Chapter 1
Business Information Systems in Your Career

Learning Objectives

1-1 Why are information systems so essential for running and managing a business today?
1-2 What exactly is an information system? How does it work? What are its people, organizational, and technology components?
1-3 How will a four-step method for business problem solving help you solve information system-related problems?
1-4 What information systems skills and knowledge are essential for business careers?
1-5 How will MIS help my career?

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Chapter Outline

1-1   Why are information systems so essential for running and managing a business today?
     How Information Systems Are Transforming Business
     What's New in Management Information Systems?
     Globalization Challenges and Opportunities: A Flattened World
     Business Drivers of Information Systems
1-2   What exactly is an information system? How does it work? What are its people, organizational, and technology components?
     What Is an Information System?
     It Isn't Simply Technology: The Role of People and Organizations
     Dimensions of Information Systems
1-3   How will a four-step method for business problem solving help you solve information system-related problems?
     The Problem-Solving Approach
     A Model of the Problem-Solving Process
     The Role of Critical Thinking in Problem Solving
     The Connections Between Business Objectives, Problems, and Solutions
1-4   What information systems skills and knowledge are essential for business careers?
     How Information Systems Will Affect Business Careers
     Information Systems and Business Careers: Wrap-Up
     How This Book Prepares You For the Future
1-5   How will MIS help my career?

Key Terms

The following alphabetical list identifies the key terms discussed in this chapter. The page number for each key term is provided.

Business model, 12
Business processes, 16
Change management, 23
Computer hardware, 17
Computer literacy, 15
Computer software, 17
Critical thinking, 24
Culture, 17
Data, 14
Data management technology, 17
Extranets, 18
Feedback, 14
Information, 14

Information system (IS), 13
Information systems literacy, 15
Information technology (IT), 13
Information technology (IT) infrastructure, 18
Input, 14
Internet, 18
Intranets, 18
Management information systems (MIS), 15
Network, 18
Networking and telecommunications technology, 17
Output, 14
Processing, 14
World Wide Web, 18

Teaching Suggestions

You are probably meeting in the first class session to introduce yourself, the course, and to meet the students. It is good to get to the classroom early and meet the students as they come in. Learn a few names as the students enter.

After going over any requirements you may have for the course, try to give an overview of the course, stressing that this is not a technical course. Usually, you can't do enough to put non-technical types at ease.

The opening case, "The Grocery Store of the Future: Look at Kroger," shows students that even some of the most successful businesses must continually embrace technology upgrades and improvements as a way to enhance customer value and increase a business's competitive advantage. Students will become familiar with the idea that many different kinds of businesses have had to change the way they operate.

By collecting data about customer shopping patterns, purchase transactions, staffing levels, and store layouts, Kroger can predict ways to meet customer demands and workloads more efficiently and effectively.

Stores have considerably reduced food waste by using technology to measure cold food storage temperature changes that previously were done by workers. New sensor-based systems cut down the number of cold products that go bad and have to be thrown out, reduces labor, and saves energy.

Because the grocery business is extremely competitive and low-margin, customer loyalty is especially critical. Enhancing the mundane tasks of grocery shopping through enhanced services made possible by technology goes a long way towards improving Kroger's competitive advantage over its rivals.

Section 1-1, "Why are information systems so essential for running and managing a business today?"
gives students a feel for the importance of information systems in business today and how they have
transformed businesses on the world stage. A good discussion of the six important business objectives
outlined in this section allows the instructor and students to discuss why businesses have become so
dependent on information systems today and the importance of these systems for the survival of a firm.
Stress to students that information systems are not a luxury. In most businesses they are the core to
survival. This would be a good time to ask students to discuss how their own schools are using
information systems to enhance their product offering.

Table 1-1 is a great way to introduce students to much of the new IT jargon that has developed over the
last several years. Most of the technologies will be discussed in future chapters. Ask students how much
hands-on experience they've had with some of the new business tools as either an employee or a
customer.

Globalization is affecting virtually every country in the world. The most striking evidence of this trend
is the increasing presence of cell phones in very small villages of Africa. As technology becomes more
pervasive and, in some cases easier to use, globalization will continue its steady march. China,
Singapore, and Russia are good examples of how globalization has flattened the world. They have
become major exporters to other countries, especially industrialized and advanced countries such as the
United States and many European countries. Emerging countries, such as Poland, the Ukraine, and
Ireland, are excellent examples of increasing globalization.

Ask students to provide examples of truly digital firms (Cisco Systems and Dell Computers), as opposed
to those businesses (local mom-and-pop stores or a local doctor's office) that still perform many
business processes outside of integrated information systems.

Review the six strategic business objectives: operational excellence; new products, services, and
business models; customer and supplier intimacy; improved decision making; competitive advantage;
and survival. The rest of the text will continually refer back to these six objectives as reasons why firms
should incorporate and integrate business processes with information systems.

Interactive Session: People: Can You Run Your Company with Your iPhone?

Case Study Questions

1. **What kinds of applications are described here? What business functions do they support? How
   do they improve operational efficiency and decision making?**

Email, messaging, social networking, and salesforce management are described in this case study. The
applications support business functions including collaboration, location-based services, and
communications with colleagues. These applications improve operational efficiency and decision
making by allowing people to communicate from wherever they are. They are no longer tethered to one
place or one machine. They can receive information and data instantaneously which allows them to
make better, faster decisions.

Network Rail uses a group of custom apps for its 22,000 iPhone and iPad devices to streamline maintenance operations, capture incident data quickly, and immediately share critical information. Several apps help Network Rail improve railway performance and safety. The Close Call app helps employees report hazards as they are found so problems can be addressed quickly. The MyWork app gives maintenance teams all the information they need to start and complete repair tasks. The Sentinel app allows field managers to electronically scan ID cards to verify that workers are qualified to perform specific tasks.

The iPhone and iPad apps provide maintenance technicians with current technical data, GPS locations, and streamlined reports, replacing cumbersome reference books and rain-soaked paperwork that slowed the repair process. Many service calls start with hazardous conditions reported by Network Rail employees themselves. Rather than waiting hours to fill out a report at the depot, workers can take pictures of dangerous situations right away, using the Close Call app to describe situations and upload photos to the call center. Once provided with the hazard's GPS coordinates, the call center will usually schedule repairs within 24 hours.

MyWork gives maintenance workers a simple overview of all of the jobs each team needs to complete during a specific shift. This mobile app clusters jobs by location, skills required, and opening and closing times. Using precise map coordinates, workers can find sites easily and finish jobs more quickly. By electronically delivering daily job schedules to more than 14,000 maintenance staff members, MyWork has enabled them to complete more than half a million work orders to date while minimizing interruptions.

2. **Identify the problems that businesses in this case study solved by using mobile digital devices.**

Network Rail runs, maintains, and develops the rail tracks, signaling, bridges, tunnels, level crossings, and many key stations for most of the rail network in England, Scotland, and Wales. Keeping trains running on time is one of its top priorities. To maintain 20,000 miles of track safely and efficiently, skilled workers must be equipped with appropriate tools and training so they can work across thousands of sites throughout the rail network 24 hours a day.

British Airways is the largest airline in the United Kingdom, with operations in more than 200 airports worldwide. The airline has found many ways to use iPads to improve customer service and operational efficiency. The airline has created more than 40 custom apps for more than 17,000 iPads for its workforce, which have transformed the way it does business. Unforeseen disruptions can create long lines of passengers seeking flight information and rebooking. British Airways' FlightReact app mobilizes agents to scan a boarding pass, review the customer's booking, look up alternate flight options, and rebook and reticket passengers—all within four minutes. iBanner allows agents to identify passengers transferring onto a specific flight, while iTranslate enables staff to communicate easily with travelers speaking any language, and BagReport helps customers find misplaced baggage in the event of a disruption.

3. **What kinds of businesses are most likely to benefit from equipping their employees with mobile digital devices such as iPhones and iPads?**

Any business with a need to communicate with customers, suppliers, and business colleagues can benefit from equipping employees with mobile digital devices.

Students' answers will vary as they relate their own experiences and knowledge of using mobile digital devices. Try to encourage the students' creativity and imagination with this question. Here are a couple examples:

Insurance companies: claims adjusters or agents writing new policies or updating old ones can take pictures of property or damages as-is, update data on the condition of a property, and document property damage for claims processing.

Real estate agents: can take pictures of homes for sale and send to prospective buyers, send information to other agents or prospective buyers and sellers, answer questions and complete documents related to buying and selling property.

Winemakers: can receive up-to-date weather forecasts, track crop information via GPS coordinates, store and access data on crop varieties for later analysis, track employee productivity during harvest time, take pictures of crops to include in a database, and communicate with suppliers and customers.

4. **One company deploying iPhones has said, "The iPhone is not a game changer, it's an industry changer. It changes the way that you can interact with your customers and with your suppliers." Discuss the implications of this statement.**

First and foremost, those that effectively and efficiently deploy mobile digital device technology gain a huge competitive advantage over those who do not use the technology to stay in constant touch with customers and suppliers. Sales and Marketing can take a hit by not having access to information that can close business deals faster and more efficiently. Costs can increase without the ability to contact suppliers and track product shipments, especially for those companies who use just-in-time supply chains.

Section 1-2, "What exactly is an information system? How does it work? What are its people, organizational, and technology components?" gives students the facts and definitions that underpin information systems and allow students to knowledgeably discuss information systems. Students do not need the knowledge of a technical person, but they do need to understand the role of information technology and how it must support the organization's business strategy. They must also understand how information technology can be used to help transform a business. Note that the chapter's definitions and terms help prepare students to discuss information systems as an intricate part of business systems. Encourage students to see that technology is subordinate to the organization and its purposes.

This is also a good place to reinforce the differences between information systems literacy and computer literacy. When asked to describe company information systems, students often depict information systems in terms of technology. It is important to stress that information systems are more than just technology, and that they have management, organization, and technology dimensions. The diagram at the beginning of the chapter can be used to illustrate this point.

Ask students why some companies can achieve much better results using information systems while others cannot. That will help them understand the concept of complementary assets and show that there is much more to building a digital firm than simply buying the latest, greatest hardware and software. It will also help them understand the delicate relationship between technology, management, and organizations' assets.

Interactive Session: Technology: UPS Competes Globally with Information Technology

Case Study Questions

1. **What are the inputs, processing, and outputs of UPS's package tracking system?**

Inputs: The inputs include package information, customer signature, pickup, delivery, time-card data, current location (while en route), and billing and customer clearance documentation.

Processing: The data are transmitted to a central computer and stored for retrieval. Data are also reorganized so that they can be tracked by customer account, date, driver, and other criteria.

Outputs: The outputs include pickup and delivery times, location while en route, and package recipient. The outputs also include various reports, such as all packages for a specific account or a specific driver or route, as well as summary reports for management.

2. **What technologies does UPS use? How are these technologies related to UPS's business strategy?**

Technologies include handheld computers (DIADs), barcode scanning systems, wired and wireless communications networks, desktop computers, UPS's central computer (large mainframe computers), and storage technology for the package delivery data. UPS also uses telecommunication technologies for transmitting data through pagers and cellular phone networks. The company uses in-house software for tracking packages, calculating fees, maintaining customer accounts, and managing logistics, as well as software to access the World Wide Web.

UPS has used the same strategy for more than 90 years. Its strategy is to provide the "best service and lowest rates." One of the most visible aspects of technology is the customer's ability to track his/her package via the UPS website. However, technology also enables data to seamlessly flow throughout UPS and helps streamline the workflow at UPS. Thus, the technology described in the scenario enables UPS to be more competitive, efficient, and profitable. The result is an information system solution to the business challenge of providing a high level of service with low prices in the face of mounting competition.

3. **What strategic business objectives do UPS's information systems address?**

*   **Operational excellence:** UPS has maintained leadership in small-package delivery services despite stiff competition from FedEx and the U.S. Postal Service by investing heavily in advanced information technology.

- **New products, services, and business models:** In June 2009, UPS launched a new web-based Post-Sales Order Management System (OMS) that manages global service orders and inventory for critical parts fulfillment. The system enables high-tech electronics, aerospace, medical equipment, and other companies anywhere in the world that ship critical parts to quickly assess their critical parts inventory, determine the most optimal routing strategy to meet customer needs, place orders online, and track parts from the warehouse to the end user.

- **Customer and supplier intimacy:** Customers can download and print their own labels using special software provided by UPS or by accessing the UPS website. UPS spends more than $1 billion each year to maintain a high level of customer service while keeping costs low and streamlining its overall operations. UPS also provides tools that enable customers, such Cisco Systems, to embed UPS functions, such as tracking and cost calculations, into their own websites so that they can track shipments without visiting the UPS site.

- **Improved decision making:** Special software creates the most efficient delivery route for each driver that considers traffic, weather conditions, and the location of each stop. UPS estimates its delivery trucks save 28 million miles and burn 3 million fewer gallons of fuel each year as a result of using this technology.

- **Competitive advantage:** UPS is leveraging its decades of expertise managing its own global delivery network to manage logistics and supply chain activities for other companies. Its Supply Chain Solutions division provides a complete bundle of standardized services to subscribing companies at a fraction of what it would cost to build their own systems and infrastructure.

4. What would happen if UPS's information systems were not available?

Arguably, UPS might not be able to compete effectively without technology. If the technology were not available, then UPS would, as it has through most of its history, attempt to provide that information to its customers, but at higher prices. From the customers' perspective, these technologies provide value because they help customers complete their tasks more efficiently. Customers view UPS's technology as value-added services as opposed to increasing the cost of sending packages.

Section 1-3, "How will a four-step method for business problem solving help you solve information system-related problems?" Too often, information systems are thought to be all about hardware and software. Issues that focus on human behavioral aspects of information systems are overlooked or minimized. That can lead to disaster.

After contrasting the technical and behavioral approaches, you should stress to your students that the sociotechnical approach does not ignore the technical, but considers it as a part of the organization.

Section 1-4, "What information systems skills and knowledge are essential for business careers?" As an exercise, instructors may wish to have their students surf the internet for job opportunities at Monster.com (www.monster.com) or another employment application site. Divide your class into groups to represent the major functional areas such as finance, accounting, marketing, human resource management, production and operations, information systems, and others. Ask each group to find five

jobs being advertised in each of the functional areas. Have them list the required qualifications being requested as they relate to the field of information systems.

Because your students should have access to email, you may want to send them an "MIS Word of the Day." Check out http://www.whatis.com, http://whatis.techtarget.com, or one of the many other online computer terminology dictionaries to locate words and definitions that supplement the Laudon text. Students often enjoy the electronic interactions with their instructor, and the words are yet another way to reinforce learning.

Section 1-5, "How will MIS help my career?" addresses how the chapter's elements and information can help in securing a good job as a financial client support and sales assistant. These types of jobs are becoming more popular as information technology becomes more important in the workplace.

Review Questions

1-1 Why are information systems so essential for running and managing a business today?

List and describe six reasons information systems are so important for business today.

Six reasons why information systems are so important for business today include:

1. Operational excellence
2. New products, services, and business models
3. Customer and supplier intimacy
4. Improved decision making
5. Competitive advantage
6. Survival

Information systems are the foundation for conducting business today. In many industries, survival and even existence without extensive use of IT is inconceivable, and IT plays a critical role in increasing productivity. Although information technology has become more of a commodity, when coupled with complementary changes in organization and management, it can provide the foundation for new products, services, and ways of conducting business that provide firms with a strategic advantage.

(Learning Objective 1: Why are information systems so essential for running and managing a business today?, AACSB: Application of knowledge.)

Describe the challenges and opportunities of globalization.

Customers no longer need to rely on local businesses for products and services. They can shop 24/7 for virtually anything and have it delivered to their door or desktop. Companies can operate 24/7 from any geographic location around the world. Jobs can just as easily move across the state or across the ocean. Employees must continually develop high-level skills through education and on-the-job experience that cannot be outsourced. Business must avoid markets for goods and services

that can be produced offshore much cheaper. The emergence of the internet into a full-blown international communications system has drastically reduced the costs of operating and transacting business on a global scale.

(Learning Objective 1: Why are information systems so essential for running and managing a business today?, AACSB: Application of knowledge.)

1-2 What exactly is an information system? How does it work? What are its people, organization, and technology components?

List and describe the organizational, people, and technology dimensions of information systems.

- **Organization:** The organization dimension of information systems involves issues such as the organization's hierarchy, functional specialties, business processes, culture, and political interest groups.
- **People:** The management dimension of information systems involves setting organizational strategies, allocating human and financial resources, creating new products and services, and re-creating the organization if necessary.
- **Technology:** The technology dimension consists of computer hardware, software, data management technology, and networking/telecommunications technology.

(Learning Objective 2: What is an information system? How does it work? What are its people, organizational, and technology components?, AACSB: Application of knowledge.)

Define an information system and describe the activities it performs.

The textbook defines an information system as a set of interrelated components that work together to collect, process, store, and disseminate information to support decision making, coordination, control, analysis, and visualization in an organization. In addition to supporting decision making, information systems may also help managers and workers analyze problems, visualize complex subjects, and create new products.

(Learning Objective 2: What is an information system? How does it work? What are its people, organizational, and technology components?, AACSB: Application of knowledge.)

Distinguish between data and information and between information systems literacy and computer literacy.

- Data are streams of raw facts representing events occurring in organizations or the physical environment before they have been organized and arranged into a form that people can understand and use.
- Information is data that have been shaped into a form that is meaningful and useful to human beings.
- Information systems literacy is a broad-based understanding of information systems. It includes a behavioral as well as a technical approach to studying information systems.

- In contrast, computer literacy focuses primarily on knowledge of information technology. It is limited to understanding how computer hardware and software works.

(Learning Objective 2: What is an information system? How does it work? What are its people, organizational, and technology components?, AACSB: Analytical thinking.)

Explain how the internet and the World Wide Web are related to the other technology components of information systems.

The internet and World Wide Web have had a tremendous impact on the role information systems play in organizations. These two tools are responsible for the increased connectivity and collaboration within and outside the organization. The internet, World Wide Web, and other technologies have led to the redesign and reshaping of organizations. They have helped transform the organization's structure, scope of operations, reporting and control mechanisms, work practices, work flows, and products and services.

(Learning Objective 2: What is an information system? How does it work? What are its people, organizational and technology components?, AACSB: Analytical thinking.)

1-3 How will a four-step method for business problem solving help you solve information system-related problems?

List and describe each of the four steps for solving business problems.

- Problem identification involves understanding what kind of problem is being presented—whether it stems from people, organizational, or technology factors or a combination of these.
- Solution design involves designing several alternative solutions to the problem that has been identified.
- Solution evaluation and choice entails selecting the best solution, taking into account its cost, available resources, and skills in the business.
- Implementation entails purchasing or building hardware and software, testing the software, providing employees with training and documentation, managing change as the system is introduced into the organization, and measuring the outcome.

(Learning Objective 3: How will a four-step method for business problem solving help you solve information system-related problems?, AACSB: Application of knowledge.)

Give some examples of people, organizational, and technology problems found in businesses.

In answering this question students may draw on examples given in Table 1.2.

- **Organization:** In order to understand how a specific business firm uses information systems, you need to know something about the structure, history, and culture of the company. Typical organizational problems include:

- Poor/outdated business processes (usually inherited from the past)
- Unsupportive culture and attitudes
- Political in-fighting
- Turbulent business environment/changes in the organization's surrounding environment
- Complexity of task
- Inadequate resources

- **People:** Information systems require skilled people to build and maintain them, and they need people who can understand how to use the information in a system to achieve business objectives. Typical people problems include:

  - Lack of employee training
  - Difficulties of evaluating performance
  - Legal and regulatory compliance
  - Work environment
  - Lack of employee support and participation
  - Ergonomics
  - Poor or indecisive management

- **Technology:** Information technology is one of many tools managers use to cope with change. Elements of technology include: computer hardware, computer software, data management technology, networking and telecommunications technology. Other technology elements include the internet, intranets, extranets, and the World Wide Web. Typical technology problems include:

  - Insufficient or aging hardware
  - Outdated software
  - Inadequate database capacity
  - Insufficient telecommunications capacity
  - Incompatibility of old systems with new technology
  - Rapid technological change

(Learning Objective 3: How will a four-step method for business problem solving help you solve information system-related problems?, AACSB: Application of knowledge.)

Describe the relationship of critical thinking to problem solving.

Critical thinking can be briefly defined as the sustained suspension of judgment with an awareness of multiple perspectives and alternatives. It involves at least four elements:

- Maintaining doubt and suspending judgment. By doubting all solutions at first and refusing to rush to a judgment, you create the necessary mental conditions to take a fresh, creative look at problems, and you keep open the chance to make a creative contribution.
- Being aware of different perspectives. Recognize that business problems have many

dimensions and that the same problem can be viewed from different perspectives. You have to decide which major perspectives are useful for viewing a given problem.

- Testing alternatives or modeling solutions to problems and letting experience be the guide. Not all contingencies can be known in advance and much can be learned through experience. Therefore, experiment, gather data, and reassess the problem periodically.
- Being aware of organizational and personal limitations.

(Learning Objective 3: How will a four-step method for business problem solving help you solve information system-related problems?, AACSB: Application of knowledge.)

Describe the role of information systems in business problem solving.

Problem solving requires critical thinking in which one suspends judgment to consider multiple perspectives and alternatives. There are a number of reasons why business firms invest in information systems and technologies. Six business objectives of information systems include: operational excellence; new products, services, and business models; customer/supplier intimacy; improved decision making; strategic advantage; and survival. When firms cannot achieve these objectives, they become "challenges" or "problems" that receive attention. Managers and employees who are aware of these challenges often turn to information systems as one of the solutions or the entire solution.

(Learning Objective 3: How will a four-step method for business problem solving help you solve information system-related problems?, AACSB: Application of knowledge.)

1-4 What information system skills and knowledge are essential for business careers?

Describe the role of information systems in careers in accounting, finance, marketing, management, and operations management and explain how careers in information systems have been affected by new technologies and outsourcing?

Each of the major business fields requires an understanding of information systems.

Accounting: Accountants need to understand future changes in hardware, software, and network security essential for protecting the integrity of accounting systems along with new technologies for reporting in online and wireless business environments.

Finance: Financial people need to understand future IT changes, financial database systems, and online trading systems for managing investments and cash.

Marketing: Marketing personnel require an understanding of marketing database systems and systems for customer relationship management as well as web-based systems for online sales.

Operations management: These individuals need knowledge of changing hardware, software, and database technologies used in production and services management and an in-depth understanding of how enterprise-wide information systems for production management, supplier management, sales force management, and customer relationship management achieve efficient operations.

Careers in information systems: The individuals clearly need to understand the central role databases play in managing information resources of the firm and how new hardware and software technologies can enhance business performance. They also need skills for leading the design and implementation of new management systems, working with other business professionals to ensure systems meet business objectives, and working with software packages providing new system solutions.

(Learning Objective 4: What information system skills and knowledge are essential for business careers?, AACSB: Application of knowledge.)

List and describe the information system skills and knowledge that are essential for all business careers.

Common information systems skills and knowledge for all business careers include an understanding of how information systems help firms achieve major business objectives; an appreciation of the central role of databases; skills in information analysis and business intelligence; sensitivity to the ethical, social, and legal issues raised by systems; and the ability to work with technology specialists and other business professionals in designing and building systems.

(Learning Objective 4: What information system skills and knowledge are essential for business careers?, AACSB: Application of knowledge.)

Discussion Questions

1-5 What are the implications of globalization when you have to look for a job? What can you do to prepare yourself for competing in a globalized business environment? How would knowledge of information systems help you compete?

Student answers to this question will vary.

1-6 If you were setting up the website for a Major League Baseball team, what people, organizational, and technology issues might you encounter?

Student answers to this question will vary.

1-7 Identify some of the people, organizational, and technology issues that UPS had to address when creating its successful information systems.

Student answers to this question will vary.

Hands-On MIS Projects

This section gives students an opportunity to analyze real world information systems needs and requirements. It provides several exercises you can use to determine if students are grasping the material in the chapter.

Management Decision Problems

1-8 Snyders of Hanover: The financial department uses spreadsheets and manual processes for much of its data gathering and reporting. Assess the impact of this situation on business performance and management decision making.

- Data entry errors from repetitive entry
- No information available on-demand
- Late reporting of critical decision-making information
- Time consuming

(Learning Objective 2: What is an information system? How does it work? What are its people, organizational, and technology components?, AACSB: Analytical thinking.)

1-9 Dollar General Corporation: The company wants to keep costs as low as possible so it does not use an automated method for keeping track of inventory at each store. What decisions have to be made before investing in an information system solution?

- Determine business problems—mismanagement of inventory, too little or too much inventory, no ability to track inventory.
- Lack of information system to manage inventory is actually increasing costs rather than decreasing them.
- What is the exact problem the company wants to solve—reduce costs.

(Learning Objective 1: Why are information systems so essential for running and managing a business today?, AACSB: Analytical thinking, Application of knowledge.)

Improving Decision Making: Using Databases to Analyze Sales Trends:

Software skills: Database querying and reporting
Business skills: Sales trend analysis

1-10 This exercise helps students understand how they can use database software to produce valuable information from raw data. The solutions provided here were created using the Query Wizard and Report Wizard capabilities of Microsoft Access. Students can, of course, create more sophisticated reports if they wish, but most information can be obtained from simple query and reporting functions. The main challenge is to get students to ask the right questions about the information.

- **Which products should be restocked?**
- **Which stores and sales regions would benefit from a promotional campaign and additional marketing?**
- **Which times of the year should products be offered at full price, and when should discounts be used?**

The answers to the questions can be found in the Microsoft Access File named:

MIS13ch01_solutionfile.mdb

(Learning Objective 2: What is an information system? How does it work? What are its people, organizational, and technology components?, AACSB: Analytical thinking.)

Improving Decision Making: Using the Internet to Locate Jobs Requiring Information Systems Knowledge

Software skills: Internet-based software
Business skills: Job searching

1-11 In addition to having students research jobs in their chosen career field, it may be quite interesting to have them research jobs in other career fields so they can see that virtually every job and/or career requires information systems skills.

(Learning Objective 4: What information system skills and knowledge are essential for business careers?, AACSB: Written and oral communication, Analytical thinking, Reflective thinking, Application of knowledge.)

Collaboration and Teamwork Project

1-12 In MyLab MIS, you will find a Collaboration and Teamwork Project dealing with the concepts in this chapter. You will be able to use Google Drive, Google Docs, Google Sites, Google +, or other open source collaboration tools to complete the assignment.

Business Problem-Solving Case: *Did Information Systems Cause Deutsche Bank to Stumble?*

1-13 Identify the problem described in this case study. What people, organization, and technology factors contributed to this problem?

People: The Commodity Futures Trading Commission (CFTC) charged that Deutsche Bank submitted incomplete and untimely credit default swap data, failed to properly supervise employees responsible for swap data reporting, and lacked an adequate business continuity and disaster recovery plan.

Organization: The CFTC complaint also alleged that Deutsche Bank's system outage and subsequent reporting problems occurred in part because Deutsche Bank failed to have an adequate business continuity and disaster recovery plan and other appropriate supervisory systems in place. The bank is now struggling with seismic changes in the banking industry, including recent regulatory change.

Technology: The CFTC complained that on April 16, 2016, Deutsche Bank's swap data reporting system experienced a system outage that prevented Deutsche Bank from reporting any swap data for multiple asset classes for approximately five days. Deutsche Bank's subsequent efforts to end the system outage repeatedly exacerbated existing reporting problems and led to the discovery and creation of new reporting problems.

Swap data reported before and after the system outage revealed persistent problems with the integrity of certain data fields, including numerous invalid legal entity identifiers. U.S. regulators have identified Deutsche Bank's antiquated technology as one reason why the bank was not always able to provide the correct information for running its business properly and responding to regulators. Poor information systems may have even contributed to the 2008 financial crisis. Banks often had trouble untangling the complex financial products they had bought and sold to determine their underlying value.

(Learning Objective 1: Why are information systems so essential for running and managing a business today?, AACSB: Analytical thinking, Reflective thinking.)

1-14 What was the role of information technology at Deutsche Bank? How was IT related to the bank's operational efficiency, decision-making capapbility and business strategy?

It turns out that Deutsche Bank, like other leading global financial companies, had undergone decades of mergers and expansion. When these banks merged or acquired other financial companies, they often did not make the requisite (and often far-reaching) changes to integrate their information systems with those of their acquisitions. The effort and costs required for this integration, including coordination across many management teams, were too great. So the banks left many old systems in place to handle the workload for each of their businesses. This created what experts call "spaghetti balls" of overlapping and often incompatible technology platforms and software programs. These antiquated legacy systems were designed to handle large numbers of transactions and sums of money, but they were not well suited to managing large bank operations. They often did not allow information to be shared easily among departments or provide senior management with a coherent overview of bank operations.

(Learning Objective 2: What is an information system? How does it work? What are its people, organizational, and technology components?, AACSB: Analytical thinking, Reflective thinking, Application of knowledge.)

1-15 Was Deutsche Bank using technology effectively to pursue its business strategy? Explain your answer.

No, Deutsche Bank was not using technology to pursue its business strategy.

Individual teams and traders each had their own incompatible platforms. The bank had employed a deliberate strategy of pitting teams against each other to spur them on, but this further encouraged the use of different systems because competing traders and teams were reluctant to share their data. Yet the bank ultimately had to reconcile the data from these disparate systems, often by hand, before trades could be processed and recorded.

Also, banks are under pressure to make their aging computer systems comply, but the IT infrastructures at many traditional financial institutions are failing to keep up with these regulatory pressures as well as changing consumer expectations.

(Learning Objective 2: What is an information system? How does it work? What are its people, organizational, and technology components?, AACSB: Analytical thinking, Reflective thinking, Application of knowledge.)

1-16 What solution for Deutsche Banks was proposed? How effective do you think it will be? Explain your answer.

The solutions that Deutsche Banks are pursuing can be effective in resolving the many problems associated with its technology and organizational structure.

In July 2015, John Cryan became Deutsche Bank's CEO. He has been trying to reduce costs and improve efficiency, laying off thousands of employees. He is focusing on overhauling Deutsche Bank's fragmented, antiquated information systems, which are a major impediment to controlling costs and finding new sources of profit and growth. Cryan noted that the bank's cost base was swollen by poor and ineffective business processes, inadequate technology, and too many tasks being handled manually. He has called for standardizing the bank's systems and procedures, eliminating legacy software, standardizing and enhancing data, and improving reporting.

In February 2015, Deutsche Bank announced a 10-year, multibillion-dollar deal with Hewlett-Packard (HP) to standardize and simplify its IT infrastructure, reduce costs, and create a more modern and agile technology platform for launching new products and services. Deutsche Bank is migrating to a cloud computing infrastructure where it would run its information systems in HP's remote computer centers. HP will provide computing services, hosting, and storage. Deutsche Bank will still be in charge of application development and information security technologies, which it considers as proprietary and crucial for competitive differentiation.

Deutsche Bank is withdrawing from high-risk client relationships, improving its control framework, and automating manual reconciliations. To modernize its IT infrastructure, the bank will reduce the number of its individual operating systems that control the way a computer works from 45 to four, replace scores of outdated computers, and replace antiquated software applications.

Thousands of applications and functions will be shifted from Deutsche Bank's mainframes to HP cloud computing services. Automating manual processes will promote efficiency and better control. These improvements are expected to reduce "run the bank" costs by 800 million euros. Eliminating 6,000 contractors will create total savings of 1 billion euros. Deutsche Bank has also opened four technology centers to work with financial technology startups. In March 2017, the bank opened a new center in New York to work with financial technology startups to improve its technology.

(Learning Objective 1: How are information systems transforming business and why are they so essential for running and managing a business today?, AACSB: Analytical thinking, Reflective thinking, Application of knowledge.)

MyLab MIS

Go to the Assignments section of your MyLab to complete these writing exercises.

1-17 What are the strategic objectives that firms try to achieve by using information systems? For each strategic objective, give an example of how a firm could use information systems to achieve the objective.

View rubrics in MyLab MIS.

1-18 Describe three ways in which information systems are transforming how business is conducted.

View rubrics in MyLab MIS.

For an example illustrating the concepts found in this chapter, view the videos in MyLab MIS.

Chapter 1 Running Case Assignment: Understanding Information System Requirements
Software skills: Presentation software
Business skills: Management analysis and information system recommendations

How do you know what information systems are really needed by a business and which are the most important? How should a company's structure or culture affect the building and use of information systems?

Dirt Bikes's management has asked you to prepare a management analysis of the company to help it assess the firm's current situation and future plans. Review Dirt Bikes's company history, organization chart, products and services, and sales and marketing in the Introduction to Dirt Bikes. Then prepare a report that addresses these questions:

- What are the company's goals and culture?
- What products and services does Dirt Bikes U.S.A. provide? How many types of products and services are available to customers? How does Dirt Bikes sell its products?
- How many employees are managers, production workers, or knowledge or information workers? Are there levels of management?
- What kinds of information systems and technologies would be the most important for a company such as Dirt Bikes?
- (Optional) Use electronic presentation software to summarize for management your analysis of Dirt Bikes's performance.

Chapter 1 Running Case Solution Description

1. What are the company goals and culture?

Dirt Bikes appears to have a very democratic, employee-friendly culture, emphasizing ongoing learning, quality, attention to detail, and employee contributions.

2 What products and services does Dirt Bikes USA provide? How many types of products and services are available to customers? How does Dirt Bikes sell its products?

Dirt Bikes specializes in off-road and motocross motorcycles that emphasize racing performance, styling, and best quality parts sourced from all over the world. It is a small company producing only 4 models. Dirt Bikes sells through a network of authorized dealers. Its sales department is responsible for working with these distributors and finding ways to promote Dirt Bikes.

3. How many employees are managers, production workers, or knowledge or information workers? Are there levels of management?

The company is very small and not very hierarchical. Most of the employees are in production. Many of its departments have less than 10 people. Production is probably the only department that warrants more than 1 manager. One might expect to see separate managers for Service, Shipping & Receiving, Parts, and Design and Engineering and perhaps several additional managers for Manufacturing.

4. What kinds of information systems and technologies would be the most important for a company such as Dirt Bikes?

One would expect to see information systems supporting manufacturing and production and sales and marketing being the most important for this company. Such systems would help the company monitor work on the assembly line, obtain parts from suppliers, monitor orders from distributors, and provide parts and servicing information. A company Web site to publicize the unique features of this brand and its connection to motorcycle racing events would also be very valuable.

Chapter 1 Running Case Solution Description

    2.   What are the company goals and culture?
Dirt Bikes appears to have a very democratic, employee-friendly culture, emphasizing ongoing learning, quality, attention to detail, and employee contributions.

    2 What products and services does Dirt Bikes USA provide? How many types of products and services are available to customers?   How does Dirt Bikes sell its products?
Dirt Bikes specializes in off-road and motocross motorcycles that emphasize racing performance, styling, and best quality parts sourced from all over the world.   It is a small company producing only 4 models. Dirt Bikes sells through a network of authorized dealers. Its sales department is responsible for working with these distributors and finding ways to promote Dirt Bikes.

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Ess13Ch06 Running Case Solution
Ess13Ch12 Running Case Solution
Ess13Ch02 Running Case Solution
Ess13Ch05 Running Case Solution
Ess13Ch11 Running Case Solution
Ess13Ch01 Running Case Solution Description
Ess13Ch02 Running Case Solution Description
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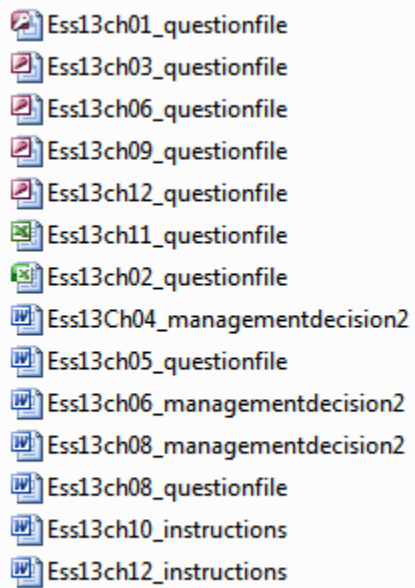Ess13Ch12 Running Case Solution Description

I	Store N	Sales Region	Item I	Item Description	Unit Price	Units So	Week Ending	Add New Field
1	1	South	2005	17" Monitor	$229.00	28	2017-10-27	
2	1	South	2005	17" Monitor	$229.00	30	2017-11-24	
3	1	South	2005	17" Monitor	$229.00	9	2017-12-29	
4	1	South	3006	101 Keyboard	$19.95	30	2017-10-27	
5	1	South	3006	101 Keyboard	$19.95	35	2017-11-24	
6	1	South	3006	101 Keyboard	$19.95	39	2017-12-29	
7	1	South	6050	PC Mouse	$8.95	28	2017-10-27	
8	1	South	6050	PC Mouse	$8.95	3	2017-11-24	
9	1	South	6050	PC Mouse	$8.95	38	2017-12-29	
10	1	South	8500	Desktop CPU	$849.95	25	2017-10-27	
11	1	South	8500	Desktop CPU	$849.95	27	2017-11-24	
12	1	South	8500	Desktop CPU	$849.95	33	2017-12-29	
13	2	South	2005	17" Monitor	$229.00	8	2017-10-27	
14	2	South	2005	17" Monitor	$229.00	8	2017-11-24	
15	2	South	2005	17" Monitor	$229.00	10	2017-12-29	
16	2	South	3006	101 Keyboard	$19.95	8	2017-10-27	
17	2	South	3006	101 Keyboard	$19.95	8	2017-11-24	
18	2	South	3006	101 Keyboard	$19.95	8	2017-12-29	
19	2	South	6050	PC Mouse	$8.95	9	2017-10-27	
20	2	South	6050	PC Mouse	$8.95	9	2017-11-24	
21	2	South	6050	PC Mouse	$8.95	8	2017-12-29	
22	2	South	8500	Desktop CPU	$849.95	18	2017-10-27	
23	2	South	8500	Desktop CPU	$849.95	18	2017-11-24	
24	2	South	8500	Desktop CPU	$849.95	20	2017-12-29	

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Ess13ch03_questionfile
Ess13ch06_questionfile
Ess13ch09_questionfile
Ess13ch12_questionfile
Ess13ch11_questionfile
Ess13ch02_questionfile
Ess13Ch04_managementdecision2
Ess13ch05_questionfile
Ess13ch06_managementdecision2
Ess13ch08_managementdecision2
Ess13ch08_questionfile
Ess13ch10_instructions
Ess13ch12_instructions

CHAPTER 1   BUSINESS INFORMATION SYSTEMS IN YOUR CAREER

CASE 1   # Business in the Cloud: Facebook, Google, and eBay Data Centers
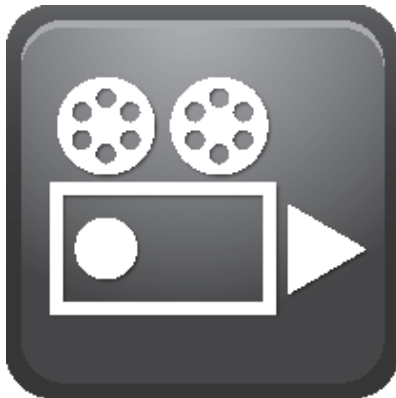
(a) Facebook Data Center

URL   https://www.youtube.com/watch?v=_r97qdyQtlk; L=8:20

(b) Google Data Center Efficiency Best Practices: Power Efficiency

URL   http://www.youtube.com/watch?v=voOK-1DLr00; L=10:00

(c) A More Detailed Look at "Triton"

URL   https://www.youtube.com/watch?v=pNUv3ekSDOU; L=4:21

SUMMARY   Businesses today run on the Internet, and the Internet runs on data centers. Today, data centers might be more accurately called business centers. Data centers drive nearly every aspect of many businesses, especially ones with a significant online presence like Facebook, Google, and eBay. But data centers are significant users of expensive electricity to cool their servers, and they make a significant contribution to pollution and global warming. Cloud data center operators are using a variety of new techniques to become more efficient in their use of electricity.

CASE   Consumers of technology constantly demand devices that are smaller, more efficient, and more powerful than the ones they have. But most consumers don't understand the massive back-end infrastructure that powers their "front end" devices, like mobile phones, smart-phones, tablets, and desktop computers.

Take, for example, smartphones and tablet computers. iPhones, Androids, BlackBerrys, iPads, and other tablets represent a trend in all forms of mobile technology towards smaller devices that perform an increasingly large number of functions. But every time a smart-phone or tablet user connects to the Internet, places a call, or sends an instant message, it uses power not only on their phone, but at every step of the infrastructure used to perform that function. More often than not, data centers are intimately involved in any Internet-based communication.

In 2017, there are approximately 3 million data centers in the United States and another 6 million data centers of all sizes worldwide. The number of data centers is growing at around 15% a year. IDC estimates that the number of data centers will decline beginning in 2018 due to the growth of very large cloud mega-data centers. Currently US data centers consume about 100 billion kilowatt hours of electricity, about 2% of all electricity generated in the United States. Because most data centers use air conditioning of one sort or another to keep operating temperatures of microprocessor chips within a safe range, they are significant contributors to pollution and global warming . Most data centers do not practice energy management, and waste approximately 20 billion kilowatt hours annually. The growth of cloud computing, in particular streaming of music, television, and movies, is expected to accelerate data center power consumption in the next ten years even as the number of data centers decline. Due to these increasing power demands, by 2020, the world's computer servers will match or exceed the carbon emissions of the airline industry.

Data centers are growing not only in number, but also in sheer size. IBM has a data center which covers approximately 40,000 square feet (three football fields) and contains 10,000 servers. The cost of running large data centers is a significant component of the overall IT budget of firms. There are two components to the energy cost of data centers: the cost of running the computers, and the cost of cooling them. For this reason, large-scale data center operators are seeking a variety of new ways to cool their servers.

Of all the Web sites in the world, Google and YouTube may get the most hits per day, but no site can top Facebook as far as raw traffic. Facebook is by far the "stickiest" of the top sites, meaning its users spend more time per visit there, so it's reasonable to argue that no site has a greater need for a robust infrastructure than the social networking giant. Valued at $523 billion and boasting a mind-boggling 1.65 billion monthly active users as of 2017, Facebook faces computing demands that no other company has ever faced. Not only is their site traffic unparalleled, but users are contributing 100 petabytes of photos and videos on Facebook each day, and that data requires storage

To manage this demand, Facebook has built 300,000 square foot data centers in Oregon, North Carolina, and Iowa, and has announced another in Texas. They are also planning more international data centers to complement their data center in Lulea, Sweden. They also lease server space across the United States and worldwide. Facebook has chosen locations that allow them to use environmental factors (such as cooling water from rivers, and cooler northern climates) to reduce the costs of cooling computers, and to minimize their carbon footprint. Each location consumes roughly 30 megawatts of electricity. To ensure 100 percent uptime of the flagship Facebook site, each site has backup power. For example, the Oregon location has 14 diesel generators capable of 3 megawatts apiece in case of a power generation.

A widely used method for assessing data center efficiency is Power Usage Effectiveness (PUE). PUE measures the ratio of total facility energy divided by IT equipment energy in watts. IT equipment refers to the computers and hard drives used in the facility. Total facility power would include lighting, and cooling the computer equipment, a major cost. PUE measures the energy used to power and cool a data center. In 2012, a typical data center consumed 2 watts of total facility power to support 1 watt of IT equipment. Today the number is much closer to 1.7 because of changes in IT equipment, and changes in facility power management. The ideal is a PUE of 1, in which case all power was being used to simply operate the IT equipment and no other significant support power for cooling is being used.

Other large tech companies like eBay are developing their own techniques and methods to better evaluate the business impact of their power consumption. The auction giant has revamped the way it views its infrastructure efficiency, using the concept of Digital Service Efficiency (DSE). DSE is like a miles-per-gallon metric used to measure how effectively its power consumption is driving its business. Instead of miles, eBay charts revenue (or other business measure), and instead of gallons, eBay charts kilowatt hours. For instance, eBay is able to understand how many kilowatts it takes to process customer transactions, and what is the carbon emission impact of its data centers. eBay managers chart the efficiency of its data center operations using a dashboard:

Digital Service Efficiency (DSE) helps eBay to see the full cost, business impact, power efficiency (PUE), and environmental impact of customer buy and sell transactions. The dashboard combines PUE with other DSE measures of data center performance. Today, many data centers use both PUE and DSE.

eBay operates one of the largest data center networks in the world, and it has begun to shift from air to water for its data center cooling needs using a new cooling technology from Dell called Triton. In large data centers, temperatures can reach 120 degrees in just two minutes if the cooling system became disabled. At this temperature, processors and hard drives begin to malfunction. The traditional method of using air cooling has become increasingly expensive as data centers continue to grow. eBay has begun reconfiguring its server cooling from air to liquid cooling using water which is a more expensive, but also a far more effective process for removing heat. The company already boasts some of the best power usage effectiveness (PUE) ratings in the industry.

VIDEO CASE QUESTIONS

1. Why does Facebook's data center specialist argue that "The Internet is not a cloud?"

2. What are some of the techniques Facebook uses to cool its data centers?

3. Describe the five methods recommended by Google for reducing power consumption.

4. Based on the Google video, how much of the world's global greenhouse gases are the result of computing?

5. What are some of the benefits of using Dell's Triton water cooling technology?