Introduction to Information Systems
Chapter 1

The Modern Organization in the Global, Web-Based Environment

Learning Objectives

1. Differentiate among data, information, and knowledge.
2. Differentiate between information technology architecture and information technology infrastructure.
3. Describe the global business environment and the new information technology infrastructure.
4. Discuss the relationships among business pressures, organizational responses, and information systems.
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Chapter Outline
1.1 Information Systems: Concepts and Definitions
1.2 The Global Web-Based Platform
1.3 Business Pressures, Organizational Responses, and IT Support
1.4 Why Are Information Systems Important to You?
1.5 The Plan of This Book

What’s in IT for me?

ACC  FIN  MKT  POM  HRM  MIS
When the World Wide Web needed new search methods to handle its size and complexity, Sergey Brin and Larry Page developed their PageRank algorithm (an *algorithm* is a mathematical formula) and founded Google (www.google.com). PageRank is a complicated mathematical formula that determines the relative importance of a Web page by analyzing the number of links to that page, along with other factors.

In June 1999, Google focused solely on algorithmic searches, and the company earned revenue by licensing its search technology to other companies. Google's own Web site had no advertising and no content other than search results. In December 1999, Google introduced paid listings, which were short text advertisements identified as “Sponsored Links” that appeared either next to, or interspersed with, search results. By mid-2001, despite having spent nothing on marketing, Google was the ninth largest U.S. Web site with 24.5 million unique monthly visitors. In mid-2004, Google had its wildly successful initial public offering (IPO).

Given Google's incredible success, you would think that the company did not have a business problem. However, the company had to consider four possibilities concerning its strategic direction. First, Google could remain a search company and continue to refine its search algorithms and targeted advertising. Second, it could become a portal like Yahoo (www.yahoo.com) or Microsoft Network (MSN) (www.msn.com). A *portal* is a Web-based, personalized gateway to a great deal of relevant information from various information systems and the Internet. Third, it could develop its role in electronic commerce (e-commerce) by facilitating transactions. *Electronic commerce* is the buying and selling of products, services, or information via computer networks, including the Internet. Fourth, it could develop products to compete with Microsoft Office. Which option would Google choose?

Along the way to its IPO, Google built a platform called the GooglePlex. A *platform* consists of the hardware, software, and communications components that organizations use to process and manage information. The GooglePlex consists of:

- **Hardware**: Google has an estimated 500,000 servers that provide enormous processing power, plus massive amounts of storage. A *server* is a computer that provides access to various services available on a network, such as data and Web pages. We discuss hardware in detail in Technology Guide 1.
- **Software**: Google servers accommodate numerous types of software and applications. We discuss software in detail in Technology Guide 2.
- **Communications**: Google servers are located around the world and are connected across the Internet by high-transmission-capacity fiber-optic cables. We discuss telecommunications, networks, and the Internet in detail in Technology Guides 4 and 5 and Chapter 5.

The GooglePlex enables Google to develop applications quickly and to deliver applications and results almost instantaneously to users. Google decided to use its platform to pursue all four strategies simultaneously! The company has been developing applications at an incredible rate, expanding its domain beyond Web search.

Google continues to improve its main mission of enabling searches by introducing many new search applications. For example, Personalized Search generates and organizes search results based on analysis of the types of results a user has clicked on in past searches. Desktop Search allows users to search the contents of their own hard drives, and Vertical Search tailors searches to specific Internet sites.

Another facet of Google's main mission is targeted advertising. The company is implementing a new pricing model that lets advertisers pay for only completed actions that they define ahead of time, such as getting a lead, a sale, or a page view.
Google is also vigorously pursuing its three other strategies. Applications such as Talk and Gmail have moved Google into the domain of Web portals, such as Yahoo and Microsoft Network. Other applications, such as Base, Book Search, Maps, and Checkout, have positioned Google in the domain of electronic commerce companies, such as eBay and Amazon. Finally, Google Apps Premier Edition, which includes Desktop, Docs & Spreadsheets, Base, and Calendar, is competing with Microsoft Office in office productivity applications. Google Apps also allows businesses to create a customized home page that includes a single sign-on to all applications, as well as 10 gigabytes of free storage for each employee, all for $50 per year per employee.

As of mid-2007, every month 400 million people were going to Google as their gateway to the Web, and the company drew 56 percent of all searches. By that time, Google had a market capitalization of almost $150 billion, as well as $11 billion in cash and investments.

Despite its amazing success, Google faces intensifying competition and threats. NBC Universal and News Corporation are planning a rival to compete with Google Video (Google purchased YouTube in 2006). The rival product will run not only clips from television shows but also full-length movies on Yahoo!, AOL, MSN, and MySpace.

Perhaps even worse, Viacom is suing Google for $1 billion, charging that YouTube infringed on copyrights by allowing users to upload clips of TV shows. Copiepress, a group representing Belgian and German newspapers, won a copyright case that could impact Google if it sets a precedent.

To further complicate matters, in 2004 Google launched its Library project, in which the company began digitizing millions of books at various libraries. It did so, however, without first securing permission from book publishers. In response, in 2005 the Authors Guild and a group of publishers each filed lawsuits against the library scanning project, charging that it violates copyright protection.

The Google case illustrates how an organization can use information technologies to survive and thrive in today’s environment. Google’s strategies and applications illustrate the following points:

- To succeed in today’s environment, it is often necessary to change business models and strategies.
- IT enables organizations to survive and thrive in the face of relentless business pressures.
- IT may require a large investment over a long period of time.
- Organizations can leverage their platforms to develop new Web-based applications, products, and services, as well as to provide superb customer service.

You are the most connected generation in history. You have grown up online. You are, quite literally, never out of touch. You use more information technologies (in the form of digital devices), for more tasks, and are bombarded with more information, than anyone in history. The MIT Technology Review refers to you as Homo conexus. Information technologies are embedded so deeply in your lives that your daily routines would be almost unrecognizable to a college student just 20 years ago.

Essentially, you are practicing continuous computing, whereby you are surrounded with a movable information network. Your network is created by constant cooperation between the digital devices you carry (for example, laptops, media players, and smart phones); the wired and wireless networks that you access as you move about; and Web-based tools for finding information and communicating and collaborating with other people. Your network enables you to pull information about virtually anything from anywhere, at any time, and push your own ideas back to the Web, from wherever you are, via a mobile device.
So, why study about information systems and information technology when you are already so comfortable using them? The answer is that when you graduate, you either will start your own business or will go to work for an organization, whether it is public sector, private sector, for-profit, or not-for-profit. In either case, you and your organization will have to survive and compete in an environment that has been radically changed by information technology. This environment is global, massively interconnected, intensely competitive, 24/7/365, real-time, rapidly changing, and information-intensive.

In this chapter we discuss the basic concepts of information systems in organizations. First, however, we distinguish between management information systems, also called information systems or IS, and information technology. Management information systems (MIS) deal with the planning for—and the development, management, and use of—information technology tools to help people perform all the tasks related to information processing and management. Information technology (IT) relates to any computer-based tool that people use to work with information and to support the information and information processing needs of an organization. Although these are distinct terms, in practice they are typically used interchangeably. For example, organizations refer to their MIS function as the Information Services Department, the Information Systems Department, the Information Technology Department, and other names. In keeping with this practice, we use these terms interchangeably throughout this book.

After presenting the basic concepts of information systems, we discuss today’s global business environment and how businesses use information technologies to survive and prosper in this highly competitive environment. We then consider in greater detail why information systems are important to you. We finish the chapter by describing the plan of the book.


1.1 Information Systems: Concepts and Definitions

It has been said that the purpose of information systems is to get the right information to the right people at the right time in the right amount and in the right format. Because information systems are intended to supply useful information, we begin by defining information and two closely related terms, data and knowledge.

Data, Information, and Knowledge

One of the primary goals of information systems is to economically process data into information and knowledge. Let’s take a closer look at these concepts.

Data items refer to an elementary description of things, events, activities, and transactions that are recorded, classified, and stored but are not organized to convey any specific meaning. Data items can be numbers, letters, figures, sounds, or images. Examples of data items are a student grade in a class and the number of hours an employee worked in a certain week.

Information refers to data that have been organized so that they have meaning and value to the recipient. For example, a grade point average (GPA) is data, but a student’s name coupled with his or her GPA is information. The recipient interprets the meaning and draws conclusions and implications from the information.

Knowledge consists of data and/or information that have been organized and processed to convey understanding, experience, accumulated learning, and expertise as they apply to a
current business problem. For example, a company recruiting at your school has found over time that students with grade point averages over 3.0 have had the most success in its management program. Based on its experience, that company may decide to interview only those students with GPAs over 3.0. Organizational knowledge, which reflects the experience and expertise of many people, has great value to all employees.

Now that we have a better idea of what information is and how it can be organized to convey knowledge, we shift our focus to the ways organizations organize and use information. To do this we must look closely at an organization’s information technology architecture and information technology infrastructure. These concepts underlie all information systems within the organization.

**Information Technology Architecture**

An organization’s **information technology (IT) architecture** is a high-level map or plan of the information assets in an organization. It is both a guide for current operations and a blueprint for future directions. The IT architecture integrates the entire organization’s business needs for information, the IT infrastructure (discussed in the next section), and all applications. The IT architecture is analogous to the architecture of a house. An architecture plan describes how the house is to be constructed, including how the various components of the house, such as the plumbing and electrical systems, are to be integrated. Similarly, the IT architecture shows how all aspects of information technology in an organization fit together. Figure 1.1 illustrates the IT architecture of an online travel agency. We discuss each part of this figure in subsequent chapters.

**Information Technology Infrastructure**

An organization’s **information technology (IT) infrastructure** consists of the physical facilities, IT components, IT services, and IT personnel that support the entire organization (see Figure 1.2). Starting from the bottom of Figure 1.2, we see that **IT components** are the computer hardware, software, and communications technologies that provide the foundation for all of an organization’s information systems. As we move up the pyramid, we see that **IT personnel** use IT components to produce **IT services**, which include data management, systems development, and security concerns.

An organization’s IT infrastructure should not be confused with its platform. As we can see in Figure 1.2, a firm’s platform consists only of its IT components. Therefore, a platform is part of an IT infrastructure.
The Google and Amazon cases in this chapter illustrate the vital importance of IT infrastructures and platforms to organizations in today’s competitive environment. The platforms of Google and Amazon operate within a global, Web-based platform that has recently emerged (see Figure 1.3). The next section discusses this global platform.

1.2 The Global Web-Based Platform

The global, Web-based platform that has recently emerged spans the world and is best represented by the Internet and the functionality of the World Wide Web. The platform enables individuals to connect, compute, communicate, collaborate, and compete everywhere and anywhere, anytime and all the time; to access limitless amounts of information, services, and entertainment; to exchange knowledge; and to produce and sell goods and services. It operates without regard to geography, time, distance, and even language barriers. In essence, this platform enables globalization. **Globalization** is the integration and interdependence of economic, social, cultural, and ecological facets of life, enabled by rapid advances in information technology.

The Three Stages of Globalization

In his book *The World Is Flat*, Pulitzer Prize-winning author Thomas Friedman argues that the world is flat in the sense that the global competitive playing field is being leveled. Friedman identifies three eras of globalization. The first era, Globalization 1.0, lasted from 1492 to
1800. During this period, the force behind globalization was the amount of muscle, horsepower, wind power, or steam power a country had and could deploy.

The second era, Globalization 2.0, lasted from 1800 to 2000. In this era, the force behind globalization was multinational companies—that is, companies that had their headquarters in one country but operated in several countries. In the first half of this period, globalization was driven by falling transportation costs, generated by the development of the steam engine and the railroads. In the second half, globalization was driven by falling telecommunications costs resulting from the telegraph, telephone, computer, satellites, fiber-optic cable, and the Internet and World Wide Web. The global economy began appearing during this era.

Around the year 2000, we entered Globalization 3.0, which was driven by the convergence of ten forces that Friedman calls “flatteners” (discussed below). In era 3.0, we are witnessing the emergence of a global, Web-based platform.
Each era has been characterized by a distinctive focus: Globalization 1.0 focused on countries, Globalization 2.0 on companies, and Globalization 3.0 on groups and individuals. This observation makes our discussion all the more important for each of you, because you will be competing with people from all over a flat world when you graduate.

Friedman’s Ten Flatteners

As already mentioned, Friedman noted that ten forces, or “flatteners,” contributed to the emergence of era 3.0 and the flat world. (See Table 1.1.)

The first force, the collapse of the Berlin Wall, took place on November 9, 1989. The subsequent collapse of the Soviet Union and the communist governments of Eastern Europe in 1991 enabled these countries to move toward free-market economies and away from totalitarian, centrally planned economies. Many of these countries eventually joined the European Union, which led people to begin thinking about the world as a single market or single community.

The second force occurred on August 9, 1995, when Netscape went public. Netscape, the first of the user-friendly browsers, popularized the Internet and the Web by making them easy to navigate. We discuss Internet browsers in Chapter 5.

The third force was the development of workflow software, which enables computer applications to interoperate, or communicate and work with one another without human intervention. For workflow software to be effective, standards had to be developed, such as Extensible Markup Language (XML), which we discuss in Technology Guide 2.

The fourth force, uploading, means that anyone can create and upload content to the Web. Uploading takes the form of open-source software (also called community-developed software), blogging, and Wikis. We discuss open-source software in Technology Guide 2, and blogging and Wikis in Chapter 5. Uploading has led to a shift from a static, passive approach to media to an active, participatory approach. Entire communities of people now collaborate on Web content.

Outsourcing, the fifth force, involves taking a specific function that your company was doing itself, having another company perform that same function for you, and then integrating their work back into your operation. Companies outsource so that they can lower costs and concentrate on their core competencies. We discuss outsourcing in Chapter 10.

Offshoring, the sixth force, differs from outsourcing. Offshoring occurs when a company moves an entire operation, or certain tasks, to another country. An example of an entire operation would be moving an entire plant. Tasks that are likely to be offshored involve lower-value-added activities such as rendering architectural drawings and medical transcription.

Friedman’s Ten Flatteners

- Fall of the Berlin Wall
- Netscape now a public offering
- Development of workflow software
- Uploading
- Outsourcing
- Offshoring
- Supply chaining
- Insourcing
- Informing
- The steroids (computing, instant messaging and file sharing, wireless technologies, voice over Internet Protocol [VoIP], videoconferencing, and computer graphics)
There, the operation and/or activities are performed the same way, but with cheaper labor, lower taxes, fewer benefits, and so on. Companies also choose to offshore in order to penetrate and then serve a foreign market without having to deal with trade barriers. We discuss offshoring in Chapter 10.

The seventh force, supply chaining, occurs when companies, their suppliers, and their customers collaborate and share information. Supply chaining requires common standards so that each segment of the chain can interface with the next. We discuss supply chains in Chapter 8.

The eighth force, insourcing, delegates operations or jobs within a business to another company, which specializes in those operations. For example, a company such as Dell will hire FedEx to analyze Dell’s shipping process and then “take over” that process. FedEx employees work inside Dell but remain employed by FedEx.

The ninth force, informing, is your ability to search for information, and it is best illustrated by search engines. Informing also facilitates the formation of global communities, as you can now look for collaborators on any subject or project almost anywhere in the world. We discuss informing in Chapter 5.

Friedman calls the tenth force the steroids because they amplify the other flatteners. In essence, they enable all forms of computing and collaboration to be digital, mobile, and personal. The steroids are new and dynamic forms of information technologies: computing (including computational capability, storage, and input/output); instant messaging and file sharing; wireless technologies; voice over Internet Protocol (VoIP); videoconferencing; and advances in computer graphics. We discuss the steroids in Technology Guide 1 as well as Chapters 5 and 7.

Google and Amazon (see the closing case in this chapter) are using the global, Web-based platform to develop and deliver new applications. What is really interesting about the platform is that it is available to you as an individual. Google and Amazon (as well as other companies) provide processing, storage, and applications to anyone for free or for a very reasonable charge. Therefore, you can use their resources in the course of your daily information processing and if you want to start your own business.

In essence, you are entering a flat world that is made possible by the global, Web-based platform we have described. This platform has had an enormous impact on many industries. The following example points out that impact on the travel industry.

Do It Yourself Traveling  Whatever happened to travel agencies? The answer is that the Web-based platform has heavily impacted this industry, and not for the better. Web users are planning almost all of their travel online. In 2006, for example, 80 percent of Americans who arranged trips on the Web also bought their tickets online. Now, a new generation of travel sites is making trip planning cheaper, more efficient, and more fun. Here is a quick look at the top new sites that illustrate what has happened to an entire industry.

Shopping for Flights. Two-thirds of online travel planners use the big three: Expedia (www.expedia.com), Travelocity (www.travelocity.com), and Priceline (www.priceline.com). However, a new way to search for bargain flights is on Kayak (www.kayak.com). The site covers fares on some 300 airlines in any given week and saves time by letting you adjust search parameters by using a sliding dial, without having to start from scratch.

Plan Your Itinerary. Yahoo’s Trip Planner (http://travel.yahoo.com/trip) provides a Web folder for your online research about museums, restaurants, lodging, and sights at your destination.

Organize a Group Trip. TripHub (www.triphub.com) allows you to book group tickets, discuss the best hotels and sights to see, or decide where you will all meet upon arrival.
Save on a Rental Car. Booking a car at an airport can cost double what you would pay online. Whether you are traveling abroad or in the United States, Bnm (www.bnm.com) can help you find and reserve the cheapest rentals available. If you do not care about the specific model you drive, check Bnm’s prices and those at Hotwire (www.hotwire.com), and then go to Priceline’s (www.priceline.com) car-rental page to bid for steeper discounts. For bidding help, go to BiddingforTravel (www.biddingfortravel.com).

Watch Where You Go. Reading about a place is just not the same as seeing it. Turnhere (www.turnhere.com) posts free short videos of popular destinations around the world to watch online.

Trip Tracking. TripStalker (www.tripstalker.com) constantly scans for inexpensive trips and alerts you by e-mail or text message once a flight, hotel, or rental car matching your search criteria turns up.


This book will discuss, explain, and illustrate the characteristics of the dynamic global business environment. We will also discuss how you and your organization can use the Web-based platform to survive and compete in this environment.

Before you go on . . .

1. What are the characteristics of the modern business environment?
2. Describe the Web-based, global platform.
3. Describe the platform used by Google, Amazon, and other companies.

1.3 Business Pressures, Organizational Responses, and IT Support

Modern organizations must compete in a challenging environment. Companies must react rapidly to problems and opportunities arising from extremely dynamic conditions. In this section we examine some of the major pressures confronting modern organizations, and we discuss how organizations are responding to these pressures.

Business Pressures

The business environment is the combination of social, legal, economic, physical, and political factors that affect business activities. Significant changes in any of these factors are likely to create business pressures on organizations. Organizations typically respond to these pressures with activities supported by IT. Figure 1.4 shows the relationships among business pressures, organizational performance and responses, and IT support. Here we focus on three types of business pressures that organizations face: market, technology, and societal pressures.

Market Pressures. Market pressures are generated by the global economy and strong competition, the changing nature of the workforce, and powerful customers. We’ll look at each of these factors in turn.

Global Economy and Strong Competition. The move to a global economy has been facilitated by the emergence of the global, Web-based platform. Regional agreements such as
the North American Free Trade Agreement (NAFTA), which includes the United States, Canada, and Mexico, and the creation of a unified European market with a single currency, the euro, have contributed to increased world trade. Furthermore, the rise of India and China as economic powerhouses has markedly increased global competition.

One important pressure that exists for businesses in a global market is the cost of labor, which varies widely among countries. In general, labor costs are higher in developed countries like the United States and Japan than in developing countries such as China and El Salvador. Also, developed countries usually offer greater benefits, such as health care, to employees, which makes the cost of doing business even higher. Therefore, many labor-intensive industries have moved their operations to countries with low labor costs. IT has made such moves much easier to implement.

**The Changing Nature of the Workforce.** The workforce, particularly in developed countries, is becoming more diversified. Increasing numbers of women, single parents, minorities, and persons with disabilities now work in all types of positions. IT is easing the integration of these employees into the traditional workforce. IT is also enabling people to work from home.

**Powerful Customers.** Consumer sophistication and expectations increase as customers become more knowledgeable about the availability and quality of products and services. Customers can use the Internet to find detailed information about products and services, compare prices, and purchase items at electronic auctions.

Organizations recognize the importance of customers and have increased their efforts to acquire and retain them. As a result, firms try to know as much as possible about their
customers to better anticipate and serve their needs. This process, *customer intimacy*, is an important part of *customer relationship management* (CRM), an organizationwide effort toward maximizing the customer experience. We discuss CRM in Chapter 8.

**Technology Pressures.** The second category of business pressures consists of those pressures related to technology. Two major technology-related pressures are technological innovation and information overload.

**Technological Innovation and Obsolescence.** New and improved technologies rapidly create or support substitutes for products, alternative service options, and superb quality. As a result, today’s state-of-the-art products may be obsolete tomorrow. For example, how fast are thin-screen televisions and computer monitors replacing the bulky TVs and monitors of just a short time ago? How fast are you replacing your old, standard cell phones with the new smart phones? These changes require businesses to keep up with consumer demands.

**Information Overload.** The amount of information available on the Internet doubles approximately every year, and much of it is free. The Internet and other telecommunications networks are bringing a flood of information to managers. To make decisions effectively and efficiently, managers must be able to access, navigate, and utilize these vast stores of data, information, and knowledge. Information technologies, such as search engines (discussed in Chapter 5) and data mining (discussed in Chapter 9), provide valuable support in these efforts.

**Societal/Political/Legal Pressures.** The third category of business pressures includes social responsibility, government regulation/deregulation, spending for social programs, spending to protect against terrorism, and ethics.

**Social Responsibility.** Social issues that affect businesses range from the state of the physical environment to companies’ contributions to education (for example, by allowing interns to work in companies). Some corporations are willing to spend time and/or money on solving various social problems. These efforts are known as *organizational social responsibility*.

One social problem that affects modern business is the digital divide. The *digital divide* refers to the wide gap between those who have access to information and communications technology and those who do not. This gap exists both within and among countries.

According to reports by the United Nations, more than 90 percent of all Internet hosts are located in developed countries, although these countries contain only 15 percent of the world’s population. Approximately 70 percent of the U.S. population has Internet access. Furthermore, this distribution is highly correlated with household income. That is, the greater a household’s income, the more likely they are to have Internet access. The U.S. federal and state governments are attempting to close the digital divide within the country by encouraging training and by supporting education and infrastructure improvements.

One development that can help close the digital divide is the installation of Internet kiosks in public places and cybercafés. In addition, in the United States, computers with Internet access usually are also available at public libraries.

**Cybercafés** are public places in which Internet terminals are available, usually for a small fee. Cybercafés come in all shapes and sizes, ranging from a chain of cafés (*www.easycity.com*) that include hundreds of terminals in one location (for example, 760 in one New York setting) to a single computer in a corner of many restaurants. Computers have popped up in many other public locations: laundromats, karaoke bars, bookstores, CD stores, hotel lobbies, and convenience stores. Some facilities give free access to patrons; others charge a small fee.
Many other government and international organizations are also trying to close the digital divide around the world. As technologies develop and become less expensive, the speed at which the gap can be closed will accelerate. A well-known project is the One Laptop per Child (OLPC) project that originated from MIT’s Media Lab (http://laptop.media.mit.edu). OLPC is a nonprofit association dedicated to research to develop a $100 laptop—a technology that could revolutionize how we educate the world’s children. In IT’s About Business 1.1, cell phones and Internet centers are helping to close the digital divide in Bangladesh.

**Compliance with Government Regulations and Deregulation.** Other business pressures are related to government regulations regarding health, safety, environmental control, and equal opportunity. Businesses tend to view government regulations as expensive constraints on their activities. In general, government deregulation intensifies competition.

In the wake of 9/11 and numerous corporate scandals, the U.S. government passed many new laws, including the Sarbanes-Oxley Act, the USA PATRIOT Act, the Gramm-Leach-Bliley Act, and the Health Insurance Portability and Accountability Act. Organizations must be in compliance with the regulations of these statutes. The process of becoming and remaining compliant is expensive and time-consuming. In almost all cases, organizations rely on IT support to provide the necessary controls and information for compliance, as we see in IT’s About Business 1.2.

### IT’s About Business

#### 1.1 The Internet Helps Bridge the Digital Divide in Bangladesh

Villages in Bangladesh, long isolated by distance and deprivation, are gaining cell-phone access to the Internet. In the process, millions of people who have no land-line telephones and who often lack electricity and running water are able to utilize services that people in developed countries consider to be basic, such as weather reports, e-mail, and a second opinion from a physician.

Bangladesh now has about 16 million cell phone subscribers—and 2 million new users each month—compared with just 1 million land-line phones to serve a population of 150 million people. About 500 Internet centers have been opened in places where there are no land lines, so the connections will be made exclusively over cell phone networks. The Internet centers are being set up by GrameenPhone (www.grameenphone.com), a cell phone provider partly owned by Grameen Bank (www.initus.com). The centers are building on a cell phone network created over the past decade by a Grameen Bank program that has helped provide more than 250,000 cell phones in villages.

People now download job applications, check news stories and crop prices, make inexpensive Internet calls, or use Web cameras to see relatives. Students from villages with few books now have access to online dictionaries and encyclopedias.

One of the most popular services is videoconferencing, which involves using a Web camera on top of a computer monitor. Entire families crowd in front of the camera to hold video conferences with relatives living overseas. Recently, one mother came in to hold up a newborn baby to give the father, working overseas, his first glimpse of his child.


### QUESTIONS

1. Why is accessing the Internet with cell phones such a huge advantage for countries or areas with no land lines? *Hint:* Consider costs and convenience.
2. What are some additional ways that villagers could use the Internet? Can Internet access really bridge the digital divide in these rural areas? Why or why not?
3. What is the relationship between providing cell phones to villagers and a flat world?
1.2 A Compliance Culture at Humana

Humana Inc. (www.humana.com) is a $14 billion healthcare company, with 9.3 million medical members in all 50 states and Puerto Rico. Compliance is a part of Humana’s culture. The company has incorporated the costly and time-consuming tasks associated with regulation into its business model. Humana has also recognized the central role that its information systems function plays in all the company’s compliance efforts.

Humana first faced compliance issues with the Year 2000 (Y2K) problem. To run its Y2K compliance projects, Humana appointed a “tiger team” that was comprised of relevant people from different departments to run critical projects with definite deadlines.

Another challenge confronting Humana was the Health Insurance Portability and Accountability Act (HIPAA), a broad piece of legislation designed to let Americans keep their health insurance if they change jobs or become unemployed. The act also sets standards for the healthcare industry for such concerns as patient health, data exchange, and data privacy. When the compliance deadlines of HIPAA began in 2003, Humana was ready.

The company created tiger teams to handle the development of privacy policies and practices, one team to handle information security and one team, composed of senior managers, to provide oversight for the other teams. Each tiger team had members from the company’s IS department, and the oversight team included two IS vice-presidents.

Humana first reorganized its compliance division. The company already had a regulatory compliance department, a Medicare department, a department for state insurers, and various groups whose job was to ensure that the company’s health plans were accredited by quality-assurance bodies. It adapted these groups into HIPAA compliance centers, making each center responsible for establishing the necessary policies for Humana to comply with the HIPAA rules that applied to that center.

Humana then revamped its information security model. The company’s old security model focused only on defense against external threats. This process was not sufficient to comply with HIPAA, which required healthcare companies to protect information from internal threats as well. An example of an internal threat would be an employee losing a laptop with sensitive company information on it. Therefore, the company implemented a new security model to handle these requirements, as well as the security requirements involved with the expanding use of the Web, interactive voice systems, and wireless connectivity.

Humana’s new security policies require employees to take all patient information off their desks before they go home at night. In addition, employees must memorize their passwords, and they may not write them down. Finally, Humana made annual compliance training for all employees mandatory.

Humana did not get everything right the first time. For example, it made errors by being too conservative with patient information. For instance, the company initially disclosed almost no patient health information to insurance agents and brokers, which made it difficult for these people to act on behalf of their clients. Humana also started out with a very difficult process of identifying the people who were trying to access their accounts on the Web. This system made it far too difficult to do something as simple as check the status of an insurance claim.

Humana’s HIPAA compliance efforts have enhanced the company’s overall operations. Being fully HIPAA compliant makes it easier for insurance companies and hospitals to communicate. This process also makes it easier for these institutions to process the vast number of healthcare transactions that occur daily.

Finally, HIPAA compliance makes Humana’s customers, who are very concerned about how Humana protects their health information, feel better. In fact, being fully HIPAA compliant has become a selling point for Humana’s services.


QUESTIONS

1. Why is it so important for an organization to make compliance an integral part of its culture? Hint: Is compliance a “top down” or a “bottom up” process?

2. Why is the IS function so important to an organization’s compliance efforts? Is this true of all industries, or is it true of some industries more than others? If the latter, for which industries would compliance be most critical? Why?
**Protection against Terrorist Attacks.** Since September 11, 2001, organizations have been under increased pressure to protect themselves against terrorist attacks. In addition, employees who are in the military reserves may be called up for active duty, creating personnel problems. Information technology can help protect businesses by providing security systems and possibly identifying patterns of behavior associated with terrorist activities that will help to prevent terrorist attacks, including cyberattacks (discussed in Chapter 3), against organizations.

An example of protection against terrorism is the Department of Homeland Security’s US-VISIT program. US-VISIT is a network of biometric-screening systems, such as fingerprint and ocular (eye) scanners, that ties into government databases and watch lists to check the identities of millions of people entering the United States. The system is now operational in more than 300 locations, including major international ports of entry by air, sea, and land.

**Ethical Issues.** Ethics relates to general standards of right and wrong, whereas information ethics relates specifically to standards of right and wrong in information processing practices. Ethical issues are very important because, if handled poorly, they can damage an organization’s image and destroy its employees’ morale. The use of IT raises many ethical issues, ranging from monitoring e-mail to invading the privacy of millions of customers whose data are stored in private and public databases. Chapter 3 covers ethical issues in detail.

Clearly, then, the pressures on organizations are increasing, and organizations must be prepared to take responsive actions if they are to succeed.

**Organizational Responses**

Organizations are responding to these pressures by implementing IT such as strategic systems, customer focus, make-to-order and mass customization, and e-business. The Amazon case at the end of this chapter illustrates all of these responses. We discuss each type in greater detail in this section.

**Strategic Systems.** Strategic systems provide organizations with advantages that enable them to increase their market share and/or profits, to better negotiate with suppliers, or to prevent competitors from entering their markets. IT’s About Business 1.3 provides an example of strategic systems at JPMorgan. We discuss strategic systems in detail in Chapter 2.

**Customer Focus.** Organizational attempts to provide superb customer service can make the difference between attracting and keeping customers on the one hand and losing them to competitors on the other. Numerous IT tools and business processes have been designed to keep customers happy. For example, consider Amazon. When you visit Amazon’s Web site anytime after your first visit, the site welcomes you back by name and presents you with information on books that you might like, based on your previous purchases. In another example, Dell guides you through the process of buying a computer by providing information and choices that help you make an informed buying decision.

**Make-to-Order and Mass Customization.** Make-to-order is a strategy of producing customized products and services. The business problem is how to manufacture customized goods efficiently and at a reasonably low cost. Part of the solution is to change manufacturing processes from mass production to mass customization. In mass production, a company produces a large quantity of identical items. In mass customization, it also produces a large quantity of items, but it customizes them to fit the desires of each customer. Mass customization is simply an attempt to perform make-to-order on a large scale.

**E-Business and E-Commerce.** Doing business electronically is an essential strategy for companies competing in today’s business environment. Chapter 6 will focus extensively on this topic. In addition, e-commerce applications appear throughout the book.
1.3 JPMorgan Invests in IT

JPMorgan (www.jpmorgan.com), the third largest U.S. bank, is spending more than $2 billion to overhaul its networks, plus another $1 billion to reduce the number of its global data centers from 90 to 30. The bank’s current organization is the product of many bank mergers, which led to a patchwork of out-of-date systems that speak different computer languages. These systems are decreasing the bank’s efficiency, particularly on the consumer side of the business (retail banking, credit cards, and so on), which accounts for about 50 percent of the bank’s profits. Of the top ten banks, JPMorgan ranks lowest both in overhead efficiency ratio and return on equity.

The bank decided to make information technology a fundamental part of its strategy. The chief information officer (CIO) is a member of the operating committee that runs the bank. The bulk of the IT spending is going to consumer banking, to perform operations as simple as enabling the network of banks to serve a customer who moves to a new city.

Retail customers are seeing technology make banking easier. JPMorgan launched the Blink credit card, which lets customers hold the card in front of a reader instead of swiping, signing, entering a PIN, or handing the card to a store employee. Also, approval for a home equity loan now takes two hours, versus days a few years ago.

On the other side of the house, investment banking is receiving an annual budget of $1 billion for technology. These monies are focusing on building sophisticated trading platforms for institutional investors and hedge fund clients who require high-end trading analysis and risk modeling.


QUESTIONS

1. How do JPMorgan’s investments in IT help the bank increase market share? increase profits? prevent competitors from entering its markets?
2. Why is it important for the CIO to sit on the bank’s operating committee?
3. If you were the CIO of JPMorgan, do you think you would get a better return from your IT investments in consumer banking or in investment banking? Support your answer.

We have described the pressures that affect companies in today’s business environment and the responses that organizations take to manage these pressures. To plan for the most effective responses, companies formulate strategies. In the new digital economy, these strategies rely heavily on information technology, especially strategic information systems. In Chapter 2, we discuss corporate strategy and strategic information systems.

Before you go on . . .

1. Describe some of the pressures that characterize the modern global business environment.
2. What are some of the organizational responses to these pressures? Are any of the responses specific to a particular pressure? If so, which ones?

1.4 Why Are Information Systems Important to You?

Information systems are important to you for a variety of reasons. First, information systems and information technologies are integral to your life. Second, the IS field offers many career opportunities. Finally, all functional areas in an organization utilize information systems.
Information Systems and Information Technologies Are Integral to Your Lives

There are many examples of how information systems and technologies are embedded in your lives. For example, think of all the things you can do online:

- Register for classes.
- Take classes, and not just classes from your university.
- Access class syllabi, information, PowerPoints, and lectures.
- Research class papers and presentations.
- Conduct banking.
- Pay your bills.
- Research, shop, and buy products from companies or other people.
- Sell your “stuff.”
- Search for, and apply for, jobs.
- Make your travel reservations (hotel, airline, rental car).

In addition to all the activities you can perform online, there are other examples of how information systems and information technologies are essential to your daily living. For example, you may not use a regular wireline telephone. Rather, you use a smartphone that has a calendar, an address book, a calculator, a digital camera, and several types of software to download music and movies. This phone enables you to seamlessly switch between different wireless modes (Bluetooth, Wi-Fi, cellular, and/or Wi-Max) to communicate by voice, e-mail, instant messaging, and text messaging.

Going further, you have your own blog, and you post your own podcasts and videocasts to it. You have your own page on FaceBook. You make and upload videos to YouTube (now Google Video). You take, edit, and print your own digital photographs. You “burn” your own custom-music CDs and DVDs. You use RSS feeds to create your personal electronic newspaper. The list goes on. (Note: If a few of these terms are unfamiliar to you, don’t worry. We discuss everything here in detail later in this book.)

IT Offers Career Opportunities

Becoming knowledgeable about IT can improve your chances of landing a good job. Even though computerization eliminates some jobs, it creates many more. IT also creates many opportunities to start your own business, as you will see in IT’s About Business 1.4.

1.4 A Startup for Used Video Games

The founder of Goozex (www.goozex.com) went to a used video game store with a number of Xbox games. For 17 used games, he received $34 in store credit. Out of curiosity, he went back to the store the next day. The games he had traded in were selling for prices ranging from $12.99 to $32.99. Not surprisingly, he felt that he had been ripped off.

Rather than simply becoming upset, he launched a Web site to help game fans get a better deal and to make money for himself. On Goozex, gamers can save some money by connecting with one another online and trading games through the mail. Goozex members pay $1 per transaction to use the site’s matchmaking service, and they store up points that serve as a form of currency toward future trades. For example, if you send out an old Game Boy title, you might earn 100 Goozex points. If you send out a fairly recent Xbox 360 title, you might receive 850 points.
Because information technology is vital to the operation of modern businesses, it offers many employment opportunities. The demand for traditional IT staff—programmers, business analysts, systems analysts, and designers—is substantial. In addition, many well-paid jobs exist in emerging areas such as the Internet and e-commerce, mobile commerce, network security, object-oriented programming (OOP), telecommunications, and multimedia design. For details about careers in IT, see www.computerworld.com/careertopics/careers and www.monster.com. In addition, Table 1.2 provides a list of IT jobs along with a description of each one.

Since the stock market “correction” of 2000–2001, a great deal of misinformation about careers in information technology has been circulated. Let’s look at four myths about IT careers.

Myth #1: There are no computing jobs. In fact, the IT job market is quite strong. The technology jobs site Dice (www.dice.com) listed 30,000 technology jobs in 2002, 76,000 in 2005, and almost 100,000 in 2007. See http://news-service.stanford.edu/news/2006/november8/vardi-110806.html.

Myth #2: There will be no IT jobs when I graduate. In fact, the four fastest growing U.S. jobs that require a bachelor’s degree from 2002 through 2012 are IT-related. They are: (1) computer engineers, (2) management/computer information systems staffers, (3) computer and information systems managers, and (4) technical support specialists. Note that numbers (2) and (3) refer to MIS majors in colleges of business.

Myth #3: All IT-related jobs are moving offshore. In fact, some IT jobs are offshored (that is, sourced to areas with lower-cost labor), but the more highly skilled IT jobs will typically not be offshored. In addition, jobs related to a company’s core competencies or projects will typically not be offshored, and neither will jobs requiring close business-to-customer contact.

Myth #4: Computing and IT salaries are low due to cheaper overseas labor. In fact, graduates who major in management information systems typically command among the highest starting salaries of any business major.
**Information Technology Jobs**

<table>
<thead>
<tr>
<th>Position</th>
<th>Job Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chief Information Officer</td>
<td>Highest-ranking IS manager; responsible for strategic planning in the organization</td>
</tr>
<tr>
<td>IS Director</td>
<td>Responsible for managing all systems throughout the organization and day-to-day operations of the entire IS organization</td>
</tr>
<tr>
<td>Information Center Manager</td>
<td>Manages IS services such as help desks, hot lines, training, and consulting</td>
</tr>
<tr>
<td>Applications Development Manager</td>
<td>Coordinates and manages new systems development projects</td>
</tr>
<tr>
<td>Project Manager</td>
<td>Manages a particular new systems development project</td>
</tr>
<tr>
<td>Systems Manager</td>
<td>Manages a particular existing system</td>
</tr>
<tr>
<td>Operations Manager</td>
<td>Supervises the day-to-day operations of the data and/or computer center</td>
</tr>
<tr>
<td>Programming Manager</td>
<td>Coordinates all applications programming efforts</td>
</tr>
<tr>
<td>Systems Analyst</td>
<td>Interfaces between users and programmers; determines information requirements and technical specifications for new applications</td>
</tr>
<tr>
<td>Business Analyst</td>
<td>Focuses on designing solutions for business problems; interfaces closely with users to show how IT can be used innovatively</td>
</tr>
<tr>
<td>Systems Programmer</td>
<td>Writes the computer code for developing new systems software or maintaining existing systems software</td>
</tr>
<tr>
<td>Applications Programmer</td>
<td>Writes the computer code for developing new applications or maintaining existing applications</td>
</tr>
<tr>
<td>Emerging Technologies Manager</td>
<td>Forecasts technology trends and evaluates and experiments with new technologies</td>
</tr>
<tr>
<td>Network Manager</td>
<td>Coordinates and manages the organization's voice and data networks</td>
</tr>
<tr>
<td>Database Administrator</td>
<td>Manages the organization's databases and oversees the use of database management software</td>
</tr>
<tr>
<td>Auditing or Computer Security Manager</td>
<td>Manages ethical and legal use of information systems</td>
</tr>
<tr>
<td>Webmaster</td>
<td>Manages the organization's World Wide Web site</td>
</tr>
<tr>
<td>Web Designer</td>
<td>Creates World Wide Web sites and pages</td>
</tr>
</tbody>
</table>

**IT Is Used by All Departments**

Simply put, organizations cannot operate without information technology. For this reason, every manager and professional staff member should learn about IT within his or her specialized field as well as across the entire organization and among organizations.
IT systems are integral to every functional area of an organization. In finance and accounting, for example, managers use IT systems to forecast revenues and business activity, to determine the best sources and uses of funds, and to perform audits to ensure that the organization is fundamentally sound and that all financial reports and documents are accurate.

In sales and marketing, managers use information technology to perform the following functions:

- **Product analysis**: developing new goods and services
- **Site analysis**: determining the best location for production and distribution facilities
- **Promotion analysis**: identifying the best advertising channels
- **Price analysis**: setting product prices to get the highest total revenues

Marketing managers also use IT to manage their relationships with their customers. In manufacturing, managers use IT to process customer orders, develop production schedules, control inventory levels, and monitor product quality. They also use IT to design and manufacture products. These processes are called computer-assisted design (CAD) and computer-assisted manufacturing (CAM).

Managers in human resources use IT to manage the recruiting process, analyze and screen job applicants, and hire new employees. HR managers use IT to help employees manage their careers, administer performance tests to employees, and monitor employee productivity. These managers also use IT to manage compensation and benefits packages.

These are just a few examples of the roles of information technology in the various functional areas of an organization. We think it is important for students from the different functional areas to see the value of the information systems in their fields.

**Before you go on . . .**

1. What are the major reasons why it is important for employees in all functional areas to become familiar with IT?
2. Why is it important to become knowledgeable about IT if you are not working as an IT employee?

**1.5 The Plan of This Book**

A major objective of this book is to help you understand the roles of information technologies in today’s organizations. The book is also designed to help you think strategically about information systems. That is, we want you to be able to look into the future and see how these information technologies can help you, your organization, and your world. Finally, the book demonstrates how IT supports all of the functional areas of the organization.

This chapter has introduced you to the global business environment and the Web-based platform that individuals and organizations use to successfully compete in that environment. Chapter 2 will introduce you to the types of information systems in organizations and how they are used for strategic advantage. Chapter 3 addresses three critical and timely topics: ethics, security, and privacy. Corporate scandals at Enron, WorldCom, HealthSouth, Adelphia, and others emphasize the importance of ethics. The large number of massive data breaches at various institutions (see the opening case of TJX in Chapter 3) makes it essential that we keep security in mind at all times. Finally, the miniaturization and spread of surveillance technologies leads many people to wonder if they have any privacy left at all.
The amount of data available to us is increasing exponentially, which means that we have to find methods and tools to manage the deluge. Chapter 4 discusses how to manage data so that we can use them effectively to make decisions.

Chapter 5 looks at telecommunications and networks, including the Internet. Because the Internet is the foundation of the global business environment, the importance of computer networks cannot be overstated.

Electronic commerce, facilitated by the Internet, has revolutionized how businesses operate today. Chapter 6 covers this important topic. One of the newest technologies to impact organizations, wireless communications, is explored in Chapter 7. Chapter 8 provides a detailed picture of the various types of information systems used in organizations today; Chapter 9 discusses the various information systems that support managerial decision making; and Chapter 10 notes how organizations acquire or develop new applications.

Technology Guides 1 (hardware) and 2 (software) provide a detailed look at the two most fundamental IT components that are the foundation for all information systems. Technology Guide 3 provides information on how to protect your own information assets. Finally, Technology Guide 4 covers the basics of telecommunications, whereas Technology Guide 5 addresses the basics of the Internet and the World Wide Web.

What’s in IT for me?

In the previous section, we discussed IT in each of the functional areas. Here, we take a brief look at the MIS function.

**for the MIS major**

The MIS function directly supports all other functional areas in an organization. That is, the MIS function is responsible for providing the information that each functional area needs in order to make decisions. The overall objective of MIS personnel is to help users improve performance and solve business problems using IT. To accomplish this objective, MIS personnel must understand both the information requirements and the technology of each functional area. For this reason, MIS personnel must think “business needs” first and “technology” second.

1. **Differentiate among data, information, and knowledge.**
   Data items refer to an elementary description of things, events, activities, and transactions that are recorded, classified, and stored, but are not organized to convey any specific meaning. Information is data that have been organized so that they have meaning and value to the recipient. Knowledge consists of data and/or information that have been organized and processed to convey understanding, experience, accumulated learning, and expertise as they apply to a current business problem.

2. **Differentiate between information technology infrastructure and information technology architecture.**
   An organization’s information technology architecture is a high-level map or plan of the information assets in an organization. The IT architecture integrates the information requirements of the overall organization and all individual users, the IT infrastructure, and all applications. An organization’s information technology infrastructure consists of
the physical facilities, IT components, IT services, and IT management that support the entire organization.

3. Describe the global, Web-based platform and its relationship to today’s business environment.
The global, Web-based platform consists of the hardware, software, and communications technologies that comprise the Internet and the functionality of the World Wide Web. This platform enables individuals to connect, compute, communicate, compete, and collaborate everywhere and anywhere, anytime and all the time, and to access limitless amounts of information, services, and entertainment. This platform operates without regard to geography, time, distance, and even language barriers. The Web-based platform has created today’s business environment, which is global, massively interconnected, intensely competitive, 24/7/365, real-time, rapidly changing, and information-intensive.

4. Discuss the relationships among business pressures, organizational responses, and information systems.
The business environment is the combination of social, legal, economic, physical, and political factors that affect business activities. Significant changes in any of these factors are likely to create business pressures. Organizations typically respond to these pressures with activities supported by IT. These activities include strategic systems, customer focus, make-to-order and mass customization, and e-business.
**Discussion Questions**

1. Describe how IT architecture and IT infrastructure are interrelated.
2. Is the Internet an infrastructure, an architecture, or an application program? Why? If none of the above, then what is it?
3. How has the global, Web-based platform affected competition?
4. Describe Google and Amazon’s new information technology infrastructure. What is the relationship between this new infrastructure and the global, Web-based platform?
5. Explain why IT is a business pressure as well as an enabler of response activities that counter business pressures.
6. What does a flat world mean to you in your choice of a major? in your choice of a career? Will you have to be a “lifelong learner”? Why or why not?
7. What impact will a flat world have on your standard of living?

**Problem-Solving Activities**

1. Visit some Web sites that offer employment opportunities in IT. Prominent examples are [www.dice.com](http://www.dice.com), [www.hotjobs.com](http://www.hotjobs.com), [www.monster.com](http://www.monster.com), [www.collegerecruiter.com](http://www.collegerecruiter.com), [www.careerbuilder.com](http://www.careerbuilder.com), [www.jobcentral.com](http://www.jobcentral.com), [www.job.com](http://www.job.com), [www.career.com](http://www.career.com), and [www.truecareers.com](http://www.truecareers.com). Compare the IT salaries to salaries offered to accountants, marketing personnel, financial personnel, operations personnel, and human resources personnel. For other information on IT salaries, check *Computerworld’s* annual salary survey.
2. In this chapter, we have an example of the impacts of the global, Web-based platform on the travel industry. With this as a guide, discuss the impacts of this platform on the residential real estate industry. Be specific with Web sites that you use for examples.

**Web Activities**

1. Enter the Web site of UPS ([www.ups.com](http://www.ups.com)).
   a. Find out what information is available to customers before they send a package.
   b. Find out about the “package tracking” system.
   c. Compute the cost of delivering a 10” × 20” × 15” box, weighing 40 pounds, from your hometown to Long Beach, California (or to Lansing, Michigan, if you live in or near Long Beach). Compare the fastest delivery against the least cost.
4. Access [www.x-home.com](http://www.x-home.com) and find information about the home of the future.
5. Experience customization by designing your own shoes at [www.nike.com](http://www.nike.com), your car at [www.jaguar.com](http://www.jaguar.com), your CD at [www.easternrecording.com](http://www.easternrecording.com), your business card at [www.iprint.com](http://www.iprint.com), and your diamond ring at [www.bluenile.com](http://www.bluenile.com). Summarize your experiences.

**Team Assignments**

1. Create an online group for studying IT or a part of it that especially interests you. Each member of the group must have a Yahoo e-mail account (free). Go to Yahoo: Groups ([http://groups.yahoo.com](http://groups.yahoo.com)) and at the bottom see a section titled “Create Your Own Group.”
   **Step 1:** Click on “Start a Group Now.”
   **Step 2:** Select a category that best describes your group (use the Search Group Categories, or use Browse Group Categories tool). You must find a category.
   **Step 3:** Describe the purposes of the group and give it a name.
Step 4: Set up an e-mail address for sending messages to all group members.
Step 5: Each member must join the group (select a “profile”); click on “Join this Group.”
Step 6: Go to Word Verification Section; follow the instructions.
Step 7: Finish by clicking “Continue.”
Step 8: Select a group moderator. Conduct a discussion online of at least two topics of interest to the group.
Step 9: Arrange for messages from the members to reach the moderator at least once a week.
Step 10: Find a similar group (use Yahoo’s “find a group” and make a connection). Write a report for your instructor.

2. Review the Wall Street Journal, Fortune, Business Week, and local newspapers for the last three months to find stories about the use of Web-based technologies in organizations. Each group will prepare a report describing five applications. The reports should emphasize the role of the Web and its benefit to the organizations. Cover issues described in this chapter, such as productivity, competitive strategies, and globalization. Present and discuss your work.

**Amazon: From Book Seller to Service Provider**

**THE BUSINESS PROBLEM** Many analysts wonder if Amazon (www.amazon.com) will ever fulfill its original promise to revolutionize retailing. Despite being the largest online retailer with annual sales in excess of $10 billion, Amazon has not shown the consistent profit growth that investors have expected. In fact, profits have fallen, and the company’s operating margins (about 4.1 percent) are less than Wal-Mart’s (5.9 percent).

In addition, competition is increasing, with other Web sites becoming preferred first stops on the Web. Google, for one, has replaced retail sites such as Amazon as the place where many people start their shopping (see Froogle at http://froogle.google.com). Other Web sites such as MySpace and YouTube (owned by Google) have become prime places for many people to gather online and eventually shop.

**THE IT SOLUTIONS** By 2007, Amazon had spent 12 years and some $2 billion building the infrastructure of its online store, which is among the biggest and most reliable in the world. However, Amazon uses only 10 percent of its processing capacity at any one time. As a result, the company has decided to provide a series of computing, storage, and other services that make its infrastructure available to companies and individuals to help them run the technical and logistical parts of their businesses. Three of these services are the Simple Storage Service (S3), the Elastic Compute Cloud (EC2), and the Mechanical Turk.

With S3, Amazon charges 15 cents per gigabyte per month for businesses to store data and applications on Amazon disk drives. Through EC2, Amazon rents out processing power, starting at 10 cents per hour for the equivalent of one basic server.

The Mechanical Turk service combines processing power with networks of real people who are paid to do the kind of work that machines cannot do well, such as recognizing inappropriate content in images or transcribing audio. Companies post pieces of work onto the Mechanical Turk and pay people online, for which Amazon receives a 10 percent commission.

**THE RESULTS** Thousands of companies are using Amazon services. For example, Webmail.us (www.webmail.us) is an e-mail hosting company that maintains e-mail programs, filters spam, and removes malicious software such as viruses and worms from e-mail for clients. The company uses S3 for storage, sending Amazon more than a terabyte of data per week. To host the development effort required to build and maintain its systems’ interface to S3, Webmail.us uses EC2. The company also uses EC2 for processing tasks related to storage backup. Webmail.us states that Amazon cut its data backup costs by 75 percent overnight.

Another example is Startup company Powerset (www.powerset.com), which offers searches that use natural language rather than stilted phrases and imprecise keywords. This task requires large amounts of processing capacity. Powerset uses S3 and EC2 to keep its costs down, while handling the background work of reading, processing, and indexing the vast number of Web pages that underlie its search processes.

Since its debut, the Mechanical Turk has attracted thousands of “ Turkers” working for dozens of companies. One company, Efficient Frontier (www.frontier.com), uses the service to analyze tens of thousands of search keywords to see which ones best attract potential shoppers to particular Web sites. Another company, Casting Words (www.castingwords.com), uses Turkers to transcribe 10-minute podcast segments, assemble them into full transcriptions, and check the quality.
The jury is out on whether Amazon services will contribute significantly to the company’s bottom line. However, these service offerings are a bid by Amazon to be a leading player in the next wave of the Internet. Specifically, Amazon is competing directly with Google, Microsoft, and other giants to build a Web-based, global computing platform. It remains to be seen if Amazon will be successful in this endeavor.


QUESTIONS

1. What is Amazon’s strategy? Is the company moving away from its core competency of being a leading online retailer? Support your answer.

2. Why is Amazon competing with Google and Microsoft? Is this a wise strategy? Compare the strategies of Amazon, Google, and Microsoft.