Chapter 1

Introduction

Chapter Outline

What You Will Learn in This Chapter

- How can MIS help you in your job?
- What is MIS?
- Why is information technology important? Why do all business majors need to study it?
- How important is the Internet in retail sales?
- Do you have too much technology?
- Do you know what a manager does?
- Do you know what a successful manager will do in the future?
- How is business changing? What will managers need to know in the future?
- Does technology alone improve a business?
- How do you break businesses into smaller pieces to analyze them?
- Why are strategic decisions so difficult?
- How do you begin searching for competitive advantage?

McDonald's

What do customers want? McDonald's Corporation has sold billions of hamburgers. Beginning in 1955 with a single drive-in in Des Plaines, Illinois, McDonald's has grown to today's system of more than 25,000 restaurants across 115 countries. As a brand, McDonald's is synonymous with a quality product at a reasonable price. Equally important, McDonald's markets itself as more than a place to get a hamburger. Ronald McDonald, Happy Meals, the clean restaurants, and each new product or promotional theme add to the fun that brings more than 40 million customers of all ages to its restaurants around the world each day.Eighty percent of worldwide McDonald's are franchiseyd. Each restaurant must meet strict requirements to make it the same as all others. This ensures that each time you drive or walk into a McDonald's, no matter where you are, the Big Mac that you order will always be the same taste, size, weight, and quality. It will also be competitively priced.

Eighty percent of worldwide McDonald's are franchised. Each restaurant must meet strict requirements to make it the same as all others. This ensures that each time you drive or walk into a McDonald's, no matter where you are, the Big Mac that you order will always be the same taste, size, weight, and quality. It will also be competitively priced.

Legal contracts, quality standards, and performance specifications direct the individual restaurants in the effort to keep all the food orders the same. What most individuals do not think about when they walk or drive into McDonald's is that McDonald's management information system (MIS) plays a critical role in ensuring the quality and consistency of each sandwich. McDonald's Corporation maintains a strict requirement that food be fresh and not stored more than a limited amount of time. MIS applications direct managers in the management of employees and the ordering and tracking of hamburgers, buns, potatoes, and soft drinks.

Competition is fierce in the fast food industry. The top chains have been struggling over the last several years to find a way to attract new customers. McDonald's experimented with changing menus. It altered its in-store system to focus on the "Made for You" campaign. Concerns about healthy food have led the company to try new foods and new ways of cooking. Following in the footsteps of Starbucks, McDonald's is offering wireless Internet access to customers for a fee. But is that what McDonald's customers really want? Will you go to McDonald's, pay money for a connection to the Internet, and then hang around to buy more food?

Introduction

How can MIS help you in your job? This is the ultimate question that you must continually ask and answer as you pursue a management career. This book explores many variations of this question and some useful answers. Information technology offers two main features to managers: (1) productivity and (2) innovation.

Productivity is the ability to accomplish more with fewer resources; and technology is often used to reduce costs. On a personal level, you are probably familiar with the basic personal tools such as a word processor, e-mail, spreadsheet, and Internet searches. All of these technologies improve your individual productivity.

Trends

Economies, businesses, people, and societies all change over time. A century ago, people were farmers and laborers. Most businesses were small. Technologies changed and people moved to cities and manufacturing jobs. Technology changed again, and the importance of the service sector grew. Although digital computers were invented in the early 1940s, it was not until the 1960s and 1970s that they became affordable for most businesses. At first, most companies used information technology to solve easy problems: transaction processing. Before computers, companies needed hundreds of bookkeepers in the back office tracking sales, updating ledgers, and summarizing data by hand. As hardware prices dropped in the 1980s and 1990s, businesses integrated personal computers into management. Networks—and today, the Internet—made it easier to share data and communicate. Information technology not only changes jobs, but also changes the way companies are organized. If you want a job in business, you need to know how to use these technologies to become a better manager and to improve the business. Remember that technology can perform amazing tasks. Businesses no longer need people to perform many of the menial middle-management tasks. Instead, businesses need managers who can think, adapt, and creatively find new solutions.

In the business world, these tools have largely eliminated the personal assistant, reducing costs and improving the response time. But, MIS goes way beyond these basic tools and the individual. As you will see, several technologies exist to help teams and the entire organization improve productivity.

Innovation is the creation of new things—new services and products, new markets, new business methods, and even new industries. Instead of cutting costs, information technology is used to open up new sources of revenue for businesses. Think about companies like Google (and the firms it bought), Amazon, and Match.com. These companies used information technology to create new ways to make money. Although less radical, many existing firms have found new ways to expand markets and make money with technology.

Innovation is sexier and more fun, but finding innovative ideas is considerably harder than using technology to increase productivity and reduce costs. These issues are part of the challenge of business strategy. Leaders and managers need to choose how their organization will view technology. Innovative uses require creativity and cost money, but can lead to gains against the competition.

As a manager, how can you use information technology to improve your business, increase sales, and gain an edge on your competitors? Keep in mind that technology changes rapidly. How do you know what tools to buy? Is it worth the money and risk to buy the latest technology? Can you rebuild your company to use the technologies? What do the customers want and how will they respond to technology? These are questions that managers face every day. The questions are challenging and the answers are hard to find. This book lays out a framework for analyzing your business problems and evaluating technology solutions.

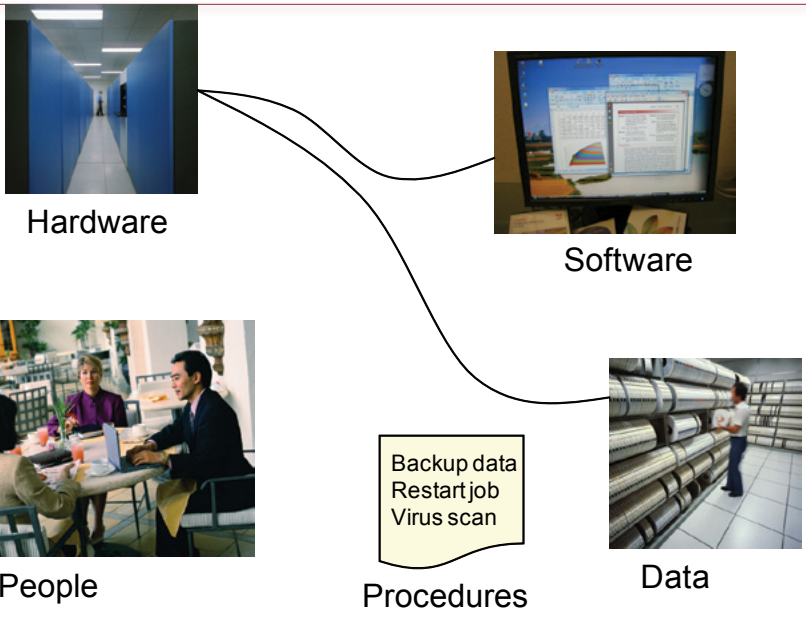


Figure 1.1

MIS Components. Information technology consists of the hardware and software, which includes networks. Information systems exist to process data. It takes people and procedures to create and run an information system. Information systems need to support users to help them make decisions.

The Scope of MIS

What is MIS? You probably have some experience with using computers and various software packages. Yet computers are only one component of a **management information system (MIS)**. As shown in Figure 1.1, an MIS consists of five related components: hardware, software (applications), people, procedures, and collections of data. More importantly, an MIS is designed to solve problems for the entire business. The term **information technology (IT)** represents the various types of hardware and software used in an information system, including computers and networking equipment.

The physical equipment used in computing is called **hardware**. The set of instructions that controls the hardware is known as **software**. In the early days of computers, the **people** directly involved in MIS tended to be programmers, design analysts, and a few external users. Today, almost everyone in the firm is involved with the information system, but some specialized MIS employees are needed to create and manage the information systems. **Procedures** are instructions that help people use the systems. They include items such as user manuals, documentation, and procedures to ensure that backups are made regularly. **Databases** are collections of related data that can be retrieved easily and processed by the computers. As you will see in the cases throughout the book, all of these components are vital to creating an effective information system.

So what is information? One way to answer that question is to examine the use of information technology on three levels: (1) data management, (2) information

Reality Bytes: Data, Information, Knowledge, and Wisdom

Consider the case of a retail store that is trying to increase sales. Some of the data available includes sales levels for the last 36 months, advertising expenses, and customer comments from surveys. By itself, this data may be interesting, but it must be organized and analyzed to be useful in making a decision. For example, a manager might use economic and marketing models to forecast patterns and determine relationships among various advertising expenses and sales. The resulting information (presented in equations, charts, and tables) would clarify relationships among the data and would be used to decide how to proceed.

It requires knowledge to determine how to analyze data and make decisions. Education and experience create knowledge in humans. A manager learns which data to collect, the proper models to apply, and ways to analyze results for making better decisions. In some cases, this knowledge can be transferred to specialized computer programs (expert systems).

systems, and (3) knowledge bases. **Data** consists of factual elements (or opinions or comments) that describe some object or event. Following the comments by Max Hopper (an early IT visionary at American Airlines) Data can be thought of as raw numbers, text, images, or even video. Data management systems focus on data collection and providing basic reports. **Information** represents data that has been processed, organized, and integrated to provide insight. Information systems are designed to help managers analyze data and make decisions. From a decision maker's standpoint, the challenge is that you might not know ahead of time which information you need, so it is hard to determine what data you need to collect. **Knowledge** represents a higher level of understanding, including rules, patterns, and decisions. Knowledge-based systems are built to automatically analyze data, identify patterns, and recommend decisions. Humans are also capable of **wisdom**, where they put knowledge, experience, and analytical skills to work to create new knowledge and adapt to changing situations. To date no computer system has attained the properties of wisdom.

Information systems continue to change over time. Computer hardware has advanced rapidly for several decades. As you will see in Chapter 2, these changes have enabled computers to handle increasingly complex data at faster speeds and lower prices. Similar improvements in data storage and transmission (networks) have opened up new options and methods of doing business. This increasing penetration of technology in business continues to cause changes in how companies operate. But, someone has to be in charge of the technology, evaluate the options, and keep everything running. The role of the people managing the information systems cannot be overemphasized. Many good careers exist in MIS and they are explored in Chapters 12 and 13. Most of them require business knowledge and skills—you do not need to be a "techie" or "geek"—and the pay has been relatively good, so as you read the chapters, try picturing yourself in one of these roles.

The Importance of Information Technology

Why is information technology important? Why do all business majors need to study it? Productivity is the bottom-line issue in informa-

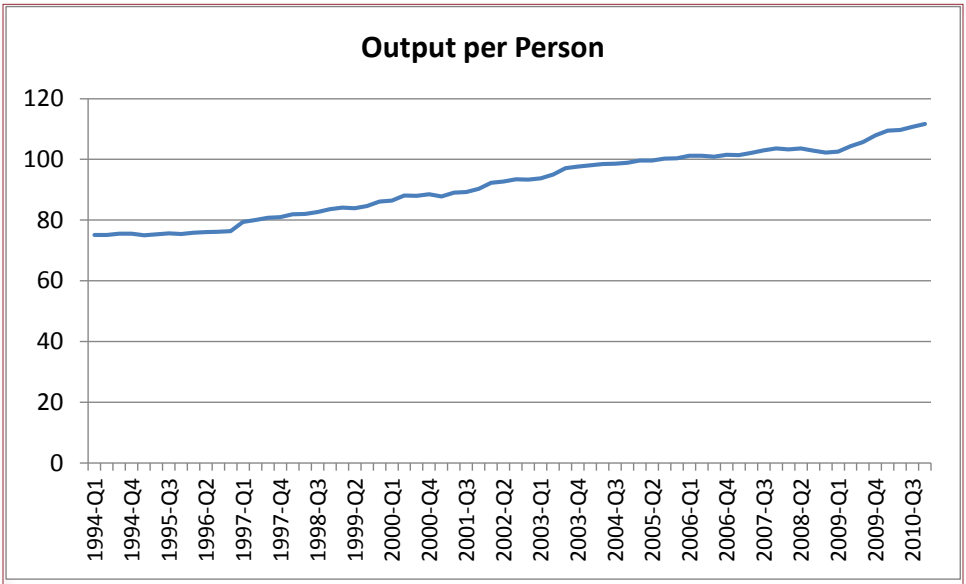


Figure 1.2

Productivity is an index of the amount of work per employee. There is a 33 percent increase in output over the decade from 1996-2006, with an average annual growth rate of 2.7 percent. Source: http://data.bls.gov/PDQ/servlet/SurveyOutputServlet?request_action=wh&graph_name=PR_lprbrief.

tion technology. Workers are expensive, difficult to manage, and hard to remove. Information technology continues to decline in price with increased power and capabilities. Programmers are more creative, and new tools are being developed to solve more complex problems. Organizations that use information technology to reduce costs and provide better service can thrive. If you want a job in management, you must learn to use the technologies. But it is not as simple as knowing how to use a spreadsheet and a word processor. You have to understand how businesses work and determine how technology can be used to improve the business.

Productivity

Figure 1.2 shows the productivity index for U.S. non-farm workers. In the seven years from 2000-2006, productivity grew at an average annual rate of 2.9 percent, but it was closer to 5 percent at the start of the century. Over about 15 years, productivity increased by about 47 percent. The other way to look at productivity is that each year, a firm needs fewer workers to produce the same level of service—which means it can operate at lower costs. Basically, the only way to achieve this continued growth in productivity is for workers to become more efficient—either through learning or improved use of technology.

As a manager, it is critical that you understand two implications of this trend. First, you have to use information technology to stay competitive. Today, computers are almost always cheaper than people. Second, at an average productivity rate of about 3 percent per year, productivity will increase by 34 percent in a decade. Firms would be able to produce the same output with 34 percent fewer workers. What happens to those workers? Chapter 14 addresses the economic issue in more

Reality Bytes: Jobs

CareerCast.com a career Web site annually rates jobs on the basis of several factors including income, stress, and job outlook. In 2011, based on a study of 200 jobs, the top career was: software engineer. Jesse Severe is a software engineer in San Diego working for ProFlight, LLC designing flight training software. He says "My job's flexible, pays well and gives [me] a lot of job satisfaction." Typical salaries for software engineers average about $87,000 up to $132,000. Many jobs exist for programmers across the U.S. and opportunities exist for entrepreneurs to develop their own software and companies. One of the challenges with programming is that technology, both hardware and software, continue to change. Consequently, the job requires constant education. Mr. Severe observes that "You can't think that you'll learn a skill and that it will be relevant in six months." Most people in the field look on technology change as a positive aspect. Tomorrow or next year there will be new tools and new challenges. The top five jobs on the list in 2011 were: (1) Software Engineer, (2) Mathematician, (3) Actuary, ($) Statistician, (5) Computer Systems Analyst. Note that all of them involve data and require analytical skills. The worst job on the list was roustabout--typically handling entry-level work on oil rigs and pipelines.

Adapted from Adapted from Joe Light," The Best and Worst Jobs," The *Wall Street Journal*, January 5, 2011.

detail, but you are going to be better off if you are one of the workers who understands and uses the technology to keep your job.

Teamwork and Communication

Teamwork is a key element in business. Teamwork means that tasks are divided among team members. You are responsible for completing specific items. You are also responsible for helping the other members of the team to find the best solution to the problems. Teamwork requires cooperation, but with technology, it no longer means that the teams have to work in the same room. Your team members may participate from around the world. Even if everyone is in the same room, you need technology to organize and share the contributions.

At a minimum, you already know how to use a word processor and a spreadsheet to write reports and analyze data. Do you know what changes have been made to these tools in the last few versions? The most important changes have been support for collaboration tools that make it easier to share documents and work as teams. Working on a team is difficult. Not only do you have to produce your own work, but you also have to communicate closely with the group to see what problems and answers they have encountered and determine how to integrate all of the pieces. Chapter 9 explores these problems and examines some of the tools available to help you.

Business Operations and Strategy

Information technology is increasingly critical to the daily operations of a business. Obviously, online businesses cannot live without technology, but neither can the local grocery store, bank, or many other businesses. Computers process sales, handle payments, and place new orders. They also analyze the sales data and help set prices and predict trends. Information technology is also used to create new

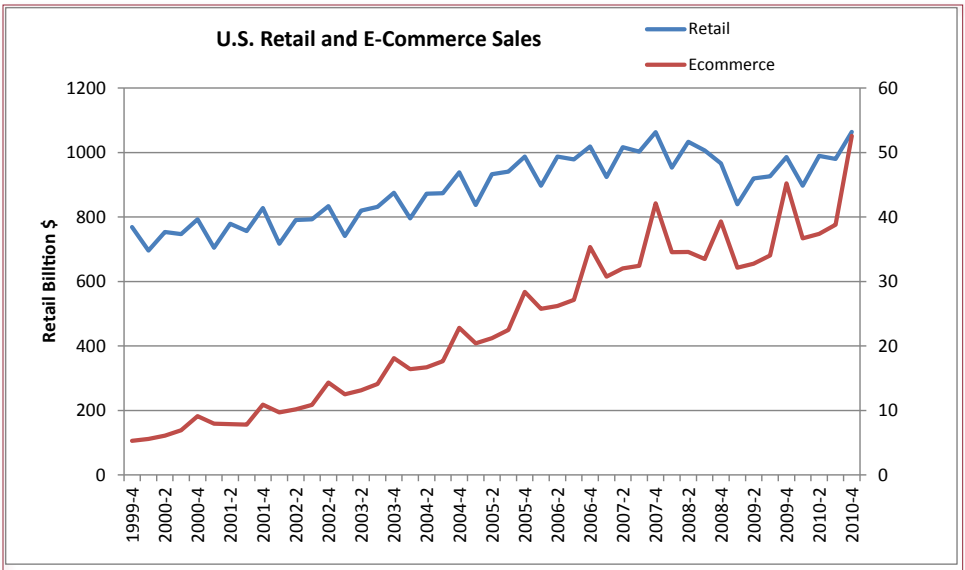


Figure 1.3

Retail and B2C e-commerce data in the United States. Although e-commerce sales are only 5 percent of the total, the percentage has been steadily increasing—despite the crash of the dot-coms in 2000 and 2001. Notice the seasonal peak in the fourth quarter—as more people go online to purchase holiday gifts. Source: http://www.census.gov/retail/index.html#ecommerce.

products and services or to provide unique features to existing products. These new features can give your company a strategic advantage and help the company grow.

The Role of the Internet in Business

How important is the Internet in retail sales? Today, almost everyone is aware of the Internet and many of its opportunities. But, how important is the Internet for sales? Electronic commerce, or **e-commerce** (EC), denotes the selling of products over the Internet. These sales can be from a business to consumers (**B2C**) or from one business to another (**B2B**). For a while in 1999, some people believed that e-commerce would become the dominant form of business—where everyone bought all items over the Internet. Thousands of firms and Web sites were created, trying to become the dominant firm in some niche. The group was called **dot-coms** because almost all had an Internet address of something.com. Many of the firms received huge amounts of funding from venture capitalists and experienced surprisingly high prices for their stock. Some foolish people predicted a new economic world. But beginning in mid-2000, thousands of these firms failed. Most had enormous expenses and huge losses. Many had been taking losses on every item they sold. And foolish people predicted the end of e-commerce. Figure 1.3 shows the U.S. statistics collected by the census bureau. The chart is somewhat misleading because EC sales are shown on the right-hand y-axis, versus total retail sales on the left. These scales make it possible to see the details in the EC data, but in reality, EC represents only about 5 percent of the

Reality Bytes: You are Already Too Old for This Job

Digital advertising is a new frontier, for consumers, companies, and advertising agencies. The big advertising agencies (Madison Avenue) have struggled to find experienced workers with knowledge of people who live and buy online. Jeff Tritt, an HRM executive at Leo Burnett, a large Chicago-based marketing firm, noted that "The demand is greater than the supply so there is a big war for digital talent right now." Some, such as WPP PLC's direct marketing unit Wunderman, are signing apprenticeship agreements with schools—getting students to work for pay or credit. Leo Burnett created a group of 35 young adults to function as a SWAT team to assist on accounts that need advice concerning the digital world. In a different twist, JWT, an ad firm of WPP created a reverse-mentor program where children ages 9 to 14 of JWT employees were brought in to work on client projects. In a project for Nestle, the kids' feedback led to the development of a mobile game to be used to promote items for the food giant. Beyond the children, the new workers not only need to understand the technology, they have to be able to use it. Wunderman brought in students to create a video to promote graphic design software from Microsoft. The students were able to complete the task in three days—instead of three weeks.

Adapted from Suzanne Vranica, "Kids Lend a Digital Hand," *The Wall Street Journal*, January 10, 2011.

total retail sales. The main point of the chart is that although small, EC sales are increasing at a faster rate than total sales. The second point to notice is the strong seasonal effect in the sales—particularly in EC. Year-end holiday sales provide a 35 percent boost to the EC numbers. This large number indicates that EC is still heavily used for gift and specialty items, instead of routine day-to-day purchases.

E-business is a more general term that encompasses e-commerce but also includes using the Internet for other business tasks, such as teamwork, communication, and new business services. As Internet technologies improve, more firms are offering e-business services—such as digital maps, remote data backup, and supply chain management. Chapter 8 discusses e-commerce and e-business in more detail.

Technology Excesses

Do you have too much technology? To some people (and organizations), technology becomes a goal by itself. They strive to be the leaders in acquiring technology and revel in the latest gadgets. The cell phone market is a leading example. Check out the offerings of the major carriers, the constant changes, and multitude of features. Now look around and notice that some people insist on having the most recent, fanciest, and often largest cell phones. Perhaps it is the bling factor, but do you really need to spend money to have the latest releases of technology? Bear in mind that most IT devices are most expensive when they are released, with prices often dropping rapidly over time. Figure 1.4 illustrates the common pattern in the release of new information technology. Prices decline over time and a new model is released with additional features. The rate of decline and the time frame (weeks, months, or years) depends on the specific technology. In all cases, you need to decide when you should purchase new technology. The answer should depend on a careful assessment of your needs, the features offered,

Figure 1.4

Information technology is often characterized by declining prices and new models. You can lead everyone and spend large amounts of money to buy new models whenever they are released, or you can keep technology until you truly need a new model.

and your budget. This analysis is the same for computers, enterprise software, and cell phones. But, with lower-priced items such as cell phones, the bling factor (and marketing) can override the judgment of consumers.

Consider a simple cell-phone example. New cell phones are constantly being introduced, and there might be a six-month (or year) lag in the release of new technologies. If you purchase a new phone every six months, you will spend at least $600 over the course of two years ($200 a phone but the first one is often free). If you keep the original phone and replace it every two years, you can generally get the phones free, or close to free. How many new features were introduced over two years? Is it worth $300 a year (or more) to have the most recent phone? Maybe it is—particularly when IT becomes a fashion accessory. But what about a $2,000 laptop for business? Should every person get a new laptop every year? The point is that these decisions depend on the individual. Until you need to evaluate the purchases for an entire organization. If you need to make the same decision for your company, you need to look at the true benefits to justify the additional costs. To make those decisions, you need to understand the technology and how it adds value to your firm. A key point in this book is that you need to begin thinking as a manager—responsible for analyzing decisions for the entire firm—not just yourself as an individual.

Another potential risk with information technology is that individuals might isolate themselves and rely on e-mail and text messages, avoiding interpersonal contact. Sometimes you need to meet face-to-face to get a true picture. Some

Reality Bytes: Hidden Data

Managers need information to make decisions—and sometimes they spend considerable time searching for information. A study of 1,000 middle managers at large companies by Accenture revealed that managers of American and English companies spent an average of two hours a day in their searches. But then, over half the data they find is worthless. Almost 60 percent said they had to use multiple sources to find data, and they typically needed three different sources. Almost half (42 percent) said they end up using the wrong data at least once a week. Much of the data, and the problems, are stored within the company. Most of the problems arise between managers. Almost half (40 percent) said that other managers are unwilling to share information. But, the respondents did help matters. Most of them said they store their most valuable information on their local computers and in their e-mail folders. It is hard to blame the problem on searching skills. The IT workers surveyed were the ones who most reported the data they found was worthless and they spent the most time looking for it. As much as 30 percent of their time was spent searching for data.

Adapted from Justin Lahart, "For Small Businesses, Big World Beckons," *The Wall Street Journal*, January 26, 2011.

communications are probably too important to use technology. Even in business, you need to be aware of the different preferences of people and know when to use technology and when to use a more personal approach.

So You Want to Be a Manager

Do you know what a manager does? Do you know what a successful manager will do in the future? Answer: The good ones work their tails off. But what exactly does a manager do? Managers actually have many tasks, and the roles depend on the culture of the organization, the style of top managers, and the skills of the individual manager. At one level managers are in charge of other employees, so they must organize tasks, set schedules, direct the processes, and communicate with other managers. On the other hand, managers often have to help with the ongoing operations. For example, an accounting manager also performs accounting tasks, and finance managers continue to analyze data. Finally, managers spend time communicating with others in the organization—both formally and informally. You always need to know what is happening in the company and how it will affect you.

Traditional Management and Observations

If you think of a traditional manager, you would consider tasks such as organizing work, planning jobs, and controlling workers. ("Joe, go peel those potatoes.") However, when observed at their jobs, managers appear to spend most of their time in meetings, talking on the phone, reading or preparing reports, discussing projects with their colleagues, explaining procedures, and participating in other activities that are difficult to fit into the traditional framework.

Henry Mintzberg, a psychologist who studies management, classifies managerial tasks into three categories: (1) interpersonal, (2) informational, and (3) decisional. Interpersonal roles refer to teaching and leading employees. Informational

Technology Toolbox: Choosing a Search Engine

Problem: How do you find information on the Internet? The Internet is huge and getting bigger. It contains an enormous number of pages. Content is provided by millions of organizations—each using different formats and terms.

Tools: Internet search engines were created specifically to crawl the Web and capture key words from the billions of pages they find.

Choosing the right starting point can be critical to a successful search. Obtaining the most number of hits is not as important as a site that returns accurate results. The main search companies constantly refine their methods to improve the accuracy. Remember the following hints when you are searching:

General purpose search engines
- Google, Bing, Yahoo

Meta-searches across multiple engines
- Dogpile, Yippy

Encyclopedia
- Wikipedia.org

Dictionary
- Wiktionary

Phone book
- Switchboard, Superpages

Products
- Mysimon, Cnet

Government data
- CIA.gov (World Factbook)
- Fedstats.gov (main data source)
- SEC.gov (EDGAR corporate filings)

Other
- Your library databases
- www.wolframalpha (math and data)

1. Google is currently the most popular search site and often returns the most hits. Bing and Yahoo are also good and sometimes the results are easier to read.
2. Some sites, such as Yippy, organize the results into categories.
3. Sometimes it is best to search an encyclopedia (wikipedia.org), dictionary (Wiktionary.com), a phone book (switchboard.com), the CIA World Factbook (www.cia.gov/cia/publications/factbook), or government statistics (fedstats.gov).
4. Check specialist magazine sites for targeted information. For example, use fortune.com to find information on the largest companies.
5. The most accurate sources are not free. University libraries provide access to huge commercial databases.

Quick Quiz: Where would you begin your search to answer the following questions?

1. Under the proposed IAU definition, which planetoid falls between Mars and Jupiter?
2. By revenue, which was the largest company in the world in 2010?
3. Find the best price on a 512 GB SSD.
4. Which U.S. professional basketball team had the fewest wins in the 2010-2011 season?
5. Which celebrities are still alive? Sophia Loren, Harman Killebrew, Phyllis Diller, Nancy Reagan, I.M. Pei.

Reality Bytes: Bicycles are Getting Expensive

Avid bicyclists have noticed huge increases in prices of high-end bicycles starting around 2005. Lightweight bicycles with carbon fiber or titanium frames could be purchased for $3,000-$5,000. By 2007, similar bikes from top-line manufacturers were commonly listed for $9,000-$10,000 or more. The pattern exists in road and mountain bikes. News in 2006 indicated that prices would continue increasing—this time because of shortages of raw materials. In particular, carbon fiber prices increased by 25 percent. Demand for the material along with titanium skyrocketed as airplane manufacturers increased production. Zsolt Rumy, CEO of carbon fiber manufacturer Zoltek Companies, Inc. in St. Louis said he was favoring his large customers (airplane manufacturers) to keep them happy. He passed on most of the 60-100 percent price increases to the sporting-goods customers, noting "we really jack up the price," for smaller customers. Titanium is relatively rare and in high demand, driving prices to more than $32,000 a ton—compared to $1,000 a ton for carbon steel. Still, 19.8 million bicycles were sold in North America in 2005—an 8.2 percent increase from 2004. Manufacturers estimate that 30,000 cyclists a year spend $3,000 or more on a bike.

Adapted from Paul Glader, "Why Bike Prices Are Shifting Higher," *The Wall Street Journal*, August 1, 2006.

tasks are based on the transfer of information throughout the organization, such as relaying information to subordinates or summarizing information for executives. Decisions involve collecting information, evaluating alternatives, and choosing directions that benefit the firm.

Other researchers have studied managers and developed alternative classifications. Fred Luthans uses three classifications of management activities. He indicates that approximately 50 percent of a manager's time is spent on traditional management activities (planning, organizing, and controlling), 30 percent in formal communications, and 20 percent in informal networking. Formal communications include attending meetings and creating reports and memos. Informal networking consists of contacts with colleagues and workers that tend to be social in nature but often involve discussions regarding business and jobs.

Making Decisions

In many ways managers expend a lot of their effort in making decisions or contributing information so others can make decisions. When you look at courses offered for future managers, you will find a focus on administration, human behavior, quantitative modeling and problem solving, decision theory, and elements of business ethics and globalization. Typically, these courses are designed to help managers solve problems and make decisions. However, if you ask managers how much time they spend making decisions, they are likely to say that they seldom make decisions. That seems like a contradiction. If managers and executives do not make decisions, who does?

In many organizations, day-to-day decisions are embodied in the methodology, rules, or philosophy of the company. Managers are encouraged to collect data and follow the decisions that have resulted from experience. The managers are

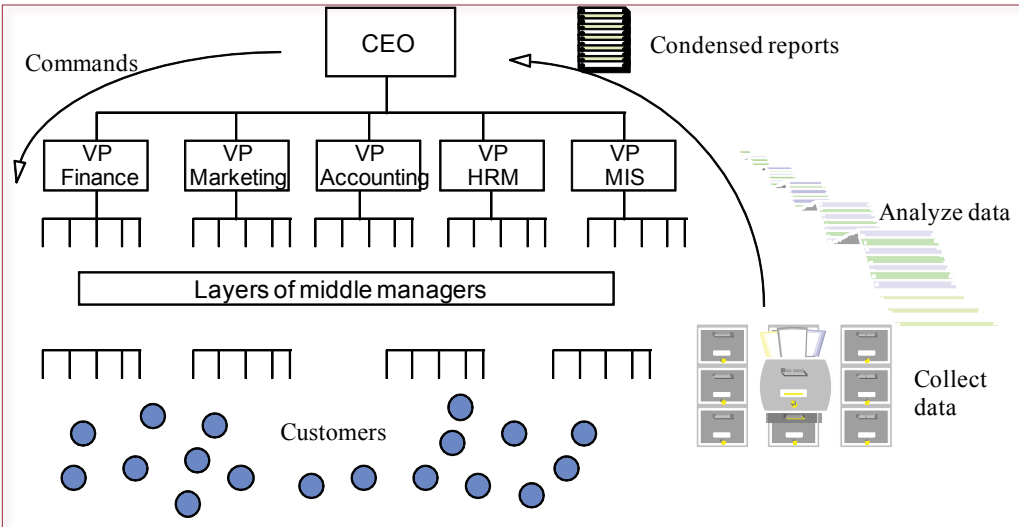


Figure 1.5

In a traditional organizational structure, lower-level managers deal with customers and collect basic data. Middle-level managers analyze the data, create reports, and make suggestions to upper-level managers. The higher-level managers make decisions and set rules to guide the other managers.

directly involved in the decision process, even though they may not think they are making the final choice.

The broader **decision process** involves collecting data, identifying problems, and making choices. Making a decision also requires persuading others to accept the decision and implement a solution. With this broader definition, many of the tasks performed by managers are actually steps in the decision process. Meetings, phone calls, and discussions with colleagues are used to collect data, identify problems, and persuade others to choose a course of action. Each of these steps may be so gradual that the participants do not think they are actually making decisions.

Because of the subtlety of the process and the complexity of the decisions, it is often difficult to determine what information will be needed. Decisions often require creativity. Because data generally need to be collected *before* problems arise, it is challenging to design information systems to support managers and benefit the organization. One important job of management is to examine the need for information and how it can be used to solve future problems.

Business and Technology Trends

How is business changing? What will managers need to know in the future? A key issue in management is that you must always work in the future. If you spend all of your time running around trying to solve today's problems by putting out fires, you will never succeed. You must plan for tomorrow and build the structure and processes to handle the day-to-day tasks.

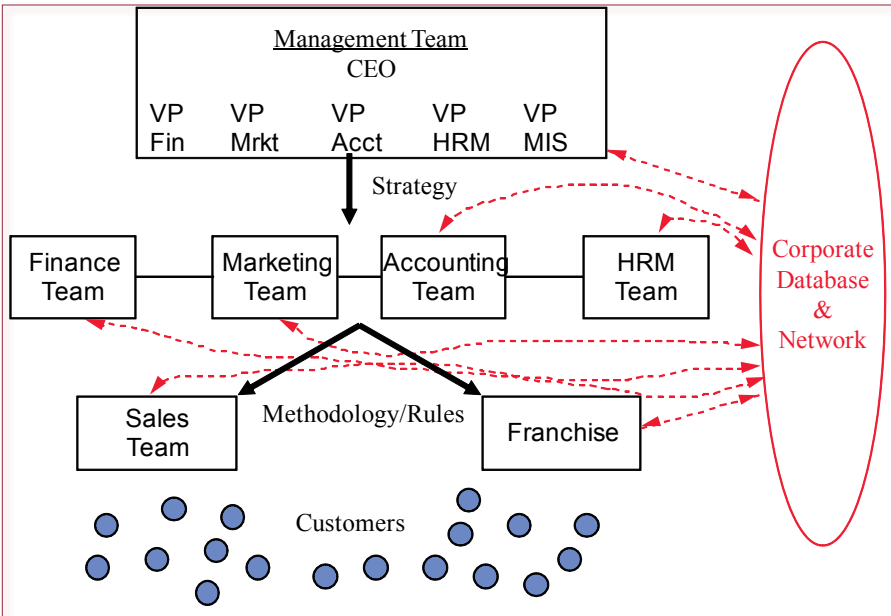


Figure 1.6

In the last few years, many companies have moved toward a more decentralized form of management. They have removed the middle layers of management and replaced them with smaller teams. Franchises and smaller teams have become the primary service contact with customers. Information sharing becomes crucial in this environment. Teams communicate directly and share data across the company.

Changes in Organizational Structure

Even without the Internet, management and companies are changing. The most important change is the move away from the traditional hierarchical structure to a team-based approach. Most of today's large companies developed years ago when communications were limited and there were no computers. Most adopted a military-inspired hierarchical command structure shown in Figure 1.5. The top-level managers set policy and directed the vice presidents to carry out the mission of the company. Sales staff dealt directly with customers, collected data, and passed it to middle managers. The middle managers organized and summarized the data and passed it up the chain. Little data was shared among the middle and lower levels.

In contrast, because it is easy to share data, information technology offers the ability to alter the way companies are organized and managed. Figure 1.6 shows the new approach. This method focuses on teamwork and a shared knowledge of all relevant data. Some teams, like sales and accounting, will have ongoing tasks. Other task forces will be formed to solve new problems—often created from managers across the company. Managers can expect to participate in many teams, essentially at the same time. Data can be obtained and shared through the information system, meetings can be held online, documents and comments can be circulated electronically.

This structure enables companies to be run with a smaller number of managers. Each manager is more productive because of the tools and the ability to perform many jobs. Another strength of this approach is that it is easy to use consultants

Business Trend	Implications for Technology
Specialization	• Increased demand for technical skills • Specialized MIS tools • Increased communication
Methodology and franchises	• Reduction of middle management • Increased data sharing • Increased analysis by top management • Computer support for rules • Reengineering
Mergers	• Four or five big firms dominate most industries • Need for communication • Strategic ties to customers and suppliers
Decentralization and small business	• Communication needs • Lower cost of management tasks • Low maintenance technology
Temporary workers	• Managing through rules • Finding and evaluating workers • Coordination and control • Personal advancement through technology • Security
Internationalization	• Communication • Product design • System development and programming • Sales and marketing
Service orientation	• Management jobs are information jobs • Customer service requires better information • Speed

Figure 1.7

Changes occurring in the business world affect the use of information technology. These trends and the implications are discussed throughout the book. Managers who understand these trends and their relationship with technology will make better decisions.

and temporary workers for short-term projects. In today's legal climate, it is exceedingly difficult to fire workers, so firms often use temporary workers for individual projects. Permanent workers, supplemented with specialized temporary talent, can organize a team. The team disbands when the project is finished.

Business Trends

As described in Figure 1.7, seven fundamental trends have been driving the economy and changing businesses: (1) specialization, (2) management by methodology, (3) mergers, (4) decentralization and small business, (5) reliance on temporary workers, (6) internationalization, and (7) the increasing importance of service-oriented businesses. These trends will be discussed throughout the text to illustrate how they affect the use of information systems and how managers can use information systems to take advantage of these trends. Tightening job markets also means that managers must continually work on self-improvement. To survive, you must provide value to the organization.

Reality Bytes: American Workers Must be Crazy

The Center for Work-Life Policy surveyed 1,600 workers who earned more than $75,000 a year. In 2007, almost half of those workers put in 60 hours a week and 10 percent were working more than 80 hours a week. Many of the workers (28 percent) in banking and finance had "extreme jobs" working more than 60 hours a week with unpredictable demands, travel, and tight deadlines. Most of the workers putting in over 60 hours a week said they loved their jobs. But half of those with "extreme" jobs said they wanted to quit within a year. Still, in a different online survey, 29 percent of 510 respondents said they would work more than 100 hours a week for their dream job. Remember that a week has only 168 hours. In other studies, American workers rarely use their full vacation allotment.

Adapted from Kyle Stock, "Would You Work 100 Hours a Week for Your Dream Job?" *The Wall Street Journal*, March 29, 2011.

Specialization

Adam Smith described the advantages of specialization and division of labor in manufacturing more than 230 years ago. The concepts are now being applied to managers. As functional areas (such as marketing or finance) become more complex, they also become more specialized. Area managers are expected to understand and use increasingly sophisticated models and tools to analyze events and make decisions. As a result, the demand for managers with specific technical skills is increasing, while the demand for general business managers is declining. First you get a job as an accountant (or whatever our specialty is), then you become a manager. This trend is reflected in MIS by the large number of specialized tools being created and the increased communication demands for sharing information among the specialists.

Management by Methodology and Franchises

Specialization's advantage is that it reduces management tasks to smaller problems. Using specialization coupled with technology, firms have reduced many management problems to a set of rules or standard operating procedures. Day-to-day problems can be addressed with a standard methodology. For example, the manager's guidebook at Wal-Mart or McDonald's explains how to solve or prevent many common problems. These rules were created by analyzing the business setting, building models of the business, and then creating rules by anticipating decisions and problems. This approach gives less flexibility to the lower-level managers but encourages a standardized product, consistent quality, and adherence to the corporate philosophy.

Management by methodology also allows firms to reduce their number of middle managers. By anticipating common problems and decisions, there is no need to call on trained managers to solve the daily problems. Franchises like McDonald's carry this technique one level further by making the franchisee responsible for the financial performance of individual units. The common management tasks, however, are defined by the central corporation.

Technology Toolbox: Finding Government Data

Problem: Many business problems require data, particularly regarding demographics and the economy.

Tools: The federal government collects a huge amount of data; much of it is now available online. The data is maintained by individual agencies and it helps if you know what types of data are provided by each agency. However, the main site www.fedstats.gov contains links to all of the agencies.

Agency	Main Types of Data	Site
Labor (BLS)	Employment and Prices	www.bls.gov/data
Census	Demographic and maps	www.census.gov
Economic Analysis (BEA)	Economic summaries	www.bea.gov
Transportation Statistics	Airline, rail, and road	www.bts.gov
Justice Statistics	Crime and courts	bjs.ojp.usdoj.gov
Economic Research (Ag)	Food and farm economics	www.ers.usda.gov
Health (CDC)	Health and Healthcare	www.cdc.gov.nchs
Securities and Exchange (SEC)	Business filings	www.sec.gov (EDGAR)

Most of the federal Web sites have the ability to download historical data, typically into spreadsheets. Some, as the BLS have search forms where you can select exactly which data you want to download. At all of the sites it is important that you read the descriptions carefully because there can be subtle but important differences in the series.

In the past couple of years, the government agencies have opened their databases to some of the search engines. In particular, Google and WolframAlpha can automatically search the databases and retrieve the data. In most cases, the data is returned as a chart, so if you truly want the underlying data, you might still have to go to the government Web site. But sometimes it is helpful to use the search engines to find the specific agency.

Quick Quiz:

1. What was the U.S. monthly unemployment rate for the last year?
2. What is the current population of the U.S.?
3. What was the value of the U.S. trade deficit for the last year?

Merger Mania

Up to the late 1800s and early 1900s, most businesses were small, having markets limited to small geographic regions. A brief history of industrial organization reveals four waves of mergers in the United States: (1) the horizontal mergers of the late 1800s epitomized by the oil and banking industries; (2) the vertical integration of the early half of the 20th century, illustrated by the oil, steel, and automobile companies; (3) conglomerate mergers of the 1950s and 1960s, in which firms like IT&T (an international telecommunications giant) acquired subsidiaries in many different industries (including a bakery!); and (4) giant horizontal mergers at the turn of the 21st century. All of these mergers arose to take advantage of economic power, but technology made them possible. Without communication (telegraph and telephones earlier, computer networks later), firms could not grow beyond a certain size because managers could not monitor and control lower-level workers.

The most recent mergers have been impressive in terms of the size of the firms and the sectors involved. The banking industry was one of the first to begin consolidation. Relaxation of federal restrictions quickly led to large regional and national banks. The telecommunications industry also experienced several changes, such as the ABC-Disney and AOL-Time/Warner merger between telecommunications and entertainment industries. Telephone, Internet, and cable companies also were fertile ground for mergers, such as MCI and WorldCom or AT&T, TCI, and the reconsolidation of the telephone companies. The horizontal mergers in the petroleum, food production, automobile, and grocery industries represented major consolidations of operations as well. Some of these combinations crossed international boundaries (e.g., Daimler and Chrysler or Chrysler and Fiat). Some of these trends were fueled by the high stock market valuations, which provided capital to the successful firms and punished the weaker ones.

One of the important keys to these mergers was the improved capability of information and communication technology. Without the IT structure, it would be exceedingly difficult to manage these combined firms. Most of the combinations also resulted in a loss of middle-management jobs. The remaining workers relied on technology to improve their productivity. The newly centralized firms also relied on communication technology to provide customer service across the country and around the world.

Decentralization and Small Business

Strangely, businesses today are becoming both larger and more decentralized. The goal of decentralization is to push the decision-making authority down to the level that deals with the customer. The top managers set strategy and establish projects across the organization. The lower-level managers and salespeople solve problems and make decisions to improve sales and negotiate with customers. The gap between these groups is bridged by information technology. Companies no longer need hundreds of middle-level managers to organize data and interpret top management commands. In the past, with limited information technology, small divisions were expensive to maintain because of the cost of collecting and processing the basic accounting and operating data.

Within a firm, operations can be decentralized into teams of workers. In this situation, departments operate relatively independently, "selling" services to other departments by competing with other teams. They often perform work for outside firms as well—essentially operating as an independent business unit within the corporation. The main goal of decentralization is to push the decisions and the

Reality Bytes: Visual Search

http://www.bing.com/visualsearch
http://image-swirl.googlelabs.com/
http://www.google.com/mobile/goggles/#text
http://images.google.com (Use Google Chrome)

Humans do not often remember items by name. People often visualize items and remember things by association. So it would be useful to have search engines that can find things based on images. The challenge is that computers are relatively weak at image recognition. The code is getting better, but search results based on actual photos are still relatively generic. Microsoft and Google both have tools to search for collections of images based on word tags. The Microsoft Bing engine has some useful collections, such as dog and cat breeds. Google tends to rely on images that are tagged by other users. Google Goggles is an early version of a search engine that uses an uploaded photo or a photo taken with a Smartphone to search for information related to the object.

Adapted from Katherine Boehret, "In Search Of...Images Worth 1,000 Results," *The Wall Street Journal*, January 12, 2010.

work down to the level of the customer, to provide better customer service and faster decisions. Information systems enable executives to gather and manipulate information themselves or with automated systems. As a result, there is less need for middle managers to prepare and analyze data.

At the same time that large business have consolidated and shed managers, many of these people have started their own small companies. Sometimes workers have become consultants—performing tasks similar to the jobs they left, but working part time for a variety of firms.

Temporary Workers

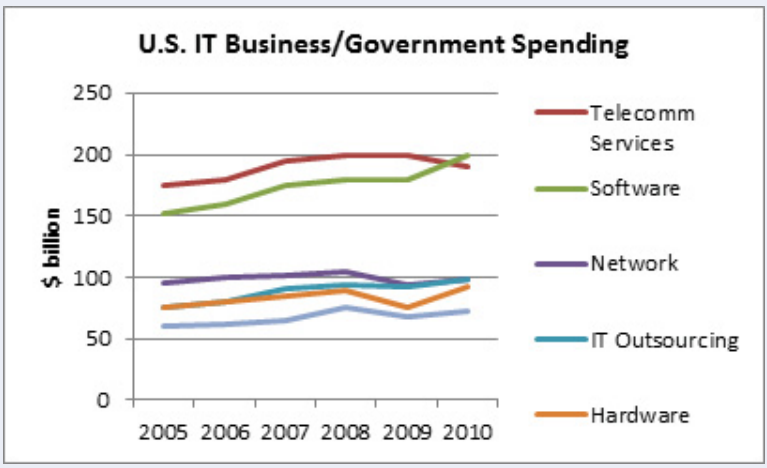
So what happens to the people who are no longer needed as middle-level managers? At various times in the past, some companies provided a form of lifetime employment for their workers. As long as workers continued to do their job and remained loyal to the company, their jobs were secure. Even in more difficult times, when employees were laid off, they were often encouraged (through extensions of unemployment benefits) to wait until the economy improved and they could be rehired. Companies in other nations, especially Japan, had stronger commitments to workers and kept them on the payroll even in difficult times.

Today, in almost every industry and in many nations (including Japan), all jobs are at risk. To compensate, companies increasingly rely on a temporary workforce. Individuals are hired for specific skills and tasks. When these basic tasks are completed, the employees move on to other jobs. Increasingly, even executives are hired because of their specific expertise. Consultants and other professionals are hired on a contract basis to solve specific problems or complete special assignments.

In many ways, it is more difficult to manage a company that relies on temporary workers. Special efforts must be made to control quality, keep employees working together, and ensure that contract provisions are met. Technology can play an

Reality Bytes: IT Spending

Forrester Research is a consulting firm that tracks trends and details in information technology. The company regularly reports on IT spending. Note that software and telecommunication services (phones and Internet) are the largest component of costs. Although, combining hardware and network equipment into a single category makes it about equal to the software costs.



Adapted from *The Wall Street Journal*, "Where the Money Goes," April 25, 2011

important role in these situations. It can improve communications, maintain easy (but controlled) access to data and contracts, and help to institute corporate standards. The Internet is beginning to play this management role—finding contract workers, negotiating the work, and distributing the finished products.

To you as a worker, the loss of middle-management jobs and reliance on temporary workers should be scary. It means more competition for jobs—particularly higher-level careers. To obtain higher-level jobs, you will need to possess more analytic skills than other potential employees. Even as a manager, you will need your own competitive (professional) advantage. Along with additional education, your use and knowledge of technology can give you an advantage.

The issue of contract workers is particularly critical with computer programmers and developers. Many firms want to hire contract programmers because they will no longer be needed after an initial application is developed. This approach works until the economy booms, then it becomes exceedingly difficult to find workers. In the end some companies find they have to hire permanent workers simply to avoid the problems of trying to find new contractors every couple of years.

Internationalization

Several events of the early 1990s demonstrated the importance of international trade: closer ties forged with the European Union, creation of the North American Free Trade Area (NAFTA), and the continued relaxation of trade restrictions through the General Agreement on Tariffs and Trade (GATT) and the World Trade Organization (WTO). Although barriers to trade remain, there is no doubt that the

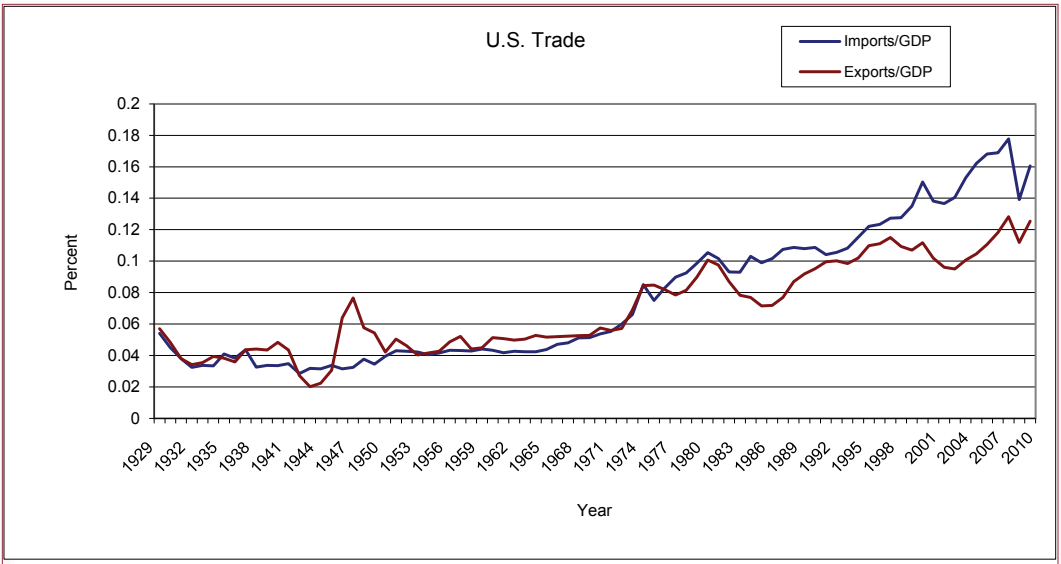


Figure 1.8

By almost any statistic, in almost every nation, the level of international trade has increased dramatically during the last 20 years. International trade brings more choices, more competition, more data, more complexity, and more management challenges. Source: http://www.bea.gov/national/nipaweb/Index.asp.

international flow of trade and services plays an increasingly important role in many companies. Even small firms are buying supplies from overseas and selling products in foreign markets. Trade also brings more competition, which encourages firms to be more careful in making decisions.

As Figure 1.8 shows, the role of exports and imports has expanded rapidly in the United States since 1970. In European nations, international trade is even more important. Today, internationalization is a daily fact of life for workers and managers in almost every company. Even small businesses have links to firms in other nations. Many have set up their own production facilities in other nations. Much of this global expansion is supported by technology, from communication to transportation, from management to quality control.

Communication facilities are one of the most prominent uses of information technology to support the move to international operations. Communication technology is especially important for service industries such as consulting, programming, design, marketing, and banking. Several years ago, services were often considered to be nontradable goods because they tended to have high transportation costs, making them difficult to export. Today, improved communication facilities through the Internet have made certain types of services easy to export. For example, financial institutions now operate globally. Today, software development has a growing international presence. Many U.S. firms are turning to programmers in Ireland, India, and Taiwan. Through the use of programmers in India, for example, a U.S.-based firm can develop specifications during the day and transmit them to India. Because of the time difference, the Indian programmers work during the U.S. night and the U.S. workers receive updates and fixes the next morning.

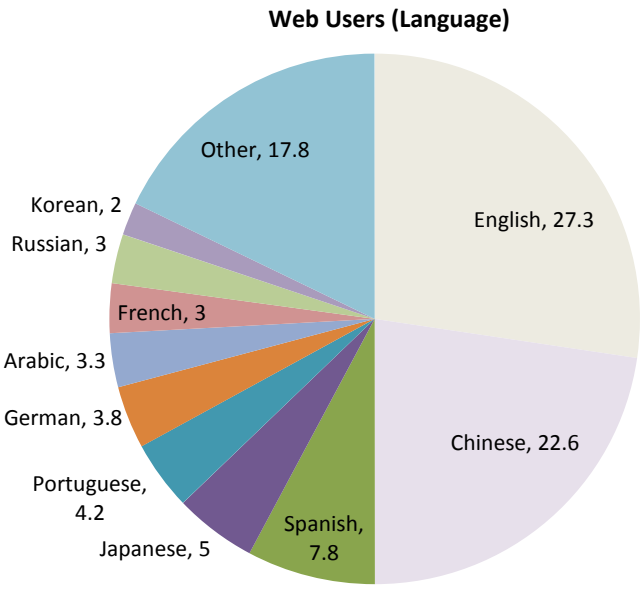


Figure 1.9

Internationalization of the Web. Percent of user languages estimated from Web browser settings. Source: http://www.internetworldstats.com/stats7.htm (2010).

Internationalization also plays a role in selling products. Groups of countries have different standards, regulations, and consumer preferences. Products and sales techniques that work well in one nation may not transfer to another culture. Information technology can track these differences, enabling more flexible manufacturing systems that can customize products for each market.

Figure 1.9 shows one way to look at internationalization on the Web. It shows the percentage of Web browsers configured for the top ten languages in 2010. English is still at the top of the list, but it is followed closely by Chinese. These numbers are relatively accurate because servers can be configured to recognize the language of the client browser and the statistics are collected automatically.

Figure 1.10 shows a broader picture by counting the number of Internet users in each geographical region. These numbers are somewhat more subjective because someone (typically the Nielsen agency) has to estimate the number of people in each nation and region who use the Internet on a regular basis. This survey approach can miscount people—particularly those who get access through work or school. Still, it shows the international character of the Internet. It does not take a high percentage of users for regions with large populations to dominate. Asia's 825 million users is only about 30 percent of the people versus about 75 percent for North America Do the statistics mean that you can create a Web site and begin selling items to the hundreds of millions of Chinese and Indian Web users? Based

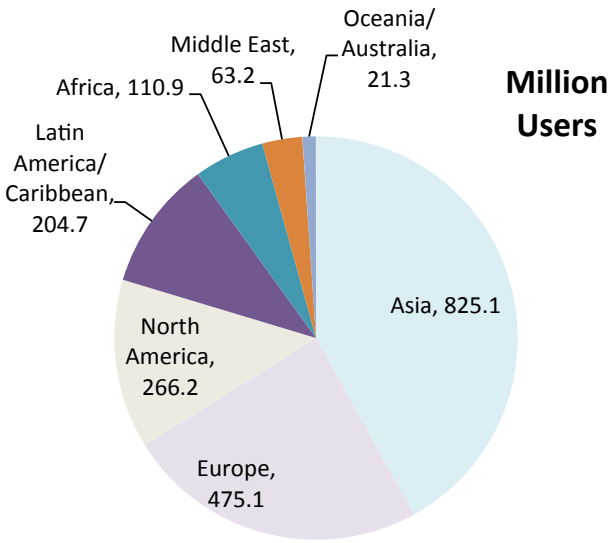


Figure 1.10

Internationalization of the Web. Number of users by geographic region. Source: http://www.internetworldstats.com/stats.htm (2010).

on the fact that businesses have been attempting to expand into Asia for decades since Nixon's trade mission in 1973, it will probably take a while. Keep in mind that per capita income is still lower in those nations, and much of the infrastructure developed for the Western world is not yet in place in Asia—including shipping and payment methods.

The increased competition created by internationalization and decentralization requires corporations to be more flexible. Flexibility is needed to adapt products to different markets, choose suppliers, adopt new production processes, find innovative financing, change marketing campaigns, and modify accounting systems. Firms that attain this flexibility can respond faster to market changes, catch opportunities unavailable to slower firms, and become more profitable.

Service-Oriented Business

Another trend facing industrialized nations is the move toward a service-oriented economy. As shown in Figure 1.11, in 1920 the U.S. census showed 29 percent of the employed were in farming. By 2000, that figure had fallen below 1 percent. In the early 1900s, people were afraid that this trend would cause food shortages throughout the United States and the world. Improvements in technology in the form of mechanization, transportation, growing techniques, chemicals, and crop genetics proved them wrong.

A similar trend in manufacturing has produced the same consternation. Although the number of workers employed in manufacturing has varied over time, it is clear that the largest increase in jobs has been in the management, clerical, and service sectors. In 2010, 11 percent of the jobs were in manufacturing, with

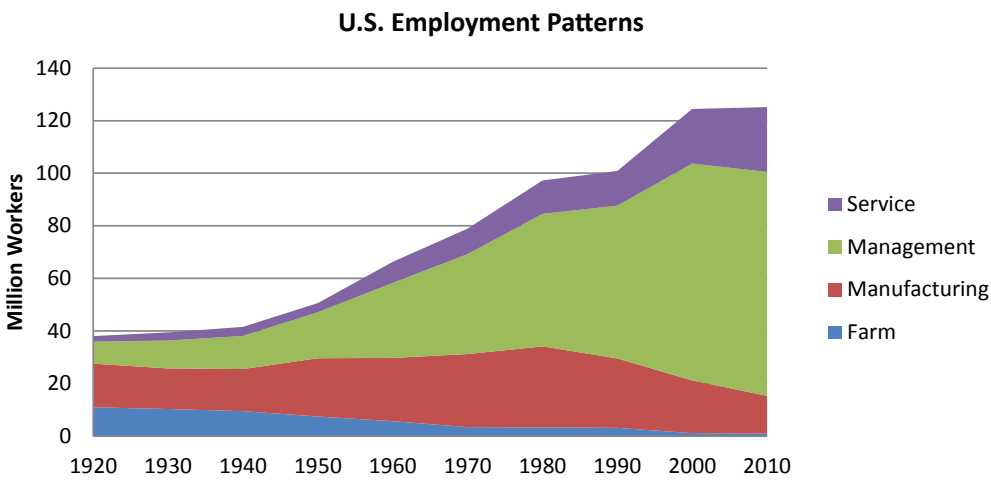


Figure 1.11

Over time, Americans have moved from agricultural to manufacturing to service and management jobs. Management and service jobs are often dedicated to collecting and analyzing data. Just as the decline of workers in agriculture did not create a shortage of food, the relative decline in manufacturing did not create a shortage of products.

88 percent in service and management jobs. The largest increase in new jobs has been in the management, clerical, and service sectors.

These trends represent changes in the U.S. economy and in demographics such as age characteristics of the population. The importance of the management, clerical, and service sectors has to be considered when examining how MIS can benefit a firm and its workers. The goal is to gain a competitive advantage through better customer service. Even manufacturing companies are beginning to focus their efforts around the concept of providing services to the customer.

Reengineering: Altering the Rules

Does technology alone improve a business? Many companies are managed by rules and procedures. It would be virtually impossible to do otherwise—the cost of an intense evaluation of every single decision would be overwhelming. Hence, upper-level managers establish procedures and rules and an organizational structure that automatically solve typical problems. More complex problems are supposed to be identified by managers and forwarded up the chain of command for answers.

This type of management creates a fixed approach to operations and to solving problems. However, the business environment rarely remains constant. Over time, new technologies are introduced, new competitors arrive, products change, old markets shrink, and firms merge. At some point, firms that have been guided by relatively static methodologies find their methods no longer match the marketplace. Hence, they decide to **reengineer** the company: beginning from scratch, they identify goals along with the most efficient means of attaining those goals, and create new processes that change the company to meet the new goals. The

Reality Bytes: Driptech with 20 Employees Goes International

Peter Frykman is the owner of Driptech, a small irrigation equipment company headquartered in Palo Alto, California. The firm has 20 employees—but seven of them are located in China and India. Mr. Frykman was part of a group of Stanford University graduate students who designed a method to make drip irrigation systems inexpensively. The group tested the equipment in Ethiopia, formed the startup company, and raised $900,000 in funding. After a pilot project in India kicked off sales in Asia in 2009, Chinese officials became interested in the technology. Driptech set up offices in Mumbai and Beijing, and Mr. Frykman soon expects half his employees to be overseas. He notes that having offices in three countries is difficult, but with modern communication technology he is able to pass work around the world and have engineers working continuously. He notes that "If you get the rhythm right, you can really be working around the clock as an organization." A few other companies also work internationally, but the U.S. Census Bureau notes that only two percent of small companies (fewer than 100 employees) sell their products in overseas markets.

Adapted from Justin Lahart, "For Small Businesses, Big World Beckons," *The Wall Street Journal*, January 26, 2011.

term *reengineering* and its current usage were made popular in 1990 by management consultants James Champy and Michael Hammer. Many of the underlying concepts have been in use for years.

Sometimes reengineering is undertaken by internal management as a means to improve the company. For example, in the early 1990s, Compaq Computer altered its strategy and reengineered its operations and management to cut millions of dollars in costs and save the company. But in 2000, Dell Computer's just-in-time and made-to-order production system dominated the industry. Unable to alter the company fast enough, Compaq was ultimately purchased by Hewlett-Packard.

Sometimes reengineering is forced on the company when it is taken over by another corporation. In a few rare cases, managers continually evaluate the firm to make several small changes instead of relying on a major overhaul.

Reengineering can be a highly complex process, requiring thousands of hours of time to analyze the company and its processes. In addition to the complexity, reengineering often faces resistance because it results in a change in the organization's structure, which affects the authority and power of various managers.

Like any management technique, reengineering is not guaranteed to work. A report by CSC Index, a major reengineering consulting company, that surveyed 497 large companies in the United States and 124 in Europe, noted that 69 percent of the American and 75 percent of the European companies have already undertaken reengineering projects. Several of these projects have not been successful. CSC Index notes that three factors are necessary for success: (1) overcome resistance by managers who are afraid of losing jobs or power, (2) earn strong support by upper management, and (3) aim high and go for major changes instead of small rearrangements.

Often, the point of reengineering is to rebuild the company so that it can make better use of technology. Simply placing computers into a firm, or just buying replacement computers, does not provide many advantages. The key to technology is to restructure the operations and management to reduce costs and make better

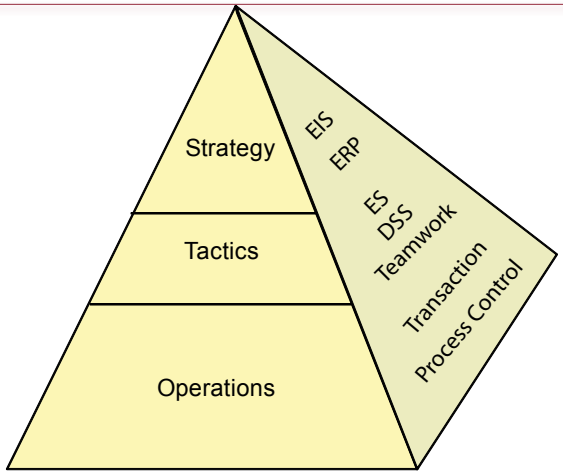


Figure 1.12

There are three primary levels of decisions in business. Business operations consist of tasks to keep the business operating on a day-to-day basis. Tactical decisions involve changes to the firm without altering the overall structure. Strategic decisions can alter the entire firm or even the industry. Information system tools exist to help with each type of decision.

decisions. For example, in the 1980s, replacing a secretary's typewriter with a personal computer had some benefits. But firms ultimately gained more benefits by giving personal computers to managers and eliminating the secretary. Today, you might consider simply updating those personal computers. However, building an information system that provides easy-to-read up-to-the-minute data to top management makes it possible to eliminate the lower-level managers and still make better decisions.

One of the challenges of reengineering is that the proposals can seem drastic. What do you mean you want to eliminate half of the corporate-level employees!? But being driven out of business by a leaner, lower-cost competitor is always a worse situation.

Management and Decision Levels

How do you break businesses into smaller pieces to analyze them? To understand management, reengineering, and information systems, it helps to divide the organization into three decision levels: strategy, tactics, and operations. Each level has unique characteristics, which use different types of support from information technology. These levels were explained by Robert Anthony in 1965. In 1971, Gorry and Scott Morton added a detailed explanation of how information systems at that time could support the various levels of management. However, the terms and characteristics are largely taken from military terms. Throughout history, in most nations the military has been the largest organization in terms of the number of "employees." Figure 1.12 is an updated picture of the typical pyramid shape of most organizations involving operations and tactical and strategic decisions. As is typical with most management models there are many gray areas and the lines are not absolute.

Reality Bytes: Fewer Workers More Output

Looking at the statistics, it is clear that employment at manufacturing companies in the U.S. has been declining for 40 years. But due to increases in productivity, total manufacturing output over that time has increased. U.S. companies are producing more than twice the output they did 40 years ago. In the meantime, even in low-wage countries such as China, a shortage of workers is driving wage increases of 15 percent or more. Christian Murck, president of the American Chamber of Commerce in Beijing notes that "China's low-wage advantage will disappear over the next five years. Supply chains are already being disrupted."

Adapted from John Bussey, "Analysis: Will Costs Drive Firms Home?" *The Wall Street Journal*, May 5, 2011.2004.

The power of the model is that it makes it easier to solve business problems. With any problem, your goal is to identify the primary management level. Once you know the level, it is easier to focus on the types of solutions that will be relevant. For example, if a company is having basic problems with its day-to-day accounting, you would focus on improving the data collection—and worry later about strategic tools and problems with competition. As you read the cases and Reality Bytes throughout this book, you should identify the primary level of each problem.

Operations

The *operations level* consists of day-to-day operations and decisions. In your first job, you will typically concentrate on the problems that arise at this level. For example, in a manufacturing firm, machine settings, worker schedules, and maintenance requirements would represent management tasks and decisions at the operational level. Information technology at this level is used to collect data and perform well-defined computations. Most of the tasks and decisions are well **structured**, in the sense that they can be defined by a set of rules or procedures. For example, a clerk at Wal-Mart follows the procedures in the guidebook to deal with

Figure 1.13

Each functional area of management faces the three categories of decisions and problems. Only a few examples are presented here.

Sector	Operations	Tactics	Strategy
Production	• Machine settings • Worker schedules • Maintenance schedule	• Rearrange work area • Schedule new products • Change inventory mode	• New factory • New products • New industry
Accounting	• Categorize assets • Assign expenses • Produce reports	• Inventory valuation • Depreciation method • Finance short/long term	• New GL system • Debt vs. equity • International taxes
Marketing	• Reward salespeople • Survey customers • Monitor promotions	• Determine pricing • Promotional campaigns • Select marketing media	• Monitor competitors • New products • New markets

Level	Description	Example	Type of Information
Strategy	Competitive advantage, become a market leader. Long-term outlook.	New product that will change the industry.	External events, rivals, sales, costs quality, trends.
Tactics	Improving operations without restructuring the company.	New tools to cut costs or improve efficiency.	Expenses, schedules, sales, models, forecasts.
Operations	Day-to-day actions to keep the company functioning.	Scheduling employees, ordering supplies.	Transactions, accounting, human resource management, inventory.

Figure 1.14

Each decision level affects the firm in different ways. Each level uses and produces different types of information.

typical operations. Common problems are anticipated, with actions spelled out in the guidebook. Computer security is an increasingly important problem—for both individuals and companies. Chapter 5 examines the major threats and tools available to protect your assets.

As summarized in Figure 1.13, managers in other disciplines—such as accounting, marketing, or finance—also face operational decisions. Personal productivity tools, like spreadsheets, word processors, and database management systems help managers collect and evaluate data they receive on a daily basis. The use of these tools is reviewed in Chapter 2.

An important task at the operations level is to collect data on transactions and operations; hence **transaction processing systems** are a crucial component of the organization's information system. The data collected form the foundation for all other information system capabilities. As discussed in Chapter 6, an important characteristic of transaction processing systems is the ability to provide data for multiple users at the same time. A special class of transaction processing software designed for factory operations is called *process control* software. Chapter 7 shows how modern **enterprise resource planning (ERP)** software extends the concepts of transactions across the organization.

Database management systems are increasingly used to control data and build systems to share data. Their role is explained in Chapter 4. Chapter 3 shows how communication networks are used to provide access to data throughout the organization. Increasingly managers work in teams—either with workers in the same department or across departments and sometimes companies. Sophisticated software tools are being developed to help integrate data in these collaborative arrangements. These integration tools and *enterprise resource planning systems* are described in Chapter 7. Operational decisions are often the easiest to understand. They deal with structured problems over relatively short periods of time.

Tactics

As you move up in your career to project leader or department manager, you will encounter a different level of decision making, where the types of problems will depend on your specialization, but some common features will stand out. At the *tactical level*, decisions typically involve time frames of less than a year. As shown in Figure 1.14, these decisions usually result in making relatively major changes but stay within the existing structure of the organization.

Reality Bytes: Growing and Dying Industries

Industry	Revenue Change 2000-2010	Revenue in 2010 ($ million)
Voice over IP (VoIP)	194.0%	12,498
Internet Publishing	25.2%	32,573
Wind Power	16.9%	3,388
E-Commerce & Auctions	12.2%	95,005
Biotechnology	11.0%	86,971
Correctional Facilities	9.1%	34,373
Environmental Consulting	7.7%	18,153
Insurance Claims Adjusters	6.9%	57,530
Video Games	6.2%	38,622
Solar Power	2.7%	69
Video Postproduction	-24.9%	4,276
Formal and Costume Rental	-35.0%	736
DVD, Game, Video Rental	-35.7%	7,839
Newspaper Publishing	-35.9%	40,726
Mills (textile)	-50.2%	54,645
Wired Telecomm. Carriers	-54.9%	154,096
Photofinishing	-69.1%	1,603
Manufactured Home Dealers	-73.7%	4,538
Record Stores	-76.3%	1,804
Apparel Manufacturing	-77.1%	12,800

Adapted from Phil Izzo, "Top 10 Dying Industries," *The Wall Street Journal*, March 28, 2011; and Phil Izzo, "Top 10 Thriving Industries," *The Wall Street Journal*, May 16, 2011.

A manufacturing tactical-level decision might involve rearranging the work area, altering production schedules, changing inventory methods, or expanding quality control measures. These changes require time to implement and represent changes to the basic methods of the firm. What distinguishes them is that they can be made without altering the overall characteristics of the organization. For example, in most cases, expanding quality control measures does not require the firm to expand into new industries, build new facilities, or alter the structure of the industry. Much of the information for making tactical decisions comes from the transaction records that have been stored in the computer. Computer tools to help analyze this type of data are called **decision support systems (DSSs)** and are described in detail in Chapter 10.

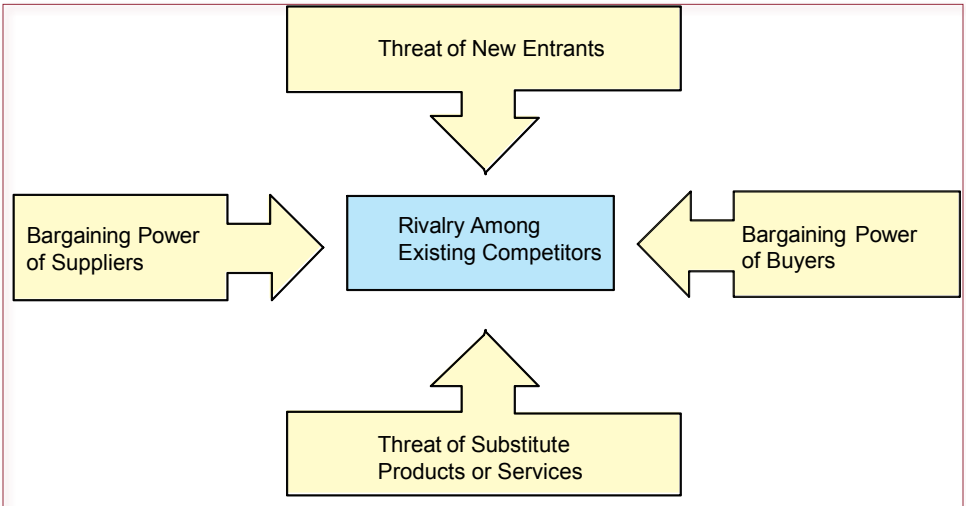


Figure 1.15

In analyzing strategies, Michael Porter focuses on the five forces: threat of new entrants, threat of substitute products or services, bargaining power of suppliers, bargaining power of buyers, and rivalry among existing competitors. Competitive advantage can be obtained by using these forces or altering the relationships between these external agents.

Other types of problems that involve more complex models occur in business. For instance, **diagnostic situations** consist of spotting problems, searching for the cause, and implementing corrections. Examples of these situations include responding to problem reports from operations to identify the cause of the problem and potential solutions. For instance, a marketing manager might be asked to determine why the latest marketing approach did not perform as well as expected. Tactical-level decisions tend to involve specialized problems and can often be solved with the help of an expert. Chapter 10 presents **expert systems (ES)** to make this knowledge more accessible to an organization.

Strategy

The next step on the pyramid moves up the corporate ladder to executive-level decisions. Although you may never be a CEO, you might be in a position to advise upper-level management about strategic opportunities—especially in small businesses. **Strategic decisions** involve changing the overall structure of the firm to give it an advantage over the competition. They are long-term decisions and are unstructured. In other words, they are usually difficult and risky decisions. Examples of strategic decisions in the manufacturing arena include building new factories, expanding to new products or industries, or even going out of business. Strategic decisions represent an attempt to gain a competitive advantage over your rivals. Because of the complexity and unstructured nature of executives' decisions, it is difficult to determine how information systems can help at the strategic level. However, Chapter 11 explores information system techniques that firms have used to gain a competitive advantage.

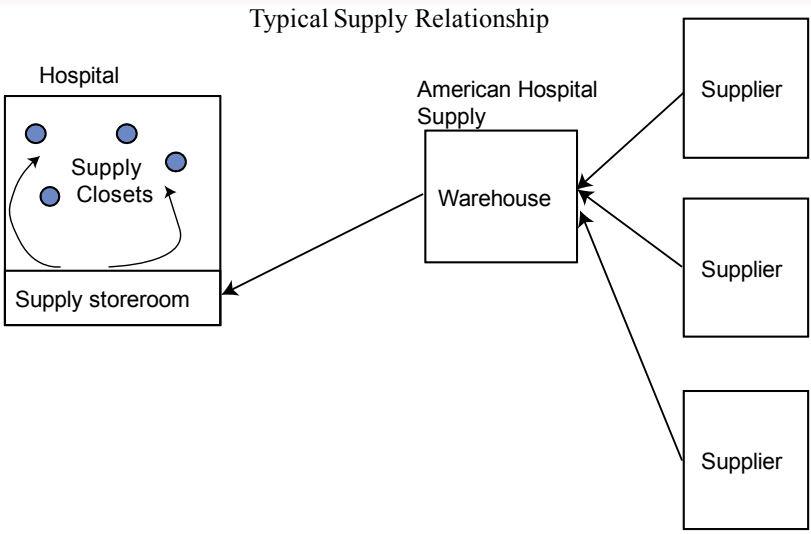


Figure 1.16

American Hospital Supply began as an intermediary that bought various medical supplies and distributed them in bulk to hospitals. The hospital distributed supplies throughout its facility and was responsible for maintaining its own inventory.

An Introduction to Strategy

Why are strategic decisions so difficult? How do you begin searching for competitive advantage? In all industries, competition is challenging. Firms are constantly searching for ways to gain an advantage over their rivals. Finding these opportunities is hard: it requires extensive knowledge of the industry, and it requires creativity. Managers also have to be willing to take risks to implement strategic options. Strategic uses of IT often involve the use of new technology and development of new software. Being the first company to implement a new idea can be risky. However, it can also bring substantial rewards.

Strategic uses of IT are discussed in detail in Chapter 11 because you need to understand the technology before trying to solve difficult problems. On the other hand, to stimulate the imagination needed for creativity, it helps to begin thinking about the basic ideas right from the start. Many cases throughout the book illustrate how firms have used technology to gain substantial advantages. These examples should help you solve other problems. If you can recognize a pattern or similarity between your problem and actions taken by other firms, the association may help you create a solution.

Searching for Ideas

Michael Porter noted that often the first step in searching for competitive advantage is to focus on external agents, or entities that are outside the direct control of your company. Porter's Five Forces model in Figure 1.15 illustrates that typical external agents are customers, suppliers, and rivals. You should also look at the role of government as an external agent. Competitive advantages can be found by producing better quality items or services at a lower cost than your ri-

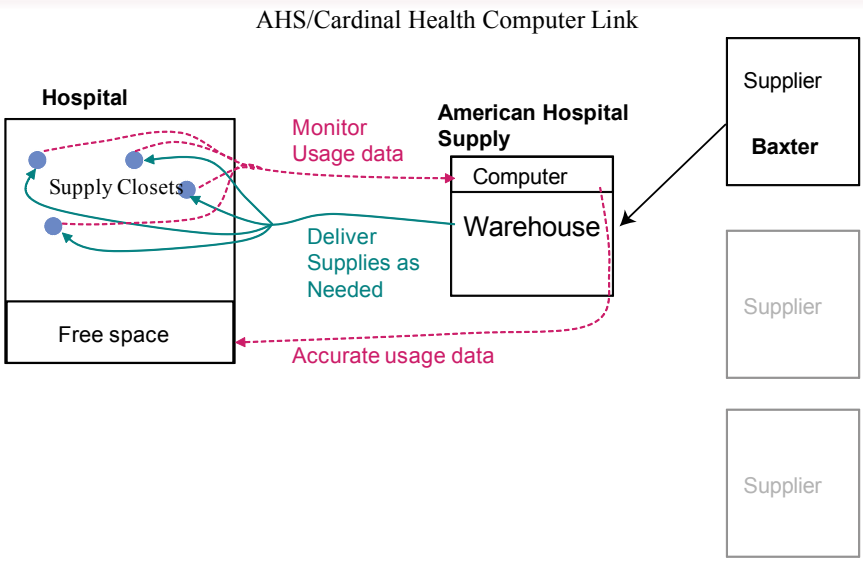


Figure 1.17

American Hospital Supply changed the industry by providing a just-in-time inventory delivery service. Supplies then were delivered directly to where they are used within the hospital. AHS could offer this system only by maintaining a computer link between supply usage and the local warehouse. The computer data also provided summary reports to management. By purchasing AHS, Baxter Healthcare gained immediate access to that sales data.

vals. Also, many firms have strengthened their positions by building closer ties with their suppliers and customers.

It is hard to find revolutionary ideas that alter the entire industry. And every firm in the world is constantly searching for that next big idea. Not only do you have to come up with the best idea, but you have to do it before someone else tries the same (or better) strategy. Then, because new strategies involve significant changes, and often high costs, you have to be able to persuade the other managers that your idea will succeed.

Strategy Example: Baxter Healthcare

Strategy is often easier to understand with examples or cases. A classic case involving IT involves management of hospitals. For a moment, picture yourself as the business manager of a medical center. Hospitals use a large amount of routine supplies such as bandages and antiseptics. Originally, they purchased them from various suppliers, held them in inventory, and distributed them throughout the hospital as they were needed. This relationship is shown in Figure 1.16. American Hospital Supply (AHS) was one of these suppliers. Then, hospitals became squeezed by initial governmental efforts to rein in and standardize medical costs. One consequence of these early controls is that hospitals and physicians no longer controlled the length of stay for patients. Consequently, hospital managers were forced to find ways to reduce costs. To gain an advantage over their competitors, AHS created a new system and made an offer to the hospital managers. AHS

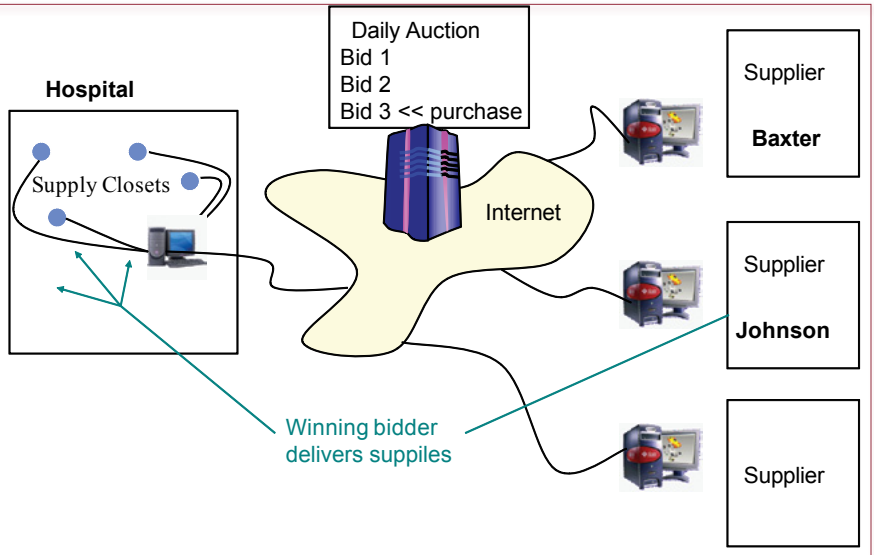


Figure 1.18

Moving to the Internet. Today, competition could be increased by connecting the hospitals and suppliers through a B2B Internet auction. The daily hospital data could be listed on a private auction site, and supplier computer system would automatically bid for each job. The winning bidder would deliver supplies as usual, but different suppliers might win the bidding each day.

placed computer terminals in hospital locations where the supplies were used (emergency, operating rooms, nursing stations, etc.). As shown in Figure 1.17, these terminals were connected to the AHS computer.

As hospital personnel removed supplies, they recorded them on the terminals. The computer kept track of the amount of supplies in each location. A list would be printed at the warehouse, and drivers delivered the necessary supplies to each location in the hospital. Monthly usage statistics were sent to the hospital.

The hospital gained because the facility did not need to maintain extra inventory, which saved money and space. Fewer hospital employees were required, because the supplies were delivered directly to the needed locations. Additionally, the hospital received detailed usage records.

To offer this service, AHS incurred higher costs—largely the cost of creating and maintaining the information system. What did AHS gain in return? As long as it was the only company offering this service, AHS gained a competitive advantage by providing a new service. Hospitals were more likely to choose AHS over the rivals. But what would happen if a competitor created a similar system? Would the hospitals stay with AHS or switch to the rivals?

Although the answer depended on the prices, hospitals had a strong incentive to stay with AHS. They would encounter various **switching costs** if they chose another supplier. For example, daily operations would be disrupted while the system was changed. Employees would have to be retrained to use the new system. Managers who used the monthly usage reports would have to adapt to the new system. A rival would have to offer strong price advantages to overcome these costs.

In 1985, Baxter Healthcare, a large manufacturer of supplies, purchased AHS. Of course, over time Baxter had an incentive to cut its costs to maintain higher profits. In the process their delivery service might suffer. Some hospitals apparently experienced problems and returned to in-house stock rooms to eliminate shortages of basic supplies. In 1996, Baxter spun off Allegiance Medical Supply Corporation as a separate unit. Today, Allegiance is a subsidiary of Cardinal Health, one of the three main health care distributors in the United States (Owens & Minor and McKesson are the other two).

With the expansion of the Internet, as shown in Figure 1.18, the entire medical supply chain industry is attempting to build an online Web service system. Ideally, miniature electronic auctions would take place each day. The supplier systems would automatically monitor the hospital needs and compete to resupply them. Most of the monitoring and bidding could take place automatically on the Internet. The best bid would win each day, and the hospitals would not be tied to a single supplier. Yet all transactions and payments would be automated, holding costs down for all parties.

Cloud Computing

As a consumer, you have certainly seen the increasing importance of Web-based technologies, including sales, news and entertainment, communications, and social network interactivity. Many of these same concepts can be applied to information technology within businesses. Instead of running applications on personal computers, all of the data and services can be moved to Web-based servers. Managers could access the data through portable devices including laptops, tablets, and cell phones. Centralizing the Web servers provides the ability to control and monitor the data and software. It also makes it easy to provide backups, duplicate facilities, and robust Internet connections. In some cases, services might be provided by other companies. The Internet is often pictured as a cloud because it has imprecise boundaries. So running operations from Web servers is often referred to as **cloud computing**.

Many aspects of MIS can impact and benefit from cloud computing. Each chapter in the book looks at various issues and examples of how Web-based servers can change the way companies deal with information systems.

Summary

Information technology is altering jobs, businesses, and society. Managers who understand and use this technology will be able to improve companies and advance their personal careers. Studying technology means that you must also study businesses and understand how they operate. Information systems consist of hardware, software, people, procedures, and collections of data. These components work together to provide information and help managers run the firm, solve problems, and make decisions. Studying information systems will also teach you to analyze business operations and solve problems.

The role of a manager is changing, but at a basic level all managers spend time organizing resources, planning, motivating workers, and communicating with other employees and managers. Several business trends will affect individual jobs, business operations, and society. Important trends include specialization, management by methodology and franchising, decentralization, the increased importance of small businesses, the use of temporary workers and consultants, the growing international scope of business, and the rise in service-oriented businesses. Infor-

mation technology is used to support these trends and provide new management alternatives.

As is true of many problems, management and information technology can be studied by breaking them down into smaller pieces. The three basic levels to management are operations, tactics, and strategies. The operations level is concerned with day-to-day operations of the firm. Tactics involve changes and decisions that improve operations but do not require a major restructuring of the firm. Strategies are designed to give a firm a competitive advantage.

Strategy typically involves examining external forces: rivals (competitors within the industry), customers, suppliers, potential new competitors, and potential substitute products or services. Information technology can be used to strengthen links strategically between customers and suppliers. It can also be used to create new products and services and to improve the quality of the operations.

A Manager's View

How do you manage and control a firm? In the 1950s, an army of back-office workers and managers were required just to record the basic data for the firm. Today, a good information system helps you manage a small company or a large empire with fewer workers. The workers that remain are those who use the technology intelligently to solve business problems. Regardless of your area of expertise, as a manager you have to be able to analyze and interpret data. You also have to communicate and share your work with teammates. Information technology provides the tools you need to solve common business problems.

Key Words

B2B
B2C
cloud computing
data
database
decision process
decision support system (DSS)
diagnostic situation
dot-com
e-business
e-commerce (EC)
enterprise resource planning (ERP)
expert system (ES)
hardware
information
information technology (IT)
knowledge
management information system (MIS)
people
procedures
reengineering
software
strategic decisions
structured decisions
switching costs
transaction processing system
wisdom

Web Site References

General Searches	
Ask	www.ask.com
Bing	www.bing.com
Dogpile	www.dogpile.com
Google	www.google.com
Yahoo	www.yahoo.com
Yippy	www.yippy.com
People and Businesses	
Anywho	www.anywho.com
Infospace	www.infospace.com
Knowx	www.knowx.com
ChoicePoint	www.choicepoint.com
Securities and Exchange	www.sec.gov
SuperPages	www.superpages.com
Switchboard	www.switchboard.com
Whitepages	www.whitepages.com
Reference	
Britannica (encyclopedia)	www.britannica.com
CIA World Factbook	www.cia.gov/cia/publications/factbook
Dictionary	www.dictionary.com
Encarta (encyclopedia)	www.encarta.com
FedStats	www.fedstats.gov
Translation dictionaries	www.freedict.com
Translate/Google	translate.google.com
Wiktionary	www.wiktionary.org
Wikipedia	www.wikipedia.org
Wolfram Alpha, math and science	www.wolframalpha.com

Review Questions

1. What is the main purpose of MIS?
2. How is MIS different from studying personal productivity tools?
3. Describe the five components of a management information system.
4. Why do students who are not MIS majors need to study MIS?
5. How important is the Internet in sales?
6. How do you know if you are buying the correct level of technology?
7. What are the roles of managers in a modern company?
8. Describe how seven basic trends in today's business environment are related to MIS.
9. Why is re-engineering important in business?
10. What are the three main management decision levels, and why are they important to know?
11. How does strategy involve "external" organizations?
12. What is cloud computing?

Exercises

1. Identify a job that has minimal use of information technology. Explain why the job might not need technology or what type of technology would be needed to improve productivity in the job.
2. Talk to at least three people and ask them how often they get a new cell phone and a new computer. Compare the answers and comment on any differences.
3. Choose a company and describe three decisions that must be made: one at the operations level, one tactical, one strategic. Be specific.
4. Choose a company and read its two most recent annual reports. Summarize the company's strategy and goals for the coming year.
5. As an entrepreneur, you decide to open a fast-food restaurant. You can purchase a franchise from one of the established corporations (as discussed in the McDonald's case) or create your own restaurant. Compare the choices by identifying the decisions you will face with each approach. What data will you need to collect?
6. Assuming you run a small business, find two Web sites that enable you to hire contract workers online. Provide a brief list of the types of tasks that are offered on the sites.
7. Review business magazines, newspapers, and Web sites. Find two organizations and identify a specific business problem that each one faces. Classify the problem as operations, tactics, or strategies.

8. Identify the most likely decision level for each of the following situations.
   a. A manufacturing firm lays off 100 workers.
   b. A restaurant completely changes it menu.
   c. A Web site begins accepting Google payments.
   d. A company builds an iPhone-based app to provide complete customer and order data to its salespeople.
   e. A California farmer tears out his fields of grape vines and plants olive trees.
   f. A large retail chain implements a new computer system to analyze sales by time and day and uses it to alter prices in every store.
   g. A manufacturer creates a computer system to evaluate workers in terms of productivity and cost and uses it to give bonuses or fire workers.
9. Find one company that is using information technology in a way that surprises you. Briefly explain what the company does and why it seems different or new. (Check places you go, try the Wall Street Journal, Computerworld, or CIO Magazine.)

10. Which geographic region of the world has the most Internet users and why?

Technology Toolbox: Searching

11. What was the name of the space shuttle that took the last flight?
12. What is the approximate ratio of cell phones to landline phones in Ethiopia?

13. How many singers have covered (recorded) John Lennon's song *Imagine*?
14. How much profit did Exxon Mobile earn in 2010?
15. Who is the main executive producer of the TV show *The Big Bang Theory*?

Technology Toolbox: Government Data

16. Find monthly unemployment data for at least five years and display it in an appropriate chart.
17. Compare the most recent population by state.

Technology Toolbox: Spreadsheets

18. Create a spreadsheet to record current sales and forecast future sales as a 4 percent increase.

	increase	4%
Region	**Sales**	**Forecast**
Midwest	132	
Southwest	651	
Northeast	478	
Southeast	391	
	1652	

19. If you have Excel 2010 or later, create the following spreadsheet and chart that consists of fictional data evaluating three search engines. The weighted average is the total of the response value in the cell times the point value on the first row, where the total is divided by the sum of the number of responses.

	5	4	3	2	1		
	SA	A	N	D	SD	Wtd Avg	
Google	71	37	12	5	1	4.365	
Bing	65	43	27	8	4	4.068	
Yahoo	32	55	45	32	12	3.358	

Teamwork

20. Each team member should find and select a new computer that could be used by a typical manager in a business. Combine the data from each person into a single spreadsheet. Compute the average price, drive size, and memory size. As a group, select one of the computers that could be used as the standard for each person in the group.

21. Choose an industry. Have each team member select one company within the industry and find the number of employees at that company for the two most recent years. Compare the total number of employees to see if the total has increased, and to see which firms are growing the fastest. Compare the industry results to those in the rest of the class.

22. As a team, find an example of companies that have recently merged. Identify potential reasons for the merger and how each company might benefit (or suffer) from the merger.

23. As a team, choose a specific company and identify at least one decision that has to be made at each of the management levels. What data would be needed to make the decision? Briefly explain why the chosen level applies to each decision.

Rolling Thunder Database

24. Install the Rolling Thunder Bicycles database. Look through the various forms. List each of the main forms and briefly describe the purpose of the form.

25. Using the Rolling Thunder help files or the description available on the Internet site, describe the goals of the firm and outline the basic operations.

26. Using Internet sources, identify the competitors to Rolling Thunder Bicycles.

27. Using Internet, financial, and government sources, estimate the size of the market (total sales and number of bicycles) for quality bicycles.

28. Locate at least five sources for additional information about bicycles and bicycle components on the Internet. List and briefly describe the sites.

Additional Reading

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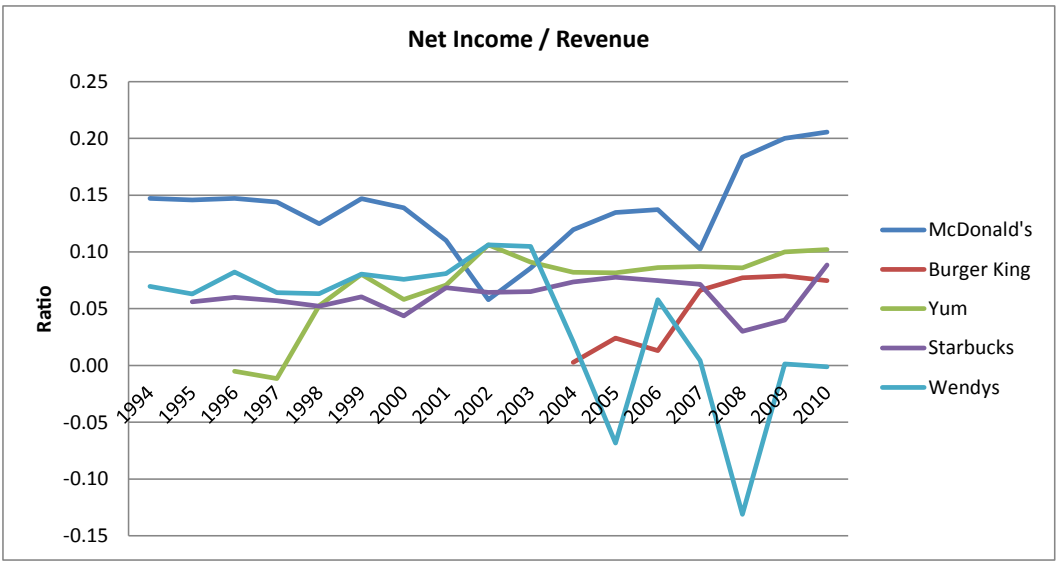
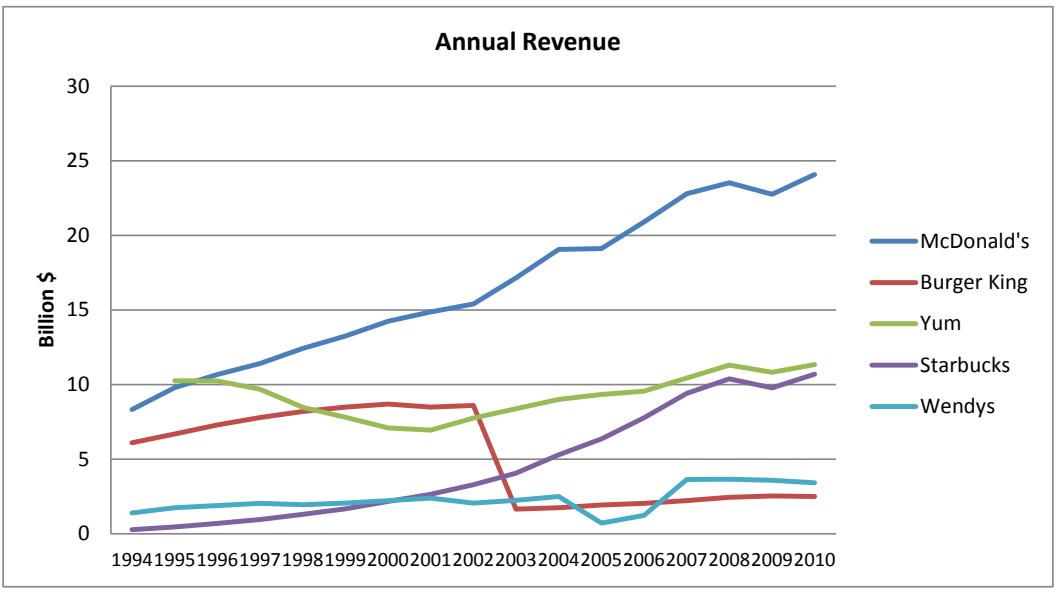
Cases: The Fast-food Industry

The Industry

What do customers want? Look at the sales for the major fast-food restaurants, and you see increases by many companies. Look at the Standard and Poor's restaurant stock market index, and investors agree. In 2003, the index was up 37.5 percent, compared to a 24.8 percent rise in the S&P 1500. Since an aging, wealthier population favors dining in full-service restaurants, the casual-dining sector is gaining share from fast-food restaurants. This trend is projected to continue as the population ages. Many restaurant chains, especially those in the fast-food sector, will increase their focus on healthy food initiatives to attract customers and reduce the impact of obesity-related lawsuits. Increased diversity in menus will help to reduce the dependence on industry price discounting, enabling operating margins to further expand. The introduction of new restaurants will likely slow in the over-stored U.S. fast-food market. Most fast-food restaurants are looking to international expansion to lead to growth. But, fast-food restaurants cannot stand still. Many radically expanded their menus, both to target higher-mar-





gin threats such as coffee and smoothies, and to add healthier snacks. And when the recession hit in 2007, fast-food restaurants were able to provide meals at substantially lower costs than full-service restaurants. In the ensuing couple of years, fast-food chains increased sales while many high-end restaurants closed down.

During the past two decades, the percentage of U.S. food dollars that has gone to eating out has increased substantially. A greater percentage of people, particularly women, are working more, leaving less time available to prepare food at home. Overall sales have increased based on three factors:

- The opening of new stores.
- Higher contributions from older restaurants.
- Acquisitions of other chains or selective sites.

But over the past several years, fast-food sales gains have lagged those of the full-service sector, due in part to ferocious competition, fierce price discounting, and reduced same-store sales and profitability. In January 2003, both McDonald's and Burger King changed management teams. Both companies have focused on rebranding efforts to recast their dowdy image and less reliance on price discounting as a means to drive traffic. In 2004, the CEO of McDonald's died of a heart attack, but it is likely the changes he instituted will continue.

What Do Customers Want?

Most of the fast-food restaurants have tested a variety of options to find what customers want. Originally, McDonald's was successful because it promised the same level of service and quality regardless of where you traveled. But incomes increased and health became an important issue. Do customers still want the same things? How can the big fast-food chains identify what customers want? How can they respond quickly enough?

New Concepts: Quick Casual.

The first generation to grow up with fast food has now reached their mature, high-income years. To meet their needs, "quick casual," limited, self-service restaurants are geared toward adults. They feature "upscale" menus, with more healthful items such as gourmet soups, salads, and sandwiches. In some quick-casual units, workers take orders from behind the counter as customers proceed in a line toward the register. In others, they take orders at a counter where customers pay for the food, which is then prepared and delivered to the customer's table. Checks, averaging between $6 and $9, are higher than in traditional limited-service units, but lower than in full-service casual dining restaurants.

The most successful and most visible of the quick-casual chains is Panera Bread Company. An operator of bakery/cafés, system sales now surpass $800 million. The company plans to add another 100 to 150 units annually over the next several years.

Focus on Health.

The American culture has become significantly more health-conscious and litigious over the past decades. This culture has resulted in lawsuits focused on the responsibility for obesity-related health problems faced by consumers, particularly children. Plaintiffs have sought remedies such as menu changes, nutritional labeling, advertising restrictions, and monetary damages. In response to this strong customer demand, many restaurant chains have begun to make significant changes in their menu offerings. Applebee's International signed a deal with Weight Watchers International Inc. in July 2003 to develop a menu for diet-conscious individuals. In February 2003, Darden Restaurants opened its first Seasons 52 unit, a test concept offering low-calorie menu items.

The fast-food industry has introduced even more dramatic changes, perhaps because it has the most to lose from consumer perceptions of the healthfulness of its food offerings and from potential lawsuits. In August 2003, Wendy's announced that it would promote four meal combinations from items already on the menu that would have less than 10 grams of fat. Wendy's also added another salad offering to its menu. Burger King and Jack in the Box have focused on salad, chicken, and turkey offerings to revamp their menus.

McDonald's has developed a wide range of "Healthy Lifestyle" programs, including the addition of menu offerings that the company believes will attract health-conscious consumers. It has also developed new Happy Meals that include yogurt, milk, vegetables, or fruit, depending on the end market. In 2002, McDonald's changed its cooking oils to reduce the amount of trans-fatty acids in its fried foods. In June 2003, it phased out animal-growth-promoting antibiotics in its meat supply. McDonald's has also sought to promote nutritional education and awareness among its customers. In May 2003, the company formed its Global Advisory Council on Healthy Lifestyles, consisting of experts such as doctors, educators, and athletes in the areas of fitness, nutrition, and active lifestyles. The group is commissioned to help guide the company toward activities that promote balanced, healthy lifestyles among its customers. McDonald's has also begun to collaborate with the World Health Organization and the U.S. Department of Health and Human Services to educate consumers on the importance of nutrition and fitness. The company has educated consumers by printing brochures directing them to the nutritional information on its corporate Web site.

The Future

The restaurant industry generally depends on the economy. When people work, they have less time and more money, so they vote for convenience. As long as costs stay low, the industry should continue to do well. Costs are heavily dependent on labor and food. Companies tend to lock in food costs for up to a year, so they are less affected by short-term swings in prices. Labor costs depend on the overall economy. The question of what customers want is difficult to answer. And the answer changes over time. Information systems can help identify sales patterns. They can also help control costs and reduce order lags with suppliers. But, analyzing the data requires a keen eye and experience.

Case: McDonald's

What do customers want? John Gusapari in *The Customer Connection* suggests that one goal is to meet customers' expectations. You accomplish this by creating value. Creating quality is not just a matter of reducing defects but of providing customers with something they value. McDonald's (ticker: MCD) has a clear definition of customer needs and expectations. Its formula is QSC, quality, service, and cleanliness (Band 1989). Transaction quality, defined from a customer's perspective, means paying for a product or service in a way that makes the customer feel good about doing business with a company.

According to Harry Beckwith (Beckwith 2003), customer definition is essential to success in marketing. Beckwith viewed McDonald's as an example of a classic, but simple, excellent service model. However, he feels that they have recently taken their eye off the ball, forgetting their formula for success. Beckwith feels their mistake is that they have been thinking that fast food is a food business. Beckwith focuses instead on the "fast" part of the definition: It is a time and convenience business. In Beckwith's opinion, McDonald's has made the menu choices too complex costing customers too much time. Beckwith does not feel that people go to McDonald's for the menu.

Corporate Summary

McDonald's Corporation serves more than 64 million customers daily from 32,737 fast-food restaurants in over 115 countries. In 2011 there were 14,000 restaurants in the United States and 17,614 in other countries. McDonald's maintains its competitiveness through substantially uniform menus and standard operating processes. The company has experimented with expansion through partner brands in additional market segments including Boston Market, Donato's Pizza, and, (in the UK) Pret A Manger. McDonald's sold its Chipotle Grill in 2006 for $300 million. McDonald's operates all of its restaurants under joint venture agreements. In 2010, McDonald's annual report showed the mix was (although only company stores are recorded as revenue):

Restaurant	Sales ($ billion)	Number
Company-operated	$16,233	6,399
Franchise + Affiliated	$61,147	26,338
Total	$78,380	32,737

Systemwide sales were $64 billion in 2010, accounting for $24 billion in revenue for McDonald's. The company is targeting sales growth rates of 3-5 percent a year. U.S. sales increases were largely driven by breakfast items and coffee, and the introduction of wraps as a menu item. International business contributed 66 percent of revenue in 2010 and 50 percent of operating income, compared to 45 percent in 2003. McDonald's 2006 Annual Report notes the existence of 550,000 restaurants in the U.S. with $365 billion in sales. McDonald's restaurants represent 2.5 percent of the total and 7.4 percent of the sales. Key factors in the performance of the company include

- The ability to forecast trends, demographic changes, and food preferences.
- The selection of menu items and product mix.
- The ability to improve day-to-day restaurant operations and hire workers.
- The ability to identify new franchisees.

To focus on the restaurant business, in 2009 McDonald's sold its interest in the Redbox company for $140 million. In 2008, it sold its interest in the UK Pret A Manger company for $229 million. However, many McDonald's stores still have Redbox movie rental kiosks.

Turnaround Under Way

Jim Cantalupo, one of the architects of McDonald's highly successful worldwide expansion in the 1990s, was lured out of retirement to run the company. He assembled a youthful and energetic management team, led by president and chief operating officer Charles Bell, to revamp the company's fortunes. Under this new leadership, the company embarked on a strategic plan to return to positive sales growth and income trends. To accomplish this goal, the company shifted its focus away from expansion and toward the improvement of existing operations. Tragically, Jim died of a heart attack in April 2003.

McDonald's began to address concerns that its menu had become stale and irrelevant to today's consumer. McDonald's made new product introductions, including salad offerings, the McGriddle breakfast sandwich, and increased Happy Meal options. Even though management believes that excessive price discounting has diminished the company's brand image, the company plans to maintain the 99-cent Value Meal offering. In relation to the brand image, the public's percep-

tion of the quality, service, and cleanliness at McDonald's units has suffered over the last several years. The company has lagged behind its peers in consumer attitude toward these areas. To improve overall customer satisfaction, the company has refocused on its quality, service, cleanliness (QSC) program. This program gauges performance at each location through customer satisfaction studies and "mystery shoppers," who pose as customers and score each unit's performance in various categories. The company has also taken a harder line with franchisers who do not perform to expectations.

McDonald's must also reinvigorate the company's franchise base. Franchisees run more than 70 percent of McDonald's 31,000 restaurants worldwide and account for a similar level of systemwide sales. In recent years, many franchisees have been demoralized by declining profits caused by company-mandated discounting, a proliferation of stores that has cannibalized individual store sales, and the overall lack of a coherent national advertising program. Retaining hardworking, entrepreneurial store owners is paramount to reinvigorating the company's health.

McDonald's began to reap benefits from its new strategies in early 2003. The company had seen its profitability deteriorate in the United States during 2001 and 2002 because of operational shortcomings and sales trends that were significantly below the industry average. In the second quarter of 2003, driven by new product offerings and improved marketing effectiveness, same-store sales jumped 4.9 percent, year to year. While these sales results are only an important first step in reviving McDonald's image, the company must show tangible improvement in its customer satisfaction scores to maintain momentum. New products may lure customers through the doors, but high degrees of customer satisfaction are often the key to keep them returning.

CEO Jim Skinner is pushing for innovation in new products, but is also focused on "maintaining fiscal discipline and tight controls on company expenses" (2006 Annual Report). 2006 was a good year for McDonald's with a 7 percent global increase in sales and improved prices of the stock. However, McDonald's used the proceeds from the sale of its Chipotle franchise to repurchase shares—contributing to the increase in stock prices.

Since 2006, McDonald's has averaged four percent increases in sales revenue at U.S. stores. Despite the recession, McDonald's has grown—even faster than its nearest competitors. The company plans to push its advantages—with plans to remodel or rebuild almost half of its 14,000 stores. Key elements in the rebuild include doubling the number of drive-through lanes and redesigning interiors that encourage people to stay longer (Jannarone 2011).

Enhancing Information Technology through Project Management

To improve the project success rates on information technology projects, McDonald's has developed an apprenticeship program for prospective project managers, combining classroom theory, on-the-job learning, and support from mentors. McDonald's is accomplishing this program in association with the Computer Technology Industry Association (CompTIA), six other companies, and a $2.8 million grant from the Department of Labor. The goal is to develop a National Information Technology Apprenticeship System, aimed at building skills and credentials around specific business-technology functions.

The grant enables CompTIA to build four career tracks in areas that it feels are prime for IT apprenticeships: IT generalist, project manager, security, and data-

base. The grant also provides funds to implement Web-based processing of applications and certification. Over the next five years, CompTIA has committed matching funds of nearly $3.8 million to develop the system's infrastructure, skill standards and work processes, and marketing strategies to encourage large-scale private sector adoption.

The Labor Department awarded CompTIA a grant of $550,000 through December 2002 to assess whether apprenticeships would work in the IT industry and to develop one apprenticeship track for the IT generalist. Success with that led the Labor Department to award a $475,000 second-round grant through December 2003 to develop additional apprenticeship tracks, including IT project management, and to test them in pilot companies such as McDonald's. The latest round of funding enables the Labor Department to expand on these original efforts.

Using Technology to Improve Operations

Day-to-day operations are critical to McDonald's restaurants. Hyperion, a software company that sells analytical tools, observes that reducing service time by six seconds increases sales revenue by one percent (Vance 2004). HyperActive Technologies, a specialty company from Pittsburgh, created HyperActive Bob, a tool that helps estimate fast-food sales for the next 10 minutes. The tool uses past sales data and cameras to evaluate traffic entering the restaurant. The computer display tells the grill cooks how many high-volume items to start cooking. When the order arrives, it is pulled right off the grill. In one trial, the system noticed fewer cars entering the drive-through than expected and it told the grill cook to hold back. The cook, with three years of experience, wanted to ramp up production for the lunch hour. The manager convinced him to listen to Bob and wait. It turns out a ruptured gas line on the road blocked traffic, and the real-time information analyzed by Bob was correct. In 2006, McDonald's rolled out a new point of sale system to 8,400 restaurants. The system created improved order accuracy and speed of service.

Sometime around 2001, McDonald's Corporation started the Innovate project that was designed to build an intranet to collect detailed data from every restaurant franchise around the globe and transfer data to corporate headquarters. The system would have integrated 30,000 restaurants in more than 120 countries. Presumably, it would have given McDonald's detailed records on sales and operations. According to SEC filings in 2003, the project was cancelled after spending $170 million on consultants and initial implementation (McDougall 2006).

Dee Crawford runs five McDonald's restaurants. She notes that "Change is a part of our business, to keep up with customer demands, and there have been a lot of changes." In 2010, her restaurants had more than 100 items on the menu—far more than in the past. (Jargon 2010). The expanded menu has helped McDonald's increase same-store sales for 30 straight quarters since early 2003. Even during the worst of the recession in 2008, same-store sales increased by 6.1 percent. Introducing high-end coffee has increased sales in some stores and struggled in others, and the machines cost $100,000 per store. The company has learned that snack wraps and other items often eaten between traditional meals have become the fastest selling items. Most stores have increased their hours to attract more non-traditional traffic. With the larger menus, a corporate distribution center automatically handles inventory and restocks stores two or three times a week.

The 2010 annual report notes that the company uses a "strategic menu pricing tool that optimizes price, product mix, and promotions." Several newer res-

taurants use electronic display boards to digitally display the menu and prices. Among other things, the tools enable the restaurant to quickly alter prices. The company also plans to introduce a new point-of-sale system beginning in 2011. In some locations, particularly Europe, the company is introducing self-order kiosks. In a few locations, drive-through productivity is improved by having employees with hand-held terminals take orders by walking down the drive-through lane.

In 2010, McDonald's worked with Nintendo to develop a DS-based game to help train new workers. Most restaurants have relatively high employee turnover, so they are constantly training new workers. The system reportedly reduced training time from 45 to 24 hours and eliminated the need for human trainers for the initial training (Perkins 2010).

Application of the Internet to Solving Business Problems

One of the ways that McDonald's has used the Internet is to provide information to customers to deal with the fat content of their meals. While this is in some way a response to attorneys and consumer groups that have criticized the industry for fattening America, McDonald's is using Internet technology to better disseminate information about the nutritional properties of their menu items. In 2003, McDonald's revamped its www.mcdonalds.com Web site to better explain the nutritional values of the chain's foods.

Among the most graphically sophisticated nutrition tools on the Internet, "Bag a McMeal" enables users to drag up to five McDonald's menu items from pull-down lists into a virtual bag. Once completed, the users receive a cumulative nutrition profile covering calories, fat, cholesterol, and sodium, among other information. A "Customize an Item" feature enables consumers to obtain a nutrition profile for a special order, such as a McChicken sandwich without mayonnaise or a Big Mac without cheese or sauce. "Bag a McMeal" uses multiple pull-down lists and drag-and-drop functionality to generate a nutrition profile for a complete meal of up to five items. The goal is to provide additional educational resources to demonstrate the range of options and service sizes available to make it easy to fit McDonald's into a balanced diet.

According to McDonald's representative Lisa Howard, the Web-surfing public has found value in the dynamic nutrition databases. "There are from 160,000 to 200,000 unique visitors to the nutrition section of McDonalds.com each month," Howard said. "We've seen it spike [upward]" since the new Web tools were put in place, she added. According to Howard, "We continue to look at new and innovative ways to communicate with customers, like in store kiosks" (Brewin 2003).

Reaction to the Web-based nutrition information has been critical. "If [the chains] were really serious about doing a better job at giving consumers information, diners would have that information at the point of decision in the restaurant," said Jeff Cronin, director of communications for the Washington, D.C.-based Center for Science in the Public Interest. "Now the [nutrition] brochures are hard to read and hard to find and sometimes altogether absent. Few consumers would leave their place in the drive-thru or counter line to find and read a poster with nutrition information before ordering, and many fewer are likely to go to a Web site before making a decision." National Restaurant Association officials and representatives of some other trade groups have countered this argument by asserting that restaurateurs provide what consumers want, not what restaurateurs think consumers should eat. They believe menu board notices are unnecessary, since many chains already provide interested consumers with printed brochures or Web site pages containing nutrition information for regular menu items.

Given the debate about practicality and accessibility, information about nutrition can be stored in large, centralized, and easily updated databases that many consumers can tap through the Internet. Such data can be presented in ways that enable Web surfers to personalize searches and "drill down" through multiple layers of details to get as little or as much insight into a topic as desired. Many restaurant companies have ignored such dynamic Internet presentation plans in favor of merely presenting at their Web sites the same nutrition information tables contained in printed brochures.

McDonald's may be considering ways to leverage its Web site technology in such a fashion, company spokeswoman Howard said. "We continue to look at new and innovative ways to communicate with customers—that is certainly something we might look at."

Of course, using the Web also opens up more holes for hackers. In December 2010, McDonald's reported that someone had broken into the company's databases and stole information about customers (Perez 2010). Much of the data was collected by Arc Worldwide, a company that develops and coordinates promotional e-mail messages for McDonald's. The data was basically personal information provided by customers and did not include SSN or financial data.

McDonald's also runs a Facebook page which it basically uses as a Web site to provide basic data but also to collect comments from users. The McDonald's site is also one of the first to use Facebook's location feature. It enables people to "check in" at a location and receive coupons or promotions for the nearest McDonald's restaurant (Gannes 2010).

Implementing Wireless Technology

Many restaurants view the public-access Wi-Fi "hot spot" technology as essential for attracting customers. But what is still unclear is how much businesses can charge customers to use the Wi-Fi links—or whether they should simply provide the Internet and e-mail access capabilities for free with the hope that increased sales of food, drinks, and other products will offset the cost of the technology.

McDonald's launched a Wi-Fi pilot project at 75 restaurants in the San Francisco Bay area in mid-2003 through a deal with Austin-based Internet access provider Wayport Inc. Mark Jamison, vice president of business strategy and development at McDonald's, said the company would use the San Francisco trial and similar ones in Chicago and New York to evaluate potential pricing models for the service and Wi-Fi technology's ability to attract customers. The end result is that McDonald's plans to equip several hundred restaurants in the United States with Wi-Fi connections by 2004. McDonald's charges $4.95 for two hours of Wi-Fi access at the San Francisco locations, but customers who buy a meal can use the technology for free. By the end of 2006, 15,000 restaurants worldwide had wireless access.

But will customers really go to a restaurant because it has wireless access? Consider the opinion of Matthew Nuss of the Valencia Group, a Houston-based hotel operator: "Wireless, in our opinion, is the next running water. It has become part of the infrastructure of a hotel" (Wright 2003). On the other hand, McDonald's is using an outside company (Wayport) to set up and run the Wi-Fi operations. McDonald's is also benefiting from the technology. It is using the same Internet connection to run its cashless payment and credit card systems. Basically, it is turning communications with the stores into a revenue-generating operation (Brewin 2004). David Grooms, VP of IT at McDonald's noted that "It gives us a

platform to use wireless applications within the restaurant." It turns out that 25 percent of the Wi-Fi traffic is produced by gamers using Nintendo DS systems (Mitchell 2007).

Seattle-based Starbucks Corp. launched Wi-Fi service in its U.S. cafes in August 2002 and offers access in about 2,000 locations. Users have to sign up for the service with Bellevue, Washington-based T-Mobile USA Inc., whose prices start at $19.99 per month. Lovina McMurchy, director of Wi-Fi business and alliances at Starbucks, said the company plans to stick with that approach. But she added that Wi-Fi hot-spot deployment is "a learning experience" for businesses and said it's hard to tell how different pricing plans or free services will play out. At this point, a lot of companies are still just "dabbling" in Wi-Fi through pilot projects, McMurchy said.

In 2009, McDonald's in partnership with AT&T opened up the Wi-Fi and offered it for free. The goal was to encourage customers to sit around longer and buy more products—particularly higher-profit margin drinks including coffee and fruit smoothies. CIO David Grooms noted that "We're becoming a destination and free Wi-Fi just naturally fits. This is another long-term investment that we see helps McDonald's stay relevant as a brand in the marketplace." McDonald's is now a significant Wi-Fi provider in the U.S., delivering one out of six hot spots (Ziobro 2009).

Questions

1. How does McDonald's use technology to learn what customers want?
2. How does information technology reduce management costs?
3. Has the Wi-Fi implementation been successful?
4. Does the franchise model make it more difficult to implement information technology solutions? Explain.
5. Is it more important for information technologies to reduce costs or provide new services?

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Case: Burger King

Burger King (private) is the second largest fast-food chain in the United States, with more than 12,000 locations 2010. For the year ending in June 2006, Burger King's annual report estimates that McDonald's, Burger King, and Wendy's account for 73 percent of the fast-food sales in the United States, with Burger King accounting for 15. Burger King has encountered difficulties over the last few years. According to *Nation's Restaurant News (NRN),* the company's market share among quick-service sandwich chains dropped from 15.03 percent in 2000 to 13.68 percent in 2002. The comparative revenue from the annual reports shows slight increases for BK sales after 2003, but far below that of McDonald's.

In the fall of 2002, Burger King was sold to a private investment group for approximately $1.5 billion. Many analysts believed the change in ownership would improve the chain's management focus and vision, increasing its competitiveness in the marketplace. Brady Blum, formerly a senior executive of Darden Restaurants Inc., was hired as CEO to engineer a turnaround. Burger King now seeks to recast its brand image by focusing on its grilling processes and retooling its menu, while downplaying its previous emphasis on discounts. The new strategy has yet to provide the desired results, however. The chain has acknowledged that negative same-store sales trends continued into the first six months of 2003. From 2003 to 2006, the chain experienced a drop-off in franchisees renewing their 20-year agreements. To renew a contract, franchisees have to pay a $50,000 fee and upgrade their restaurants to current standards—typically paying around $325,000. Fewer than 50 percent of the franchisees were able to or willing to pay the costs for a full renewal. BKC also experienced problems collecting royalty payments from many franchisees and the company initiated a program to assist strong stores and help close the weaker ones. In 2006, BK went public again with an IPO. In 2010, BK returned to private ownership when it was purchased by 3G Capital (Web site history). Less than a week after the takeover, Raj Rawal was replaced as CIO by Heitor Goncalves (Betts and King 2010). Previously, Goncalves had worked Anheuser-Busch InBev, both as director of Mergers and Acquisitions and as a vice president of "rewards and target setting."

Standardized Point-of-Sale Terminals

New point-of-sale (POS) terminals from NCR Corp. have provided more than 130 Burger King restaurants in Canada with a standard method of order taking and data entry. Burger King Corp. has already installed NCR's Compris food service software, support services, and RealPOS 7454 terminals in more than 600 company-owned restaurants in the United States. It is wrapping up deployment in its 259 company locations in Canada, the United Kingdom, and Mexico. The goal of the deployment is to streamline equipment across corporate-owned restaurants around the globe, according to Michael Lingswiler, director of technical services with Burger King. "The drive behind this is standardization. The NCR platform provided the functionality and given where they are in the market are able to provide for future releases" (Hilson 2003).

A standard interface for all restaurants enables changes in the menu or special promotions to be easily linked with the corporation's back-end systems. Training can be standardized and deployed across all regions of the company. Simplicity, durability, and environmental friendliness are important in these fast-paced environments. Prior to the standardization effort, Burger King had a mixture of NCR and non-NCR equipment in their restaurants. Typically, these terminals have a life cycle of about three years. While franchise restaurants are responsible for their own POS hardware/software selections, they often adopt the corporate-owned model for ease in purchase and maintenance.

In its 2006 Annual Report, Burger King noted that it had selected three primary POS systems as preferred providers, but it does not require franchisees to choose a particular hardware and software package. Data collection from franchisees is still handled manually. By 2010 (annual report), the new POS systems had been installed in all company-owned restaurants and 57 percent of the franchises. All restaurants are required to install the new POS before January 1, 2014. Until that time, most of the restaurant are still reporting sales manually and BK has only incomplete data on sales.

Computer Security

Given its worldwide status, Burger King wanted to use automation to help it efficiently assign and manage the identities and network privileges tied to enterprise and online initiatives. "In our opinion it is a necessity," says Burger King's chief information officer, Rafael Sanchez. Such tools are needed "because every organization has legacy systems, and most legacy systems have their own security." (Liddle October 2003) In 2003, the installation of Oblix NetPoint software for enterprise Web access and identity management purposes was the latest development in a sweeping Burger King information technology project. That undertaking, for which Burger King involved consultant PricewaterhouseCoopers, is aimed at improving internal network security and controls over financial statements and enhancing the chain's performance by better empowering employees and improving relationships with franchisees, and vendors.

According to Burger King officials and PricewaterhouseCoopers documents, the latter two goals can be achieved by making available to field personnel, franchisees and suppliers certain business support applications and information once accessible only by select headquarters or regional staff. Such information sharing can take place through an Internet portal that might also benefit Miami-based Burger King by acquiring additional higher-quality operations information from franchisees, a PricewaterhouseCoopers case study of the project suggested.

Oblix NetPoint supports "single sign-on" for network users, or the consolidation of user-ID and password information for multiple Web-based applications or applications with Web front ends. It works with the Active Directory feature of Microsoft's Windows Server to streamline and automate several of the steps needed to make changes to user identity information and access privileges. The NetPoint software supports self-registration by users and the delegation of some administrative duties to certain classes of end users, such as department heads. It also ties access and privileges administration into a user organization's workflow routine. That makes possible scenarios such as one in which network access is immediately revoked for any employee subject to a termination notice from the company's human resources department.

Under the former security plan at Burger King, different legacy applications required or permitted administrators to create log-in IDs of passwords different from those used for other programs. That, CIO Sanchez says, made it possible for individual users to wind up with multiple log-on IDs or passwords or both. In the Burger King information technology realm "a person may have access to from five to 15 different applications," Sanchez explains. Those programs, he adds, include such things as basic network access and applications tied to sales, finance, and franchise-related matters.

Sanchez says he or someone else in his department had to change log-on IDs and password information and access privileges for a variety of applications whenever an employee joined the company, left the company, was given additional responsibilities, or was stripped of duties. Because disgruntled terminated employees are a potential threat to company resources accessible via a network, Sanchez says of the old security plan, "I had to pray that whoever provided access [to the employee in question] let me know about the termination." Creating an identity management infrastructure "allows you to manage the [network] environment a lot more efficiently," Sanchez says. "Everyone has one user ID and password for everything they use."

According to Sanchez, under the new system the "primary user of a particular application," such as a department head, assigns access and privileges to people within his or her sphere of influence. Such assignments, however, must be in keeping with the protocols and security parameters established by the configuration of NetPoint and the underlying identity management infrastructure, he indicates. "Dealing with outside communities—that is where we will use the power of Oblix [NetPoint] for self-administration," Sanchez remarks, referring to resources he expects to save by delegating administration of identity and privileges to suppliers and franchise groups with extranet access. The concept, he says, is that he might say to a supplier, "I'll give you access for up to 20 people, but the internal assignment within your company is your responsibility."

Human resources "can clue us [to personnel changes] in house, but when your partners are outside, it becomes even more difficult" to determine who should have access or who should have access terminated, Sanchez observes. Burger King's goal, Sanchez reports, is to reduce the time spent administering network security, while increasing the company's ability to implement new security strategies. To help achieve that goal, the Miami-based chain used PricewaterhouseCoopers to help build a modern directory and identity management infrastructure.

Among other things, Burger King will use its new identity management capabilities to help support portal access to the company's SAP R/3 suite of applications. Offering a wide range of end users access to business support software

through a portal with solid identity management underpinnings "allows us to extend the applications to the outer edge" of the Burger King universe, Sanchez says. "Technologies like identity management that drive costs down and increase employee, franchisee and [business] partner satisfaction give companies in the restaurant industry a competitive edge," Sanchez states. Because the use of NetPoint will reduce to one the number of log-on IDs and passwords used by Burger King employees, it should be easier for those workers to remember that information. And that, Sanchez says, should help reduce costs, or at least the workload, associated with the chain's information technology help desk.

The Internet

Burger King sometimes runs off-beat advertising campaigns. In 2009, they created a new campaign that involved Facebook. The company offered people free hamburgers if they deleted 10 online friends, calling it the Whopper Sacrifice. Facebook took offense at the campaign—partly because the BK site sent messages to the people being deleted telling them they were sacrificed for a free burger (Gaudin 2009). About 60,000 people had taken advantage of the free burgers in the first week, but BK decided to stop the campaign after discussions with Facebook.

Questions

1. Why is security so important to Burger King?
2. Why is technology standardization so critical?
3. Do all franchises need to worry as much about security, or just the fast-food industry?

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Case: Wendy's

Driven by expansion and new product offerings, U.S. annual sales gains at Wendy's (ticker: WEN) Old Fashioned Hamburgers outpaced those of McDonald's from 1998 through the end of 2002. According to *Nation's Restaurant News,* Wendy's market share in the quick-service sandwich sector rose to 11.4 percent in 2002, from 10.3 percent in 2000. While the company's expansion enabled it to continue capturing market share in 2003, same-store sales at its restaurants were down, year to year, through July. This decline was due to a change in comparisons from 2002 and competitive pressures, particularly from a recovering McDonald's. Systemwide sales for 2006 totaled $7.8 billion. Same-store sales increased by less than one percent, but profit margins at company-operated restaurants increased slightly.

The company has sustained its image as selling high-quality products in the quick-service sector and continues to enhance its reputation for offering a diverse selection of sandwiches. The company has also maintained industry-leading customer satisfaction scores. Future plans include an increase in national advertising spending targeting the growing number of Hispanics and late-night customers. Though the company has stalled for the near term, its strong brand image has prepared it for the longer term. In 2006, the company spun off the Tim Hortons and Baja Fresh subsidiaries, and approved the sale of its Café Express stores. Apparently copying McDonald's, the company used the funds to repurchase more than $1 billion in shares, hoping to prop up the stock price. According to Wendy's annual report, the company intends to expand its breakfast offerings to more store in an attempt to grow revenues in this newer segment. The company recognizes that it needs to work to rebuild its image. It also needs to reduce expenses, partly through selling some of the company-owned stores. In 2007, Wendy's executives floated the news that it was willing to be purchased—possibly by a private equity firm.

In 2011, Wendy's sold off the Arby's chain for $130 million to a private equity firm. The Arby's chain had suffered during the 2008 recession—largely because its sandwiches are more expensive than those at other chains. Wendy's will initially retain an 18.5 percent share of the new company.

Customer Cards

Under the direction of Scott McClenahan, Wendy's in Redwood City, Utah, is collaborating with Visa USA in a payment card acceptance pilot test. Wendy's is using a Verifone Omni 3200 customer-activated, credit-card-payment terminal on the front counter and a Verifone Everest terminal at the menu board in the drive-through. In configuring the Everest for the drive-through, Verifone developed a weatherized case for the terminal and attached a MagTek dual-head "dip" card reader to minimize instances of incorrect insertion that could slow transactions. The drive-through Everest terminal served as a remote link to the countertop Omni model. The two units were connected by a cable that ran underground from the restaurant to the outdoor terminal at vehicle-window height near a red LED order-confirmation board.

To keep transaction times as low as possible, most quick-service chains have limited their initial tests of card acceptance to credit cards and "check cards" that can be processed without requiring card users to sign receipts or enter personal identification numbers. As a result, drive-through point-of-order payment terminals often came without numeric keypads. The latest card-acceptance platforms combine a payment terminal supporting PIN-based debit transactions with LCD order-confirmation systems. A 2.4-gigahertz, wireless transmitter with encryption capabilities from AeroComm is now being used to transfer payment terminal data to the POS system.

Drive Through

Drive-through orders add up to 75 percent of a fast-food restaurant's sales. But most restaurants have only one order-taking station and that slows down the process. You have undoubtedly sat in the lines waiting for the person in front of you to stumble through an order. Miami Management, Inc., a company that owns 16 Wendy's franchises places two order stations in the drive-through lane. All of them are connected to an order center in Lexington, KY through voice-over-Inter-

net technology. The orders are entered into the point of sale system and displayed at the appropriate restaurant. Brian Fields, director of operations noted the system increased peak lunch hour performance from 117 to 137 cars per hour (Mitchell 2006). But all was not perfect. In at least one restaurant, the manager reported that the call center employees sometimes got orders wrong or failed to greet customers (Mitchell 2007). Part of the problem was that restaurants chose to use lower-priced DSL phone lines instead of dedicated T1 connections. And in many locations, the communication quality was inconsistent or poor.

Questions

1. Why has Wendy's been more successful at identifying customer desires than Burger King?
2. How do most customers pay for fast food? How much are they willing to pay in service charges to use ATMs in the restaurant?

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Case: Yum! Brands

After several years of closing unprofitable stores and selling company-owned units to franchisees, Yum! Brands Inc. (ticker: YUM) has shown renewed vigor. The owner of the KFC, Pizza Hut, and Taco Bell brands acquired the Long John Silver's and A&W restaurant brands in 2002 as part of its multibranding restaurant strategy. The company is aggressively expanding internationally as well, particularly in China, Mexico, Korea, and the United Kingdom. The company's diversified portfolio has enabled Yum! Brands to successfully grow its business despite difficulties that may occur at any one of its restaurant brands. Through late August 2003, strength at Taco Bell had helped to offset difficulties at KFC, while overall profitability was aided by a weaker dollar. Today, Yum! Brands, with 33,000 restaurants in five major chains and 2006 revenue of $9.6 billion with worldwide total system sales of $31.1 billion, is the world's largest restaurant operator in terms of units (34,595 in 2006). Yum has focused heavily on international growth, including KFC in China. The potential sales to over 1 billion customers is appealing to any company, but KFC has had to weather challenges with supply—particularly with SARS, the avian virus. According to the company's 2006 Annual Report, Pizza Hut is already the leader in casual dining in the UK and KFC and Pizza Hut are the number 1 quick-service brands in mainland China. In 2011, Yum! announced that it was selling the A&W and Long John Silvers chains. The company also announced plans to expand in China by acquiring the Little Sheep chain. Yum already owned 20 percent of the company, and profits from China were driving profitability for the entire company in 2010 (annual report).

The restaurants are trying to lift traffic and sales around the world by adding ambience, quality, and service to a business that largely ignores such niceties. Emphasis is placed upon training at the counter and upgrading the restaurants in terms of equipment and food. The average checks in the restaurants are $3 to $4 at Taco Bell and $5 to $7 at KFC.

While the burger chains duke it out on price, KFC, Pizza Hut, and Taco Bell are adding and emphasizing better food, which, in the case of KFC's roasted chicken, at least, also means lighter fare. Yum restaurants are pushing higher-priced items to bolster dine-in business. Among them: Pizza Hut's Chicago Dish pizza ($13) and Taco Bell's popular Southwest Steak Border Bowl ($3.50).

The CEO, David Novak, began an overhaul in 2000 in response to customer feedback. Customers bluntly told the chains their service was shoddy, their food subpar, and their restaurants, in some cases, shabby (Wells 2003). Novak, aged 50, still fumes when he recalls answering a call on Taco Bell's toll-free complaint line in early 2001. A woman named Michelle complained bitterly about getting the wrong $3.60 order and a lot of attitude. "I can assure you Michelle would be justified to tell everyone she sees about how poorly she was treated," Novak exploded in an e-mail to restaurant managers after the call. "This is the kind of word-of-mouth that kills us."

David Novak hopes that acting on this feedback will make the company stronger. Employees at all the chains around the world now attend training four times a year at which customer-service initiatives are hammered home. They also get evaluated, in part, on how they treat customers and react to problems when they arise. Novak is pushing to slice service times, particularly at Taco Bell and KFC. At Taco Bell a timer installed at drive-through windows beeps after 60 seconds. This is the time in which an employee is supposed to spend taking and filling an order. Novak blames some of the lingering problems at the restaurants on former owner PepsiCo. He feels Pepsi emphasized marketing at the expense of quality food, service, and atmosphere. "It wasn't our schtick," PepsiCo President and Chief Financial Officer Indra Nooyi answers. "The restaurant business wasn't our schtick."

David Novak is orchestrating this dramatic shift to civilize the fast-food experience. At Taco Bell, where food is delivered to its 6,444 U.S. restaurants premade, new $1,450 grills are being installed to cook new menu entries on-site. Restaurants in the Mexican-themed chain are also paying $16 million more a year for better-quality beef, tortillas, and beans. The company is developing higher-end ideas, such as Yan Can, the name of four new Asian-themed restaurants in California created with Arthur Ho, a Hong Kong-based franchisee of KFC, and chef Martin Yan of PBS Yan Can Cook fame. Average sales at these restaurants exceed $35,000 a week, compared with just under $20,000 a week at a typical Taco Bell. Yum! Brands is also combining Pizza Hut with a fast-casual chain called Pasta Bravo in test markets.

Some Taco Bell franchisees argued against paying more for the new ingredients. "I didn't think our customer base was that discerning," says Ned Kirby, a franchisee in Noblesville, Indiana "But they noticed the better food and didn't resist the higher prices" (Wells 2003). Not every trial restaurant is successful. Bell Grille was an experimental restaurant the company opened in Garden Grove, California to test higher-end menu items, such as smoothies. According to Emil Brolick, president of Taco Bell, it was short-lived, because the food did not fit in with the restaurant, which looked like a regular Taco Bell.

Novak is also pushing to pair the different Yum! Brands restaurants in multibranded units, which offer unit sales that are 20 percent higher than that of standalone restaurants. With just 1,870 twofers open, the goal is to have 6,000 by 2007. Novak has focused on new designs for the multibranded units, emphasizing what traditionally makes fast-casual chains popular. The new designs include inviting lighting with sleek sconces that are conducive to reading or hanging out. Whimsical murals fuse the personalities of two restaurants when they are combined into one unit. "Fast-casual chains make a statement. They spend little on advertising but a lot on the dining experience. If we apply this kind of thinking to our category we think it will give us some edge" (Wells 2003).

Given the weakness in the market sector and the focus on fast-food companies' vulnerability to new lawsuits, Yum's stock has recently fallen. Since 1997, revenue has sagged from a high of $9.7 billion. Since that time, operating income has more than tripled to $891 million in 2001. Debt has been slashed from $4.6 to $2.1 billion. Emphasis continues to be placed on refurbishing the restaurants themselves in a concentrated program.

Yum has experienced problems with its supply chain, from SARS in China to E. coli in lettuce in New England in December 2006, costing the company at least $20 million in profit (Annual Report). Sales growth in the U.S. was flat in 2006, but 4 percent worldwide. Almost all of the growth was through new stores. Pizza Hut has to compete against all of the fast food chains, the national pizza chains, and the local pizzeria. Domino's CEO David Brandon said that "our industry has seen a shift where all of the national brands have lost market share and seen significant reductions in traffic growth at the expense of regional and local pizza shops" (Gibson 2007). Papa John's CEO also notes the lack of product innovation. On the other hand, Papa John's is promoting online ordering in an attempt to build brand loyalty.

In 2005, Alinean, a research company, awarded Yum! Brands the number 3 spot in the retail industry in terms of return on IT investment. Dividing economic value added by its IT spending gave it a value of 201 percent, not to far below the 290 percent of the number 1 company (Next Group PLC) (Betts 2005).

One of the challenges of Yum! Brands is that the company actually consists of multiple "concept" restaurants. Finding common ground and getting 1.6 million global employees to work together is a challenge. In 2011, Dickie Oliver, head of global IT at Yum! Brands emphasized a four-point strategy for coordinating workers. He created the iChing social network to enable employees to post documents, ask questions, and collaborate. Similarly, an enterprise search system from Coveo enables workers to search for answers and data. An online learning system from Saba makes it easier to distribute training. And a high-definition videoconferencing system from Tandberg lets employees hold virtual meetings to reduce travel time and costs.

Questions

1. How does Yum! Brands use information technology to improve efficiency?
2. With the mix of restaurants, how could Yum! Brands use IT to determine the best store combinations and selection of items to sell?

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Case: Starbucks

Since 1985, Starbucks (ticker: SBUX) is committed to offering the highest quality coffee and the Starbucks Experience while conducting its business in ways that produce social, environmental, and economic benefits for the communities in which it does business. In addition to its retail operations, the company produces and sells bottled Frappuccino coffee drinks, Starbucks DoubleShot coffee drink, and a line of super-premium ice creams through its joint venture partnerships. The company's brand portfolio provides a wide variety of consumer products. Tazo Tea's line of innovative premium teas and Hear Music's exceptional compact discs enhance the Starbucks Experience through best-of-class products. The Seattle's Best Coffee and Torrefazione Italia Coffee brands enable Starbucks to appeal to a broader consumer base by offering an alternative variety of coffee flavors. Some of these products are now sold directly to consumers as Starbucks VIA Ready Brew and through national food distributors SYSCO Corporation and US Foodservice.

An interesting feature of Starbucks is that it does not franchise its stores. Starbucks has grown to 8,833 corporate stores plus 8,025 licensed retail stores internationally in 2010 from only 125 stores in September 1991. Starbucks purchases green coffee beans for more than 50 blends and varieties from coffee-producing regions worldwide. All green coffee beans purchased are of the Arabica species, which is of higher quality than the Robusta species typically found in supermarket coffees. Starbucks custom roasts the coffee beans to exacting standards. To add sales margins, the company stores offer a wide selection of coffee-making equipment, accessories, pastries, and confections.

In fiscal year 2010, retail stores accounted for 84 percent of net sales. Stores are typically clustered in high-traffic, high-visibility locations in each market. This includes office buildings, downtown and suburban retail centers, and kiosks placed in building lobbies, airport terminals, and supermarkets. In fiscal year 2002 the retail store sales mix by product type was 77 percent beverages, 13 percent food items, 6 percent whole bean coffees, and 4 percent coffee-related hardware items.

Starbucks has expanded its retail business by increasing its share in existing markets, and opening stores in new markets in which it sees an opportunity to become the leading specialty coffee retailer. The company opened a net total of 810 company-owned stores in fiscal year 2006 and planned to open a similar number in fiscal year 2007. But in the U.S. it closed 474 stores in 2009 and 57 in 2010. Starbucks has tried to use its Specialty Operations, which accounted for 16 percent of total revenues in fiscal year 2003, to develop the Starbucks brand outside the company-owned retail store environment. Starbucks has licensing agreements

(35 percent of specialty revenues) with prominent retailers in North America, Central America, Europe and Asia. The company has about 5,600 food service accounts (27 percent), where it sells whole bean and ground coffee to various coffee distributors, hotels, airlines, and restaurants. Starbucks has a licensing agreement (13 percent) with Kraft, Inc., which markets and distributes the company's whole bean and ground coffees in the U.S. grocery channel. In addition, the company sells its coffee products through warehouse club accounts (13 percent), and through mail order and online (7 percent) (Standard and Poor's, Starbucks annual report). The company's long-term plans are to run 20,000 stores in the U.S. and another 20,000 worldwide, with an emphasis on China. Although the Annual Report observes the increasing difficulties in managing that many stores, comparable store sales grew by 7 percent in 2006; but hints are that the growth rate has slowed in 2007. The company also spent $1 billion buying back its stock to prop up the price (Blumenthal 2007). From 2007 through 2009, Starbucks was hit hard by the recession where sales growth slowed and fell in 2008 and 2009 (annual report 2010). Howard Schulz returned to the CEO position in 2008 to help organize the response to competition and the recession.

In the fourth quarter 2003, Starbucks acquired Seattle Coffee Company, which includes Seattle's Best Coffee and Torrefazione Italia coffee brands, for $72 million. Negotiating and controlling the supply of its products is a key factor in the Starbucks operation. The company also spent $6.5 million in 2006 on research to create and improve products as well as operations (Annual Report).

When the top management was replaced in 2008, Starbucks also named Chris Bruzzo to be acting CIO and asked him "to create innovative ways for Starbucks to connect with our customers and build loyalty programs" (Wailgum 2008). At the time, the company had grown too rapidly—unfortunately just as the economy was entering the recession. The firm was focused on growth through adding new stores, so the technology focused on evaluating real estate, location, and demographics. Instead, the company needed to find a way to encourage each customer to spend more money.

In 2009, Stephen Gillett was given the job of CIO at Starbucks. He has an IT staff of 1,000 people. The size of the staff is almost a problem—it is difficult to find and hire good workers. And he still faces one key area: business intelligence—finding people and tools that can analyze the customer data (Mann 2009).

Stored Value Card

Brian Cyrnes, senior vice president and chief information officer, is proud of the coffeehouse chain's stored-value, customer loyalty-enhancing Starbucks Card and Duetto. The new Duetto offering is a combination Starbucks Card and Visa credit card. This was accomplished by keeping an eye toward offering the best service and value, while targeting competitive advantages, speed-to-market issues, and enterprisewide integration. The launch follows the success of the reloadable Starbucks Card, of which more than 11 million have been activated since the card began in November 2001. A Starbucks Visa credit card, incorporating the stored-value feature, was launched in association with Bank One in March 2003.

The Starbucks Card program was run by an outside vendor, ValueLink, a First Data Corporation. First Data is an electronic payment service specialist. Customers buy the cards in dollar amounts to be redeemed like cash at the checkout line. ValueLink processes the transactions and manages an offsite database for the sys-

tem. The program is already "a big loyalty winner." Starbucks redeemed 11 million cards worth $41 million in the recent second quarter. Starbucks outsourced the processing because it felt it lacked the knowledge to develop a complex customer service program on its own.

Wi-Fi technology

Based on its experience at thousands of Starbucks Coffee outlets, Starbucks is convinced that providing Internet access to guests will build customer loyalty and sales. As a result, Starbucks is forging ahead with deployment of wireless local area networks, as other food service chains accelerate rollouts or expand tests of the technology. Starbucks Corp. launched Wi-Fi service in its U.S. cafes in August 2003 and now offers access in over 2,000 locations. Users have to sign up for the service with Bellevue, Washington-based T-Mobile USA Inc., a unit of Deutsche Telkom, whose prices start at $19.99 per month. The T-Mobile HotSpot service is backed by reliable high-speed T-1 connections that can accommodate the full spectrum of applications from checking e-mail to viewing rich multimedia and video. T-Mobile HotSpot window signs are visible near the entrance of all participating Starbucks locations. A complete list of stores can be found by visiting the Starbucks store locator on www.starbucks.com/hotspot and selecting "Wireless HotSpot Stores" as the Store Type.

Today the chain has fee-based hot spots managed by strategic partner T-Mobile International at about 2,600 of its 3,854 company-operated coffee bars. The goal is to install hot spots in about 70 percent of the retail sites operated by the company. Size, seating capacity, and the demographics of a market all determine which stores will incorporate the technology. Starbucks looked at a number of alternatives in terms of how to provide in-store Internet access, but decided wireless was the way to go to provide access without disrupting the other customers. The chain did not want to become known as an "Internet café" littered with cabling and other hardwired network paraphernalia.

The wireless service is already paying dividends at Starbucks. The company charges customers about $6 an hour for the T-Mobile service. The typical wireless user stays for 45 minutes. Of the nonwireless users, 70 percent spend 5 minutes or less at the store; the remaining 30 percent linger for about 20 minutes. "We certainly believe that means they buy more coffee and food. The real exciting thing for us about the hot-spot service is that it is bringing people into our stores at different times of the day, and hot-spot users are staying longer," Nick Davis, Starbucks spokesman, remarked. (Liddle August 2003). Typically, a Starbucks unit is busiest from 6 a.m. to 9 a.m., so building traffic later is a positive development. About 90 percent of hot spot users arrive after 9 a.m., and that group, on average, spends about 45 minutes online and in the stores.

In the attempt to leverage its wireless network installations further, Starbucks in 2004 began testing possible synergies between its hot spot strategy and the distribution of product by its music industry holding, Hear Music. To spur additional hot spot registrations and publicize Hear Music's "Artist's Choice" compact disc of Sheryl Crow's favorite songs by other recording stars, Starbucks' hot spot users were given Web access to audio clips of the songs and Crow interviews on the CD. They were permitted to download three complete songs from the compilation product.

By 2010, partly pressured by McDonald's, Starbucks opened the Wi-Fi to free and unlimited access. Other coffee shops find Wi-Fi to me more challenging.

Freeloaders might buy a cheap cup of coffee and then take up space for hours—making it hard for paying customers to find a place to sit (Elgan 2010). Starbucks will also offer free access to major newspapers such as *The Wall Street Journal* and *New York Times*.

Starbucks and the Sundance Film Festival

In addition to being the official coffee at the 2004 Sundance Film Festival, Starbucks worked closely with the Sundance Institute to sponsor the 2004 festival, as well as bring the excitement of the Sundance Film Festival experience directly to customers in its stores. Throughout the month of January, customers who visited their favorite participating Starbucks location with a Wi-Fi (802.11b)-enabled notebook computer or Tablet PC experienced the passion and inspiration of the 2004 Sundance Film Festival firsthand. By simply launching the Internet browser on their device, customers watched exclusive filmmaker interviews, behind-the-scenes video clips, and film trailers for free prior to logging on to the T-Mobile HotSpot wireless broadband Internet service.

Customers who logged on to the T-Mobile HotSpot service received a free day pass to the Sundance Online Film Festival—the online extension of the 2004 Sundance Film Festival. The free day pass enabled Starbucks customers to access the Sundance Online Film Festival, where they could cast a vote for their favorite animation and short subject films while in the comfort of any participating Starbucks location. Independent film aficionados and consumers did not have to be in Park City to experience the festival—they only needed to find the nearest T-Mobile HotSpot-enabled Starbucks to access the exclusive content.

Starbuck's sponsorship of the film festival enabled them to add value to the T-Mobile HotSpot service in their stores by giving their customers the ability to interact directly with digital entertainment. Since Starbucks has sponsored film festivals large and small, this next step enabled the company to share their enthusiasm for independent film directly with their customers. Starbucks expanded its involvement in the entertainment industry—even creating a separate subsidiary. In 2006, it promoted a movie to its customers, but the effect was minimal. In 2007, Starbucks continued its sales of music CDs with a special solo album from Paul McCartney. Starbucks also backed another movie in 2007 (Adamy 2007). Analysts are mixed over whether the entertainment options attract customers and encourage sales, or if they just distract management from selling coffee.

Phones

Like many other companies, Starbucks sells customers a prepaid card that can be used for future purchases. In 2011, Starbucks released an app that lets customers store their prepaid card data on their smart phone. Cashiers simply scan the bar code from the phone and deduct the amount from the balance (Segall 2011). Because the Starbucks card is linked to a credit card, the payment card can be reloaded. The smartphone app includes the ability to easily add more money to the card (Hamblen 2011).

In a different twist, Starbucks in 2010 became one of the first companies to pay Twitter to deliver "Promoted Tweets," or advertising over Twitter. The marketers will be charged per thousand impressions of their ads that are displayed on their Web site alongside search results. Starbucks already publishes Twitter notes about its promotions, but the ads will always show up near the top of the page, making them more visible (Miller 2010).

Questions

1. Has Wi-Fi access improved sales and profits at Starbucks?
2. Given the huge number of stores, how could Starbucks use information technology to determine where to open new stores and which ones to close?

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Summary Industry Questions

1. What information technologies have helped this industry?
2. Did the technologies provide a competitive advantage or were they quickly adopted by rivals?
3. Which technologies could this industry use that were developed in other sectors?
4. Is the level of competition increasing or decreasing in this industry? Is it dominated by a few firms, or are they fairly balanced?
5. What problems have been created from the use of information technology and how did the firms solve the problems?