Chapter 1: Information Systems: An Overview

This chapter starts with an overview of common uses for computers and information systems, explains the difference between computer literacy and information literacy, and then reviews transaction processing systems as one of the earliest applications of information systems. Next, we discuss the components of a management information system (MIS), including data, database, process, and information and see how information systems relate to information technologies. This chapter also covers the roles and applications of information systems and explains the Five Forces Model, used to develop strategies for gaining a competitive advantage. Finally, we will touch on the future of information systems.

Learning Outcomes

After studying this chapter you should be able to:

LO1 Discuss common applications of computers and information systems.

LO2 Explain the differences between computer literacy and information literacy.

LO3 Define transaction processing systems and management information systems.

LO4 Describe the four major components of an information system.

LO5 Discuss the differences between data and information.

LO6 Explain the importance and applications of information systems in functional areas of a business.

LO7 Discuss how information technologies are used to gain a competitive advantage.

LO8 Explain the Five Forces Model and strategies for gaining a competitive advantage.

LO9 Summarize the future outlook of information systems.

Organizations use computers and information systems to reduce costs and gain a competitive advantage in the marketplace. Computers and information systems are used in grocery and retail stores as well. For example, a point-of-sale (POS) system speeds up service by reading the universal product codes (UPCs) on items in your shopping cart. This same system also manages store inventory, and some information systems can even reorder stock automatically. Banks, too, use computers and information systems for generating your monthly statement and running ATM machines for many banking activities.
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short-message service. Users can send and receive

With social networking sites, you can connect

Many workers now use telecommuting to perform

Figure 1.1 A point-of-sale system

Figure 1.2 Examples of smartphones

As a knowledge worker of the future, computers and information technology will help you be more effective and productive, no matter what profession you choose.

Figure 1.1 A point-of-sale system

As you read, keep in mind that the terms “information systems” and “information technologies” are used interchangeably.

As a knowledge worker of the future, computers and information technology will help you

be more effective and productive, no matter what profession you choose.

For improving decision making but involve some chal-

lenges, too, such as security and privacy issues. The

information box on TJX Companies is an example of

potential challenges.

TJX Companies, Inc.: Credit Card Breach

In January 2007, TJX Companies, which includes T.J. Maxx and Marshalls stores, announced that identity thieves had stolen more than 46.5 million credit cards. Identity theft is a crime in which unauthorized people obtain personal infor-

mation, such as social security numbers, bank account numbers, and driver’s license numbers, and use them for their

personal gain.

“While technology has made our lives much easier, it has also created new vulnerabilities,” Michael J. Sullivan, U.S. Attorney for the District of Massachusetts, said in a statement announcing the indictments. “This case clearly shows how

strokes on a keyboard with a criminal purpose can have costly results.”

The identity thieves used sophisticated hacking techniques to break through security systems and steal information

from TJX. For example, they used wireless scanners to find stores with vulnerable networks and network sniffers to cap-
ture credit card numbers and other information. They stored the stolen information on servers in Eastern Europe and the

United States and sold some account information to other criminals. They were able to convert the stolen data to cash by

creating counterfeit credit and debit cards and then using them to withdraw money from ATMs.

This case also shows the international nature of cybercrime, as several members of the identity theft ring are from
countries outside the United States, including Ukraine, Estonia, China, and Belarus.

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countries outside the United States, including Ukraine, Estonia, China, and Belarus.
3. To summarize, knowledge workers should know the marketplace. (BI is discussed in more detail in Chapter 7) and gives organizations a competitive advantage in the role of predicting views of business operations and environments and information technology. On the other hand, understanding the role of information in generating and using business intelligence. Business intelligence (BI) is more than just information. It provides historical, current, and predictive views of business operations and environments and gives organizations a competitive advantage in the marketplace. (BI is discussed in more detail in Chapter 3.) To summarize, knowledge workers should know the following:

• Internal and external sources of data
• How data is collected
• Why data is collected
• What type of data should be collected
• How data is converted to information and eventually to business intelligence
• How data should be indexed and updated
• How data and information should be used to gain a competitive advantage

4. Management Information Systems

A management information system (MIS) is an organized integration of hardware and software technologies, data, processes, and human elements designed to produce timely, integrated, relevant, accurate, and useful information for decision-making purposes. The hardware components (discussed in more detail in Chapter 2) include input, output, and memory devices and vary depending on the application and the organization. MIS software, also covered in Chapter 2, can include commercial programs, software developed in-house, or both. The application or organization determines the type of software used. Processes are usually methods for performing a task in an MIS application. The human element includes users, programmers, systems analysts, and other technical personnel. This book emphasizes users of MISs. In designing an MIS, the first task is to define the system’s objectives clearly. Second, data must be collected and analyzed. Finally, information must be provided in a useful format for decision-making purposes.

Many MIS applications are used in both the private and public sectors. For example, an MIS for inventory control provides data such as how much of each product is on hand, what items have been ordered, and what items are back-ordered. Another MIS might forecast sales volume for the next fiscal period. This type of system uses recent historical data and mathematical or statistical models to generate the most accurate forecast, and sales managers can use this information for planning purposes. In the public sector, an MIS for a police department, for example, could provide information such as crime statistics, crime forecasts, and allocation of police units. Managers can examine these statistics to spot increases and decreases in crime rates or types of crimes and analyze this data to determine future deployment of law enforcement personnel.

As you’ll see in this book, many organizations use information systems to gain a competitive advantage. The information box on Hertz is one example of this use. (Note: MISs are often referred to as just “information systems,” and these terms are used interchangeably in this book.)

Information Technology at Hertz Car Rental Company

Executives in the car-rental business must be able to electronically sift through important information on a wide array of topics, such as cities, climates, holidays, business cycles, tourist activity, past promotions, and market forecasts. Examining this information helps executives make effective marketing decisions so that they can compete in the car rental business.

To gain a competitive edge, Hertz used a mainframe-based decision support system (DSS) and an executive information system (EIS) that includes tools for analyzing the massive amount of demographic data to make real-time marketing decisions. (DSSs and EISs are discussed in Chapter 12.)

With the EIS, Hertz executives can now analyze essential information from both external and internal sources. Internal sources include rental agreements, fleet purchases, computer reservation system reports, and airport reports comparing revenues for Hertz and other car-rental companies. In addition, they can manipulate and refine data to make it more meaningful and use data for a variety of what-if analyses. According to Hertz executive Scott H. Meadow, using an EIS doesn’t ensure prosperity, but “how you use it” does have an impact.

5. Major Components of an Information System

In addition to hardware, software, and human elements, an information system includes four major components, discussed in the following sections: data, database, process, and information, as shown in Exhibit 1.1.
If an organization has defined its strategic goals, objectives, and critical success factors, structuring the data component to define what type of data is collected and in what form is usually easy.

5.1 Data

The **data** component of an information system is considered the input to the system. The information users need affects the type of data that’s collected and used. Generally, there are two sources of data: external and internal. An information system should collect data from both sources, although organizational objectives and the type of application also determine what sources to use. Internal data includes, for example, sales records, personnel records, and so forth. The following list shows some examples of external data sources:

- Customers, competitors, and suppliers
- Government agencies and financial institutions
- Labor and population statistics
- Economic conditions

Typically, data has a time orientation, too. For example, past data is collected for performance reports, and current data is collected for operational reports. In addition, future data is predicted for budgets or cash flow reports. Data can also be collected in different forms, such as aggregated (reporting subtotals for categories of information, for example) or disaggregated (itemized lists, for instance). An organization might want to disaggregate data to analyze sales by product, territory, or salesperson. Aggregated data can be useful for reporting overall performance during a particular sales quarter, for instance, but it limits decision makers’ ability to focus on specific factors. If an organization has defined its strategic goals, objectives, and critical success factors, structuring the data component to define what type of data is collected and in what form is usually easy. On the other hand, if there are conflicting goals and objectives or the company isn’t aware of critical success factors, many problems in data collection can occur, which affects an information system’s reliability and effectiveness.

5.2 Database

A **database**, the heart of an information system, is a collection of all relevant data organized in a series of integrated files. (You learn more about databases in Chapter 3.) A comprehensive database is essential for the success of any information system. To create, organize, and manage databases, a database management system (DBMS) is used, such as Microsoft Access or Parc Software’s FileMaker Pro for home or small office use. In a large organization, a DBMS, such as Oracle or IBM DB2, might be used.

Databases are also important for reducing personnel time needed to gather, process, and interpret data manually. With a computerized database and a DBMS, data can be treated as a common resource that’s easy to access and use.

5.3 Process

The purpose of an information system’s **process** component is generating the most useful type of information for decision making. This component generally includes transaction-processing reports and models for decision analysis that can be built into the system or accessed from external sources. An information system can include a wide range of models to support all levels of decision making. Users should be able to query an information system and generate a variety of reports. In addition, an information system should be able to grow with the organization so that users can redefine and restructure models and incorporate new information into their analyses.

5.4 Information

Although they might seem the same, data and information are different. Data consists of raw facts and by itself is difficult to use for decision making. Information—the output of an information system—consists of facts that have been analyzed by the process component and, therefore, are more useful for decision making. For example, XYZ Company’s sales total last month was $5,000,000. This number is data because it doesn’t tell you how the company performed. Did it meet the sales goal? Did sales increase or decrease from the previous month? How did the company perform against its top competitors? These questions and more can be answered by the information an information system provides.

The quality of information is determined by its usefulness to users, and its usefulness determines the success of an information system. Information is useful if it enables decision makers to make the right decision in a timely manner. To be useful, information must have the following qualities:

- **Timeliness**
- **Integration with other data and information**
- **Consistency and accuracy**
- **Relevance**

If information lacks any of these qualities, the results are incorrect decisions, misallocation of resources, and overlooked windows of opportunity. If the system can’t give users a minimum level of confidence in its reliability, it won’t be used or users might dismiss the reports it generates. Information must provide a base for users to explore different options or gain insight into tasks.

Another factor affecting the usefulness of information is the information system’s user interface. Because this interface must be flexible and easy to use, most information systems make use of graphical user interfaces (GUIs), with features such as menus and buttons. To be useful, information systems should also produce information in different formats, including graphs (pie charts and bar graphs, for example), tables, and exception reports, which highlights data that is outside a specified range. Supplying information systems with a variety of formats increases the likelihood of users understanding and being able to use the information. Note that in addition to the formal information that an information system generates, users need to be able to make use of informal information, such as rumors, unconfirmed reports, and stories, when solving problems.

The ultimate goal of an information system is to generate business intelligence (BI), described earlier in this chapter. As you’ll learn throughout this book, many different tools, techniques, and types of information system technologies are used to generate BI.

5.5 Examples of Information Systems

To better understand the four main components of an information system, take a look at the following examples.

**Example 1** A state university stores all student data in a database. The collected data includes each student’s first name, last name, age, gender, major, nationality, and so forth. The process component of the information system performs all sorts of analysis on this data. For example, the university’s DBMS has a built-in query capability that can generate the following information:

- How many students are in each major?
- Which major is the fastest growing?
- What is the average student age?
- Among the international students, which country represents the highest number of students?
- What is the ratio of male to female students in each major?

Many other types of analysis can be done. A forecasting model (part of the process component) could be used to generate the estimated number of students for 2015, for instance. In addition, decisions could be

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of students for 2015 can help with facilities planning.

Example 2 Teletech, an international textile company, uses a database to store data on products, suppliers, sales personnel, costs, and so forth. The process component of the information system conducts analysis on the data to provide the following information about the preceding month:
- Which salesperson generated the highest sales?
- Which product generated the highest sales? The lowest sales?
- Which region generated the highest sales?

Again, forecasting models can be used to generate predictions for the next sales period, and these predictions can be broken down by product, region, and salesperson. Based on this information, many decisions could be made, such as allocating the advertising budget to different products and regions.

6.1 The Importance of Information Systems

Information is the second most important resource (after the human element) in any organization. Timely, relevant, and accurate information is a critical tool for enhancing a company’s competitive position in the marketplace and managing the four Ms of resources: manpower, machinery, materials, and money.

To manage these resources, different types of information systems have been developed. Although all have the major components shown previously in Figure 1-3, they vary in the kind of data they collect and the analyses they perform. This section discusses some major types of information systems, focusing on the types of data and analysis used in each.

Information systems are designed to collect data, process the collected data, and deliver timely, relevant, and useful information that can be used for decision making.

Information Technologies at Home Depot

Home Depot revolutionized the do-it-yourself home improvement industry in the United States. Its stores use a POS system for fast customer service and improved inventory management and a wireless network for efficient in-store communication. Home Depot also has a Web site to communicate with customers and increase sales with online orders and uses RFID tags to better manage inventory and improve the efficiency of its supply chain network.

Home Depot maintains a high-speed network connecting its stores throughout the United States and Canada and uses a data warehousing application to analyze variables affecting its success—customers, competitors, products, and so forth.1 The information system gives Home Depot a competitive advantage by gathering, analyzing, and using information to better serve customers and plan for customers’ needs.

A personnel information system (PIS) or human resource information system (HRIS) is designed to provide information that helps decision makers in personnel carry out their tasks more effectively. Informatics have played a major role in improving the efficiency and effectiveness of HR departments. For example, intranets are often used to provide basic HR functions, such as employees checking how much vacation time they have left or looking up how much they have in their 401(k) plans. Intranets reduce personnel costs and speed up responses to common employee requests. As discussed in Chapter 7, an intranet is a network within an organization that uses Internet protocols and technologies, for collecting, storing, and disseminating useful information that supports business activities such as sales, customer service, human resources, and marketing. The main difference between an intranet and the Internet is that intranets are private and the Internet is public. A PIS/HRIS supports the following decisions, among others:
- Choosing the best job candidate
- Scheduling and assigning employees
- Predicting the organization’s future personnel needs
- Providing reports and statistics on employee demographics
- Allocating human and financial resources

A logistics information system (LIS) is designed to reduce the cost of transporting materials yet maintain safe and reliable delivery. The following are a few examples of decisions supported by an LIS:
- Improving routing and delivery schedules
- Selecting the best modes of transportation
- Improving transportation budgeting
- Improving shipping planning

The information box on UPS shows uses of information systems and information technologies, particularly logistics information systems.

A manufacturing information system (MIFS) is used to manage manufacturing resources so that companies can reduce manufacturing costs, increase product quality, and improve inventory decisions. MIFSs can perform many types of analysis with a high degree of timeliness and accuracy. For example, managers could use an MIFS to assess the effect on final product costs of a seven percent increase in raw materials or determine how many assembly-line workers are needed.
to produce 200 automobiles in the next three weeks. Some decisions an MFIS supports are as follows:
- Improving ordering decisions
- Improving product cost calculations
- Improving space utilization
- Improving the bid evaluation process used with vendors and suppliers
- Improving analysis of price changes and discounts

The goal of a financial information system (FIS) is to provide information to financial executives in a timely manner. An FIS is used to support the following decisions, among others:
- Improving budget allocation
- Minimizing capital investment risks
- Monitoring cost trends
- Managing cash flows
- Determining portfolio structures

In addition, marketing information systems (MKISs) are used to improve marketing decisions. An effective MKIS should provide timely, accurate, and integrated information about the marketing mix (price, promotion, place, and product). Some decisions an MKIS supports are as follows:
- Analyzing market share, sales, and sales personnel
- Sales forecasting
- Price and cost analysis of items sold

### 6.2 Using Information Technologies for a Competitive Advantage

Information technologies can help bottom-line and top-line strategies. The focus of a bottom-line strategy is improving efficiency by reducing overall costs. A top-line strategy focuses on generating new revenue by offering new products and services to customers or increasing revenue by selling existing products and services to new customers. For example, e-commerce businesses are adapting business models to reduce distribution costs dramatically. A good example is anti-virus vendors using the Internet to distribute software. For a subscription fee of around $30, you can download the software and get updates for a year. Without the Internet for easy, inexpensive distribution, vendors couldn’t afford to offer software at such a low price.

As discussed in Chapter 11, many organizations use enterprise systems, such as supply chain management (SCM), customer relationship management (CRM), enterprise resource planning (ERP), and collaboration software, to reduce costs and improve customer service. The goal of these systems is to use information technologies to create the most efficient, effective link between suppliers and consumers. A successful CRM program, for example, helps improve customer service and create a long-term relationship between an organization and its customers.

For differentiation strategies, organizations try to make their products and services different from their competitors. Apple has been successful with this strategy by designing its computers to look much different from PCs (offering computers in an assortment of bright colors, for example) and focusing on its computers’ high-resolution graphics and ease of use. As another example, Amazon.com has differentiated its Web site by using certain information technologies, such as personalization technologies (covered in more detail in Chapter 11) to recommend products to customers based on their previous purchases. Amazon.com also uses the 1-Click system for fast checkout. With this system, customers can enter credit card numbers and addresses once, and in subsequent visits simply click once to make a purchase, without having to enter information again.

With focus strategies, organizations concentrate on a specific market segment in an attempt to achieve a cost or differentiation advantage. Apple has also used this strategy to target iPhones to consumer users rather than business users. Similarly, Macintosh computers are marketed mainly to hobbyists and consumers. On the other hand, Research in Motion targets Blackberry mostly to business users. As another example, Abercrombie & Fitch targets high-end clothing to low-income customers, such as teenagers and young adults, while Nordstrom targets their high-end clothing to high-income customers. Information technologies could assist these companies in reaching their target market segments more cost effectively.

6.3 Porter’s Five Forces Model: Understanding the Business Environment

Michael Porter also created a comprehensive framework called the Five Forces Model for analyzing an organization, its position in the marketplace, and how information systems could be used to make it more competitive. The five forces are as follows (see Exhibit 1-2):
- Buyer power
- Supplier power
- Threat of substitute products or services
- Threat of new entrants
- Rivalry among existing competitors

Buyer power is high when customers have many choices and low when they have few choices. Typically, organizations try to limit buyers’ choices by offering services that make it difficult for customers to switch, which is essentially using a differentiation strategy. For example, Dell Computer was among the first to offer computer customization options to customers, and other computer manufacturers followed suit. Grocery stores, such as Sams Club, offer club cards that encourage customers to shop by giving them big discounts, an example of overall cost leadership strategies. Similarly, airlines and hotels offer free

**Walmart Stores, Inc.**

Walmart, the largest retailer in the world (http://walmartstores.com), built the Walmart Satellite Network, which is the largest private satellite communication system in the United States. It links branch stores with the home office in Bentonville, Arkansas by using two-way voice and data and one-way video communication. In addition to the POS systems used for many years, Walmart uses the following information technologies to gain a competitive advantage:

- Telecommunication is used to link stores with the central computer system and then to suppliers’ computers. This system creates a seamless connection among all parties.
- Network technologies are used to manage inventory and implement a just-in-time inventory system. As a result, products and services can be offered at the lowest possible prices.
- Walmart uses an extant, called RetailLink, to communicate with suppliers. Suppliers can use this extranet to review product sales records in all stores and track current sales figures and inventory levels. (Extranets are discussed in Chapter 7.)
- Electronic data interchange (EDI, discussed in Chapter 11) is used to streamline the order-invoice-payment cycle, reduce paperwork, and improve accuracy.
- Wal-Mart is a major user of RFID technologies, which have improved its supply chain and inventory management systems.
mileage and points when customers use their services. Information systems can manage these strategies easier and more cost effective.

By using these strategies, organizations try to combat the threat of new entrants or substitute products by increasing customer loyalty. However, certain information technology tools, such as the Internet, have exerted the playing field by giving customers more access to all sorts of data, such as being able to compare prices. This increased access to data increases buyers’ bargaining power and decreases supplier power, discussed next.

Supplier power—the opposite of buyer power—is high when customers have fewer options and low when customers have more options. Organizations might use information systems to make their products and services cheaper or offer more services to distinguish themselves from competitors (again, another use of a differentiation strategy). Boeing, for example, uses information technologies to replace human experts. Boeing uses intelligent information systems (discussed in Chapter 13) to stay ahead of the competition. These systems include artificial intelligence technologies, such as neural networks, natural language processing, and expert systems that perform tasks usually carried out by human experts. Boeing uses these systems to develop and provide technology solutions and applications in information management, collaborative technologies, knowledge management, data and text mining, and natural language processing. For example, one solution is a tool for communication between vehicle diagnostic systems and technical support databases and is used to collect information sent to airplane mechanics. Boeing also uses these systems internally to support its 787 program, commercial aviation services, the Multi-Mission Maritime Aircraft program, and many military aircraft and space programs.10

Threat of new entrants is low when duplicating a company’s product or service is difficult. Organizations often use focus strategies to ensure that this threat remains low. For example, developing a search engine that could compete successfully with Google would be difficult. In addition, organizations use information technologies to increase customer loyalty, as mentioned previously, which reduces the threat of new entrants. For instance, banks offer free bill paying to attract customers and keep them from switching to another bank; setting up a bill-paying service at another bank takes time that most customers don’t want to spend. Similarly, after customizing their home pages with options offered by sites such as Yahoo! and Google, many users don’t want to repeat this process at a new site.

Rivalry among existing competitors is high when many competitors occupy the same marketplace position and is low when there are few competitors. For example, online brokerage firms operate in a highly competitive environment, so they use information technologies to make their services more unique. The information box on Charles Schwab shows you how one company used this strategy.

Information Technology at Boeing

Boeing is the world’s leading aerospace company and the largest manufacturer of commercial jetliners and military aircraft (www.boeing.com/company/offices/aboutus/). Additionally, Boeing designs and manufactures electronic and defense systems, missiles, satellites, launch vehicles, and advanced information and communication systems.

Boeing uses intelligent information systems (discussed in Chapter 13) to stay ahead of the competition. These systems include artificial intelligence technologies, such as neural networks, natural language processing, and expert systems that perform tasks usually carried out by human experts. Boeing uses these systems to develop and provide technology solutions and applications in information management, collaborative technologies, knowledge management, data and text mining, and natural language processing. For example, one solution is a tool for communication between vehicle diagnostic systems and technical support databases and is used to collect information sent to airplane mechanics. Boeing also uses these systems internally to support its 787 program, commercial aviation services, the Multi-Mission Maritime Aircraft program, and many military aircraft and space programs.10

7 Future Outlooks

Information Technologies at Charles Schwab

Charles Schwab Corporation, one of the largest U.S. financial services firms, provides securities brokerage and financial services for more than 8 million customers. Schwab was the first discount brokerage to offer automated, around-the-clock phone service and the capability to access current research on stocks and other securities.11

To stay ahead of competition, Schwab uses a variety of information technologies, including the Internet for online stock trading, wired and wireless networks, automated data centers, and a comprehensive sales system, among others. Schwab has also developed a customer information system to help people make decisions on investments; this system helps Schwab reach other customers besides those who are already financially knowledgeable.12

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Microsoft, founded in 1975, is the world's largest software company and is involved in all aspects of desktop computing. It's best known for Disk Operating System (DOS), Windows operating systems (OS), and office software suites such as Office. Some products and services Microsoft offers are the following:

- Windows—The most popular operating system for PCs and PC-compatible computers
- Windows XP and Windows Vista—Two widely used OSs for PCs
- Windows Server 2003 and Server 2008—Widely used server operating systems used in network environments
- Office—The most widely used office suite; includes Word, Excel, Access, and PowerPoint
- Internet Explorer—A popular Web browser
- Expression Web (replacing FrontPage)—Code-named Visual Studio—A graphical programming language, used by many e-commerce sites
- Sharepoint Server—Microsoft's new groupware for facilitating information sharing and content management
- SQL Server 2005—A widely used database management system
- Xbox—A video game system
- Visual Studio—A graphical programming language, mostly used for Web applications
- Zune—A portable media player and software; includes Zune Marketplace, which provides online music, video, and podcast downloads
- e-Wallet and Passport—Electronic payment systems used by many e-commerce sites

Microsoft's future plans include incorporating voice-enabled computing into the next generation of Windows products.

Industry Connection

MICROSOFT CORPORATION *

Microsoft, in this chapter, you have seen examples of uses for computers and information systems, learned the difference between computer literacy and information literacy, and reviewed transaction processing systems as one of the earliest applications of information technology. You have learned what a management information system (MIS) is and its major components: data, database, process, and information. This chapter has also given you an overview of how information systems and information technologies are used in different areas of business and explained how companies can use Porter’s three competitive strategies and the Five Forces Model to gain a competitive advantage.

Chapter Summary

1. What are the differences between information literacy and computer literacy?
2. Which type of data gives you more options in making decisions: aggregated data or disaggregated data? Why?
3. Describe the difference between data and information.
4. What are the necessary qualities of information in an information system, and why are they important?
5. Research Facebook and Twitter, two popular social networking sites. Write a two-page report on how these sites are used for business and personal purposes. In addition, explain how law enforcement personnel use these sites to track down some criminals.
6. Research the capabilities of a logistics information system (LIS) and write a two-page report, explaining what kind of decisions an LIS could improve and what types of data an LIS should collect.

Problems, Activities, and Discussions

1. What are the differences between information literacy and computer literacy?
2. Research Michael Porter's three competitive strategies, and write a two-page report on them, including two examples of companies that have used these strategies and how information technologies helped to carry out each strategy.
3. Improvements in artificial intelligence technologies will result in a decline in computer crimes. True or False?
4. Organizations often use focus strategies to ensure that the threat of new entrants remains low. True or False?
5. Which of the following best describe the components of an information system?
   a. Database, data, process, and decisions
   b. Data, process, information, and decisions
   c. Data, database, process, and information
   d. None of the above

USING INFORMATION TECHNOLOGIES AT FEDERAL EXPRESS

Federal Express, founded in 1971, handles an average of 3 million package-tracking requests every day (http://about.fedex.designdcdt.com). To stay ahead in a highly competitive industry, Federal Express focuses on customer service by maintaining a comprehensive Web site, FedEx.com, to assist customers and reduce costs. For example, every request for information handled at the Web site instead of going to the call center saves roughly $1.87. Federal Express has reported that customer calls have decreased by 83,000 per day since 2000, which saves the company $527.6 million per year. In addition, each package-tracking request costs Federal Express three cents; by using the Web site instead of the call center to handle these requests, costs have been reduced from more than $1.36 billion per year to $21.6 million per year. Another technology for improving customer service is Ship Manager, an application installed on customer's sites so that users can weigh packages, determine shipping charges, and print shipping labels. Customers can also link their invoicing, billing, accounting, and inventory systems to Ship Manager.13 However, Federal Express still spends almost $326 million per year on its call center to reduce customers’ frustration when the Web site is down or when customers have difficulty using it. Federal Express uses customer relationship management software called Clarify in its call centers to make customer service representatives’ jobs easier and more efficient and speed up response time.14

Answer the following questions:
1. Is technology alone enough to ensure high-quality customer service?
2. What are Federal Express’s estimated annual savings from using information technology?