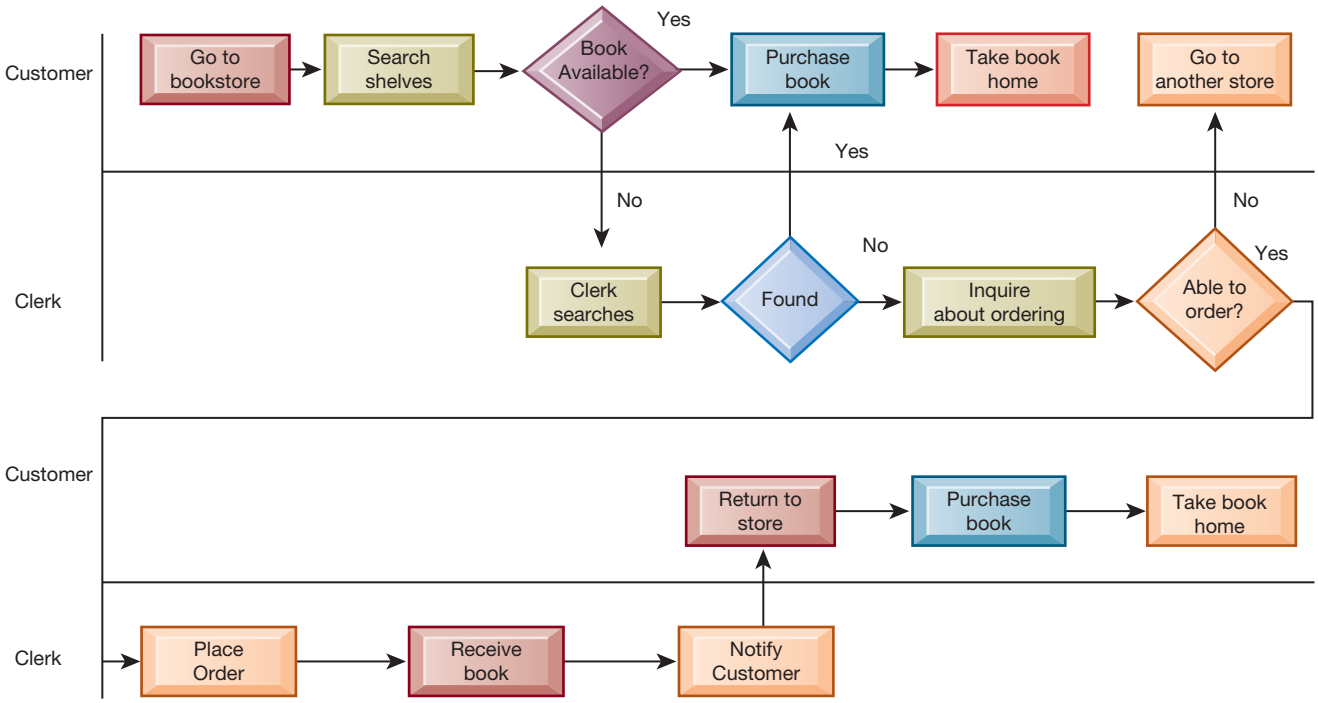


Figure 3.6
As-Is Business Process for Purchasing a Book from a Physical Bookstore.
Purchasing a book from a physical bookstore requires both the seller and the customer to perform many steps.

Figure 3.6 illustrates the as-is process for purchasing a book from a physical bookstore. A customer would visit a physical bookstore and search its shelves for a book. If he or she finds the book, that person takes it to the checkout counter and pays for it by credit card, cash, or check. If the customer cannot locate the book, he or she must ask a bookstore clerk to search the shelves or check the bookstore's inventory records to see whether it is in stock. If the clerk finds the book, the customer purchases it and leaves. If the book is not available locally, the clerk inquires about ordering it for the customer, either from the bookstore's warehouse or from the book's distributor or publisher. Once the ordered book arrives at the bookstore, a bookstore employee telephones the customer with this information. The customer would have to go to the bookstore again to pick up the book and pay for it. If the bookstore cannot order the book for the customer, the customer would have to try another bookstore. You can see that this process has many steps and might require the customer to make multiple trips to the bookstore.

3. **Design the new process:** Once the existing process is mapped and measured in terms of time and cost, the process design team will try to improve the process by designing a new one. A new, streamlined to-be process will be documented and modeled for comparison with the old process.

   Figure 3.7 illustrates how the book purchasing process can be redesigned by taking advantage of the Internet. The customer accesses an online bookstore over the Internet from his or her computer. He or she searches the bookstore's online catalog for the book he or she wants. If the book is available, the customer orders the book online, supplying credit card and shipping address information, and the book is delivered to the customer's home. If the online bookstore does not carry the book, the customer selects another online bookstore and searches for the book again. This process has far fewer steps than that for purchasing the book in a physical bookstore, requires much less effort from the customer, and requires fewer sales staff for customer service. The new process is therefore much more efficient and timesaving.

   The new process design needs to be justified by showing how much it reduces time and cost or enhances customer service and value. Management first measures the time and cost of the existing process as a baseline. In our example, the time required for purchasing a book from a physical bookstore might range from 15 minutes (if the customer immediately finds what he or she wants) to 30 minutes if the book is in stock but sales staff has to locate it. If the book has to be ordered from another source, the process might take one or two weeks and another trip to

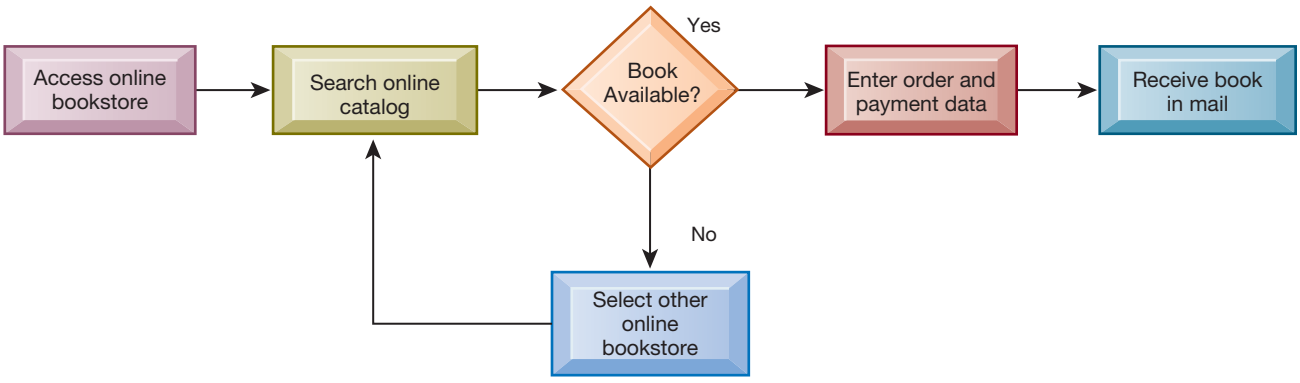


Figure 3.7
Redesigned Process for Purchasing a Book Online
Using Internet technology makes it possible to redesign the process for purchasing a book so that it only has a few steps and consumes fewer resources.

the bookstore for the customer. If the customer lives far away from the bookstore, the time to travel to the bookstore would have to be factored in. The bookstore will have to pay the costs for maintaining a physical store and keeping the book in stock, for sales staff on site, and for shipment costs if the book has to be obtained from another location.

The new process for purchasing a book online might only take several minutes, although the customer might have to wait several days or weeks to receive the book in the mail and will have to pay a small shipping charge. Nevertheless, the customer saves time and money by not having to travel to the bookstore or make additional visits to pick up the book. Booksellers' costs are lower because they do not have to pay for a physical store location or for local inventory.

4. **Implement the new process:** After the new process has been thoroughly modeled and analyzed, it must be translated into a new set of procedures and work rules. New information systems or enhancements to existing systems may have to be implemented to support the redesigned process. The new process and supporting systems are rolled out into the business organization. As the business starts using this process, problems are uncovered and addressed. Employees working with the process may recommend improvements.
5. **Continuous measurement:** After a process has been implemented and optimized, it needs to be measured continually. Why? Processes may deteriorate over time as employees fall back on old methods, or they may lose their effectiveness if the business experiences other changes.

Many software tools are available to facilitate various aspects of BPM. These tools help businesses identify and document processes requiring improvement, create models of improved processes, capture and enforce business rules for performing processes, and integrate existing systems to support new or redesigned processes. BPM software tools also provide analytics for verifying that process performance has been improved and for measuring the impact of process changes on key business performance indicators.

The Interactive Session on Organizations illustrates how a company can benefit from business process management. As you read this case, try to find out how strategic application of information systems improved Hong Kong Disneyland's business performance

Business Process Reengineering

Many business process improvements are incremental and ongoing, but occasionally, more radical change is required. Our example of a physical bookstore redesigning the book purchasing process so that it can be carried out online is an example of this type of radical, far-reaching change. This radical rethinking and redesign of business processes is called **business process reengineering (BPR)**.

When properly implemented, BPR can lead to dramatic gains in productivity and efficiency, even changing the way the business is run. In some instances, it drives a paradigm shift that transforms the nature of the business itself. This actually happened in book retailing when Amazon challenged traditional physical bookstores with its online retail model. By radically rethinking the way a book can be purchased and sold, Amazon and other online bookstores have achieved remarkable efficiencies, cost reductions, and a whole new way of doing business.

BPM poses challenges. Executives report that the most significant barrier to successful business process change is organizational culture. Employees do not like unfamiliar routines and often resist change. This is especially true of business process reengineering projects because the organizational changes are so far-reaching. Managing change is neither simple nor intuitive, and companies committed to extensive process improvement need a good change management strategy (see Chapter 12).

Strategic Information Systems at Hong Kong Disneyland

Spread across 68 acres on Lantau Island, Hong Kong Disneyland is the largest theme park in Hong Kong. Though the park now attracts more than 7 million visitors a year, its current success is a remarkable example of a turnaround achieved through the strategic application of information systems. When it opened in 2005, it failed to meet its target of 5.6 million visitors the first year, and that figure dropped by 20 percent the second year against fierce competition from other tourist spots and theme parks. Hong Kong Disneyland decided to re-engineer its core operations by realigning its information systems.

Every operation was studied exhaustively to reposition information systems as a strategic asset. Online ticketing systems and point-of-sales (POS) terminals recorded visitors' email addresses so that notifications could be sent to them whenever a new ride or a new character was introduced. This also enabled the park's management to identify regular visitors and send them special offers, such as a 2-for-1 pass. In addition, text messages were sent to regular visitors to inform them about special events. These measures worked, and visitors began to show up in great numbers again. The long queues, however, were their own problem. The management turned again to the information it had gathered from visitors' emails, sending text messages to direct visitors toward other, less crowded sections of the park.

One of Disneyland's innovations in information collection is the MagicBand, a wristband provided to all the visitors of Disneyland. Based on RFID technology and powered by a battery that can last two years, a MagicBand can store all the visitors' vital information, including hotel keys, credit cards, and tickets. Data from the credit card tells Disneyland which products are being purchased, enabling it to manage inventories in real time. Visitors must swipe their MagicBands to get on a ride, and this tells Disneyland the exact location of its visitors, how many rides each one has taken, and what the waiting times of the rides are, which again allows it to direct visitors to those with low waiting times. The MagicBand is more than just about directing visitor traffic, however. Disneyland wants to give its visitors a unique experience, so it mines information that will help it decide which characters and themes to promote in the park. Much of this information is sourced at the Disney Studio, where cameras capture the facial movements of audiences as they watch Disney movies. Disneyland then predicts which character or theme is most appealing and promotes the most liked theme or character in the park to match the collective tastes of its customers.

Another strategic application of information systems is the management of Hong Kong Disneyland's suppliers, who play a crucial role in running the eateries and souvenir shops. To ensure close coordination with them, a uniform interface was developed to share real-time data—as soon as a product is sold or an eatable is ordered, the suppliers know about it. This strategy has not only played a vital role in managing inventory but has also reduced waste of perishable items.

Employees are a strategic asset for any organization, and Disneyland understands this well. A specially designed staff engagement app called CastApp connects every employee, anywhere at the park. The app is based on Web Content Accessibility Guidelines (WCAG) 2.0, so the content can be easily read by employees with vision problems. CastApp allows Disneyland's management to share the daily rooster with employees, and the latter can keep tabs on any activity taking place at the park. Moreover, there is a constant need to train the employees as new characters and themes are introduced, and CastApp helps employees enroll in the different training modules that are offered regularly at Disneyland..

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CASE STUDY QUESTIONS

1. Discuss the various strategies adopted by Hong Kong Disneyland to attract visitors.
2. What problem did Disneyland face as it began to draw more visitors to the theme park? How was it overcome?
3. How does Hong Kong Disneyland manage its suppliers?
4. How does Hong Kong Disneyland determine which theme or character should be introduced in the park?

Case contributed by Sahil Raj, Punjabi University

3-5 How will MIS help my career?

Here is how Chapter 3 and this book can help you find a job as an entry-level business development representative.

THE COMPANY

A+ Superior Data Quality, a fast-growing London-based company providing software and services to help large companies manage their data and data quality, is looking for an entry-level business development representative. The company's data quality and data management tools and services help firms correct, standardize, and enhance customer data by capturing accurate address, email, and phone information; removing duplicate data in corporate systems; analyzing data to discover relationships; restructuring and standardizing data; and monitoring data to ensure ongoing quality control and standardization. The company has 12,000 clients worldwide, 450 employees, and offices throughout the United States, Europe, and Asia.

POSITION DESCRIPTION

The business development representative will help the company's sales team meet aggressive growth targets. The company provides classroom and on-the-job training on how to communicate with prospects and customers, how to identify appropriate markets for its solutions, how to write a sales plan, and how to use tools such as Salesforce.com. Job responsibilities include:

- Researching targeted accounts to generate potential business opportunities.
- Supporting customer acquisition and sales strategies.
- Implementing tactics for successful execution of marketing campaigns.
- Building and managing a pipeline of sales leads through prospecting and qualifying marketing-generated leads.
- Reporting on the success of campaigns and lead generation activities.

JOB REQUIREMENTS

- Bachelor's degree
- Strong interest in a sales career
- Exceptional communication, interpersonal, analytical, and problem-solving skills
- Ability to multitask in fast-paced environment

INTERVIEW QUESTIONS

1. What do you know about data quality and data management? Do you have any work experience in these areas? Have you ever encountered a data quality problem? If so, can you describe how the problem was solved?
2. Have you ever worked with Salesforce.com? What do you know about it? How have you used the software?
3. Can you give us an example of a marketing or sales-related problem or other business problem that you helped solve? Do you have any examples of your writing and analysis work?
4. Have you had much face-to-face contact with customers? Can you describe what work you did with customers?

AUTHOR TIPS

1. Review this chapter's discussion of IT and business strategy and also Chapter 6 on data management, including the section on data quality.
2. Use the web to find out more about tools and services for promoting data quality and data management and research the company's specific offerings in this area.
3. Review the company's LinkedIn profile and posts in addition to other social media channels. Are there consistent themes across these channels the company seems to be focused on? Be prepared to show that you understand the kinds of business challenges and opportunities facing this company.
4. Learn what you can about Salesforce.com related to the responsibilities outlined for this job. Inquire about exactly how you would be using Salesforce.com in your work.
5. Consider inquiring what kinds of problems with customers' data quality you would most likely encounter on the job.

Review Summary

3-1 **How do Porter's competitive forces model, the value chain model, synergies, core competencies, and network-based strategies help companies use information systems for competitive advantage?** In Porter's competitive forces model, the strategic position of the firm, and its strategies, are determined by competition with its traditional direct competitors. They are also greatly affected by new market entrants, substitute products and services, suppliers, and customers. Information systems help companies compete by maintaining low costs, differentiating products or services, focusing on market niche, strengthening ties with customers and suppliers, and increasing barriers to market entry with high levels of operational excellence. Information systems are most successful when the technology is aligned with business objectives.

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

Information systems achieve additional efficiencies or enhanced services by tying together the operations of disparate business units. Information systems help businesses use their core competencies by promoting the sharing of knowledge across business units. Information systems facilitate business models based on large networks

of users or subscribers that take advantage of network economics. A virtual company strategy uses networks to link to other firms so that a company can use the capabilities of other companies to build, market, and distribute products and services. Firms can also redefine their businesses to become niche players or keystone firms in platform-based business ecosystems where multiple industries work together to deliver value to the customer. Disruptive technologies provide strategic opportunities, although first movers do not necessarily obtain long-term benefit.

3-2 **How do information systems help businesses compete globally?** Information systems and the Internet help companies operate internationally by facilitating coordination of geographically dispersed units of the company and communication with faraway customers and suppliers. There are four main strategies for organizing businesses internationally: domestic exporter, multinational, franchiser, and transnational.

3-3 **How do information systems help businesses compete using quality and design?** Information systems can enhance quality by simplifying a product or service, facilitating benchmarking, reducing product development cycle time, and increasing quality and precision in design and production.

3-4 **What is the role of business process management (BPM) in enhancing competitiveness?** Organizations often have to change their business processes to execute their business strategies successfully. If these business processes use technology, they can be redesigned to make the technology more effective. BPM combines and streamlines the steps in a business process to eliminate repetitive and redundant work and to achieve dramatic improvements in quality, service, and speed. BPM is most effective when it is used to strengthen a good business model and when it strengthens processes that have a major impact on firm performance.

Key Terms

3-D printing, 124
Benchmarking, 114
Best practices, 115
Business ecosystem, 118
Business process management (BPM), 125
Business process reengineering (BPR), 127
Competitive forces model, 107
Computer-aided design (CAD) system, 124
Core competency, 117
Cycle time, 123
Disruptive technologies, 119
Domestic exporter, 121
Efficient customer response system, 110
Franchiser, 121
Mass customization, 110
Multinational, 121
Network economics, 118
Platforms, 118
Primary activities, 114
Quality, 122
Six Sigma, 123
Support activities, 114
Switching costs, 111
Total quality management (TQM), 122
Transnational, 121
Value chain model, 112
Value web, 116
Virtual company, 117

Review Questions

3-1 How do Porter's competitive forces model, the value chain model, synergies, core competencies, and network-based strategies help companies use information systems for competitive advantage?

- Define Porter's competitive forces model and explain how it works.
- List and describe four competitive strategies enabled by information systems that firms can pursue.
- Describe how information systems can support each of these competitive strategies and give examples.
- Explain why aligning IT with business objectives is essential for strategic use of systems.

- Define and describe the value chain model.
- Explain how the value chain model can be used to identify opportunities for information systems.
- Define the value web and show how it is related to the value chain.
- Describe how the Internet has changed competitive forces and competitive advantage.
- Explain how information systems promote synergies and core competencies that enhance competitive advantage.
- Explain how businesses benefit by using network economics.
- Define and describe a virtual company and the benefits of pursuing a virtual company strategy.
- Define and describe a business ecosystem and how it can provide competitive advantage.
- Explain how disruptive technologies create strategic opportunities.

3-2 How do information systems help businesses compete globally?

- Describe how globalization has increased opportunities for businesses.
- List and describe the four main ways of organizing a business internationally and the types of systems configuration for global business organizations.

3-3 How do information systems help businesses compete using quality and design?

- Define TQM and explain who has the associated responsibilities within an organization.
- Describe the purpose and the value of benchmarking.

3-4 What is the role of business process management (BPM) in enhancing competitiveness?

- Define BPM and explain how it helps firms become more competitive.
- Explain how a business can go about identifying processes for change.
- Explain the value and purpose of tools provided by software companies in relation to BPM.

MyLab MIS™

To complete the problems with **MyLab MIS**, go to EOC Discussion Questions in MyLab MIS.

Discussion Questions

3-5 MyLab MIS It has been said that there is no such thing as a sustainable competitive advantage. Do you agree? Why or why not?

3-6 MyLab MIS What are some of the issues to consider in determining whether the Internet would provide your business with a competitive advantage?

3-7 MyLab MIS It has been said that the advantage that leading-edge retailers such as Walmart have over competitors isn't technology—it's their management. Do you agree? Why or why not?

Hands-On MIS Projects

The projects in this section give you hands-on experience identifying information systems to support a business strategy and solve a customer retention problem, using a database to improve decision making about business strategy, and using web tools to configure and price an automobile. Visit **MyLab MIS** to access this chapter's Hands-On MIS Projects.

MANAGEMENT DECISION PROBLEMS

3-8 Dolce is an Italian company selling high-end turnkey kitchen designs—designer stoves, refrigerators, microwave ovens, and other appliances as well as worktops and kitchen cabinets. To compete better globally, Dolce has decided to let customers design their own kitchens through a web-based interface. The client needs to insert the exact measurements and make requests for appliances and furniture materials, and then the order will go to the Italian factory, where the kitchen's parts will be assembled, packaged, and sent to the client. How can Dolce take advantage of information systems to succeed with this concept?

3-9 Tracfone Wireless is a leading prepaid wireless service in the United States, Puerto Rico, and the US Virgin Islands. Despite its rock-bottom rates for mobile voice and data services, Tracfone's growth has been slowing. Management wants to know why this is happening and what can be done to attract more customers. Are customers rejecting Tracfone because of poor customer service, uneven network coverage, or low-cost wireless service charges offered by competitors such as Sprint and T-Mobile? How can the company use information systems to help find the answer? What management decisions could be made using information from these systems?

IMPROVING DECISION MAKING: USING A DATABASE TO CLARIFY BUSINESS STRATEGY

Software skills: Database querying and reporting; database design
Business skills: Reservation systems; customer analysis

3-10 In this exercise, you'll use database software to analyze the reservation transactions for a hotel and use that information to fine-tune the hotel's business strategy and marketing activities.

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

The owners currently use a manual reservation and bookkeeping system, which cannot provide management with immediate data about the hotel's daily operations and revenue. Use the database to develop reports on average length of stay per room type, average visitors per room type, base revenue per room (i.e., length of visit multiplied by the daily rate) during a specified period of time, and strongest customer base. After answering these questions, write a brief report about the Inn's current business situation and suggest future strategies.

IMPROVING DECISION MAKING: USING WEB TOOLS TO CONFIGURE AND PRICE AN AUTOMOBILE

Software skills: Internet-based software
Business skills: Researching product information and pricing

3-11 In this exercise, you will use software at car-selling websites to find product information about a car of your choice and use that information to make an important purchase decision. You will also evaluate two of these sites as selling tools.

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

COLLABORATION AND TEAMWORK PROJECT

Identifying Opportunities for Strategic Information Systems

3-12 With your team of three or four students, select a company described in the *Wall Street Journal, Fortune, Forbes*, or another business publication. Visit the company's website to find additional information about that company and to see how the firm is using the web. On the basis of this information, analyze the business. Include a description of the organization's features, such as important business processes, culture, structure, and environment, as well as its business strategy. Suggest strategic information systems appropriate for that particular business, including those based on Internet technology, if appropriate. If possible, use Google Docs and Google Drive or Google Sites to brainstorm, organize, and develop a presentation of your findings for the class.

BUSINESS PROBLEM-SOLVING CASE

OFFLINE, ONLINE, AND BACK: THE EVOLUTION OF THE UK GROCERY MARKET

The UK grocery market is predicted to grow by 12.5 percent through 2024, and according to the food and grocery research organization IGD, it is expected to reach a value of £217.7 billion. The main grocery stores operating in Great Britain are Tesco, which, as of September 2019, had a market share of 26.9 percent; Sainsbury, 15.3 percent; ASDA, 15.1 percent; and Morrisons, 9.9 percent. Together, they cover over 65 percent of the grocery market and are considered the "Big Four" in the United Kingdom. Tesco reached its peak in 2007, when it held 31.1 percent of the UK grocery market share. Worldwide, the company operates around 7,000 stores across Europe and Asia.

In the United Kingdom, Tesco focused on implementing a strategy that enabled the company to offer the lowest costs and achieve cost leadership. This drew price-sensitive customers away from its competitors and increased its market share. Tesco adopted the following strategies to maintain this cost leadership: (1) high utilization of assets through production of large outputs and spreading fixed costs over large quantities, (2) minimal direct and indirect costs in the production and distribution stages, and (3) strict control over the supply chain to ensure low costs. This strategy was viable for Tesco; as a big company, it could take advantage of economies of scale in the market.

However, due to the popularity of discount supermarkets such as Aldi and Lidl, Tesco has recently been struggling to maintain its cost leadership. Consumer behavior has changed in the United Kingdom due to economic recession and inflation, leading customers to shift to budget supermarkets for their groceries purchases. Over the last several years, Tesco's market share has fallen slightly; by contrast, Aldi and Lidl have continuously been increasing their market share over the last few years. In September 2019, Aldi was the fifth largest grocery chain in the United Kingdom with a market share of 8.1 percent.

Besides the physical supermarkets, Tesco initially operated two online platforms: Tesco.com for grocery home deliveries and Tesco Direct for household goods and clothing. However, in May 2018, Tesco announced Tesco Direct's closure in an unexpected move. Tesco Direct had been launched in 2006, and it had cost the company between £25 and £30 million. According to Charles Wilson, who recently took over as CEO of Tesco's UK chain, closing one of the websites would help them to focus their investment in one platform to offer better service and more products to customers. Although the closure cost 500 jobs, it was not a huge surprise, considering that Tesco had, by its own admission, faced challenges in making it profitable. Tesco's attempt to compete with huge online retailers such as Amazon and Argos had failed because it had been unable to make profits after covering the costs of marketing and order fulfillment.

Besides this setback, Tesco must also contend with the threat from discount supermarkets. By June 2019, Aldi had opened 830 stores in the United Kingdom since 1990, when its first store was launched. Aldi reported £11.3bn in revenue for 2018, an 11 percent increase over the previous year. Similarly, Lidl reached a total of 760 stores by June 2019 and also plans to continue to grow during the next five years. Customers were skeptical at the beginning, but once they saw the low-price products, they switched their buying preferences to these discount supermarkets.

In addition to gaining a larger market share every year, Aldi and Lidl are contributing to the UK economy in different ways. According to some analysis, Aldi has contributed over £8.5 billion to the GDP of the United Kingdom through job creation, taxes, and capital investment. Predictions also show that Aldi is expected to provide a £2.2 billion boost for British businesses. Customers who switched from the Big Four supermarkets save over £2.2 billion annually by shopping at Aldi. Aldi UK's most successful year was 2017, when it generated £10 billion in annual sales for the first time.

Experts argue that the main reasons these discount supermarkets have been successful is rising inflation and the stagnation in wages. The services offered by Aldi are similar to those that the "Big Four" provide their customers, but Aldi has the advantage of lower prices and is still considered a discounter, which is especially attractive for customers during inflation. Surveys show that Aldi also gets very good ratings in customer satisfaction.

Ever since the two discount supermarkets came to the United Kingdom from Germany, they have forced the big grocery stores to rethink their approach. Thanks to their low-price grocery strategy, Aldi and Lidl have changed the UK supermarket industry for some time to come. Big supermarkets like

Tesco and Sainsbury already offer online grocery shopping, but they faced difficulties making a profit from their e-commerce operations. With Aldi and Lidl's entry into this market, these challenges will only increase.

In the beginning of 2016, Aldi opened its first online store for the UK market. The discount retailer made its opening move by investing £35 million to launch an online website for selling wine, which was followed by non-food "special buys." According to Kantar Retail analyst Bryan Roberts, this move is a smart way of reaching customers who don't have access to an Aldi.

Lidl founded the Lidl Digital Logistics, and experts expect this supermarket to enter the grocery delivery market too. So far, Lidl has sold wine and some non-food items online in parts of Europe, but not groceries. Lidl's approach to entering the digital market is quite innovative: recently, they launched a chatbot designed to help customers in their choice of wine based on what they are eating.

The public love for the discounters signifies a major threat for big supermarkets looking to keep their market share, both on- and offline. To take the fight to Aldi and Lidl, and having seen Aldi and Lidl's success in gaining market share, Tesco announced plans in 2018 to open a discount chain of 60 stores all over the United Kingdom, thus entering the fast-growing discount market. However, it has since scaled back those plans and even closed some of those stores. History has shown that attempts by big supermarkets to launch discount brands have largely failed.

With Aldi and Lidl trying to enter the e-commerce industry and Tesco trying to defeat them by entering the discount market, the war between the big and budget supermarkets has taken some interesting turns, especially since food shopping has undergone changes too: more people prefer to buy food on a daily basis and more locally, and a high number of them prefer to buy their food online. A number of European retailers have responded to this by opening smaller stores in nearby locations, launching online stores, and testing other new models for shopping.

Tesco has been in the business of selling on the Internet for a long time now; in 1996, it became the first supermarket to launch online shopping. There are several ways Tesco is using information technology to its advantage. For instance, in 2011, while Tesco's domestic United Kingdom sales were dropping, it was a huge success in South Korea, its largest market outside the United Kingdom, as a result of its ability to adapt to local customer needs. As South Koreans are among the people with the longest working hours worldwide, Tesco introduced "virtual stores" with its Homeplus brand in the country. It displayed these virtual stores in subways and bus stations, where people could scan products' barcodes using their smartphones and purchase them online. These products were then delivered to them right after they returned home, thus saving time and effort for the consumers.

History has shown that the grocery industry needs to adapt to consumer demands and lifestyles continuously. The United Kingdom and South Korea are a study in contrasts. While people in the United Kingdom switched from domestic big supermarkets to budget supermarkets, the opposite happened in South Korea thanks to Homeplus, which turned Tesco into the country's second largest grocery retailer. Customers in the United Kingdom are price-sensitive due to economic recession and inflation, whereas customers in South Korea have embraced the technology made available to them to suit their time-sensitive lifestyle.

E-commerce is a huge opportunity for discounters, but what will happen to the grocery sector if Aldi and Lidl decide to offer their full range of products online? Perhaps more importantly, can they gain a bigger share of the grocery market at the expense of the Big Four in United Kingdom? Some experts believe that this strategy is untenable. According to retail consultant Graham Soult, the discount supermarkets' initiative of entering the online shopping market runs the same risks and problems that other supermarkets have faced. He believes that the uniqueness of these supermarkets lies in their simplicity and low cost, which they might be putting at risk when they start to sell food and groceries online. Simply put, the complexity of the e-commerce industry might not fit their low-cost business model.

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CASE STUDY QUESTIONS

3-13 Analyze the cost leadership strategy of Tesco based on Porter's Competitive Forces Model. Why would it be a smart move to close one of its online shopping sites?

3-14 Do you think Aldi and Lidl's strategy of venturing into e-commerce is a good idea?

3-15 Comment on Tesco's strategy of opening a discount chain. Do you think it could recover Tesco's former market position? Explain your answer.

3-16 How much potential do you see for virtual stores (like the ones Tesco introduced in South Korea) in the United Kingdom?

Case contributed by Bernd Schenk

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