**Chapter 1**

**Information Systems in Global Business Today**

**Student Learning Objectives**

**1-1** How are information systems transforming business and why are they so essential for running and managing a business today?

**1-2** What is an information system? How does it work? What are its management, organization, and technology components? Why are complementary assets essential for ensuring that information systems provide genuine value for organizations?

**1-3** What academic disciplines are used to study information systems and how does each contribute to an understanding of information systems?

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**Key Terms**

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

|  |  |
| --- | --- |
| Business functions, 19 | Information technology (IT) infrastructure, 22 |
| Business model, 14 | Input, 17 |
| Business processes, 12 | Internet, 21 |
| Complementary assets, 26 | Intranets, 22 |
| Computer hardware, 21 | Knowledge workers, 19 |
| Computer literacy, 18 | Management information systems (MIS), 18 |
| Computer software, 21 | Middle management, 19 |
| Culture, 20 | Network, 21 |
| Data, 16 | Networking and telecommunications technology, 21 |
| Data management technology, 21 | Operational management, 19 |
| Data workers, 19 | Organizational and management capital, 27 |
| Digital firm, 12 | Output, 18 |
| Extranets, 22 | Processing, 17 |
| Feedback, 18 | Production or service workers, 19 |
| Information, 16 | Senior management, 19 |
| Information system, 16 | Sociotechnical view, 30 |
| Information systems literacy, 18 | World Wide Web, 22 |
| Information technology (IT), 16 |  |

**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, reduce labor, and save 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, “How are information systems transforming business and why are they 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 the 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 like the United States and many European countries. Emerging countries like 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: Management: The Mobile Pocket Office**

**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 that allows them to make better, faster decisions.

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

Sonic Automotive uses mobile device apps to speed up sales and service. Sales associates have immediate access to vehicle information, pricing, trade-in values, interest rates, special promotions, financing, and what competitors are charging for identical vehicles. The apps have speeded up and simplified trade-in appraisals and pricing.

SKF, a global engineering company, uses mobile devices and apps to monitor factory production lines. Operators using the apps are able to use secure instant messaging to communicate with managers and each other, update maintenance logs, and track products in real time as they move through the factory line. Other employees use apps to access product literature, catalogs, product specifications and interactive marketing materials.

1. **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 communication with customers, suppliers, and business colleagues can benefit from equipping employees with mobile digital devices.

Student 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 of examples:

**Insurance companies:** claims adjusters or agents writing new policies or updating old ones, can take pictures of property as-is or that’s been damaged, 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.

1. **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 is an information system? How does it work? What are its management, organization, and technology components? Why are complementary assets essential for ensuring that information systems provide genuine value for organizations?”*** 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 expert, 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. Figure 1-5 and 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.

1. What technologies are used by UPS? 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 over 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.

1. 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.
   * **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 won systems and infrastructure.
2. 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, “What academic disciplines are used to study information systems and how does each contribute to an understanding of information systems?”***

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. Figure 1-9 may help you explain contemporary approaches to information systems.

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.

## Review Questions

**1-1 How are information systems transforming business and why are they so essential for running and managing a business today?**

**Describe how information systems have changed the way businesses operate and their products and services.**

Wireless communications, including computers and mobile hand-held computing devices, are keeping managers, employees, customers, suppliers, and business partners connected in every way possible. Email, online conferencing, the web, and the Internet, are providing new and diverse lines of communication for all businesses, large and small. Through increased communication channels and decreased costs of the communications, customers are demanding more of businesses in terms of service and product, at lower costs. E-commerce is changing the way businesses must attract and respond to customers. (Learning Objective 1-1: How are information systems transforming business and why are they so essential for running and managing a business today? AACSB: Application of knowledge.)

**Identify three major new information system trends.**

Three information system trends that are influencing the way businesses interact with employees, customers, suppliers, and business partners include emerging mobile digital platforms, the growth of online software-as-a-service, and the growth of cloud computing.

Table 1-1 (page 8) outlines new MIS changes and their impact on business. The table is organized by the three dimensions of information systems: technology, management, and organizations. (Learning Objective 1-1: How are information systems transforming business and why are they so essential for running and managing a business today? AACSB: Application of knowledge.)

**Describe the characteristics of a digital firm.**

* Significant business relationships with customers, suppliers, and employees are digitally enabled and mediated.
* Core business processes are accomplished through digital networks spanning the entire organization or linking multiple organizations.
* Key corporate assets—intellectual property, core competencies, and financial and human assets—are managed through digital means.
* They sense and respond to their environments far more rapidly than traditional firms.
* They offer extraordinary opportunities for more flexible global organization and management, practicing time-shifting and space-shifting. (Learning Objective 1-1: How are information systems transforming business and why are they so essential for running and managing a business today? AACSB: Application of knowledge.)

**Describe the challenges and opportunities of globalization in a “flattened” world.**

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. Businesses must avoid markets for goods and serves that can be produced offshore much more cheaply. 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 1-1: How are information systems transforming business and why are they so essential for running and managing a business today? AACSB: Application of knowledge.)

**List and describe six reasons why 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 1-1: How are information systems transforming business and why are they so essential for running and managing a business today? AACSB: Application of knowledge.)

**1-2 What is an information system? How does it work? What are its management, organization, and technology components? Why are complementary assets essential for ensuring that information systems provide genuine value for organizations?**

**Define an information system and describe the activities it performs.**

An information system is 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 1-2: What is an information system? How does it work? What are its management, organization, and technology components? Why are complementary assets essential for ensuring that information systems provide genuine value for organizations? AACSB: Application of knowledge.)

**List and describe the organizational, management, 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.
    - **Management:** 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 1-2: What is an information system? How does it work? What are its management, organization, and technology components? Why are complementary assets essential for ensuring that information systems provide genuine value for organizations? 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 1-2: What is an information system? How does it work? What are its management, organization, and technology components? Why are complementary assets essential for ensuring that information systems provide genuine value for organizations? 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 that 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 1-2: What is an information system? How does it work? What are its management, organization, and technology components? Why are complementary assets essential for ensuring that information systems provide genuine value for organizations? AACSB: Analytical thinking.)

**Define complementary assets and describe their relationship to information technology.**

Complementary assets are those assets required to derive value from a primary investment. Firms must rely on supportive values, structures, and behavior patterns to obtain a greater value from their IT investments. Value must be added through complementary assets such as new business processes, management behavior, organizational culture, and training. (Learning Objective 1-2: What is an information system? How does it work? What are its management, organization, and technology components? Why are complementary assets essential for ensuring that information systems provide genuine value for organizations? AACSB: Application of knowledge.)

**Describe the complementary social, managerial, and organizational assets required to optimize returns from information technology investments.**

Table 1-3 lists the complementary social, managerial, and organization assets required to optimize returns from information technology investments. Here are a few of them:

Organizational assets:

* Supportive culture that values efficiency and effectiveness
* Appropriate business model
* Efficient business processes
* Decentralized authority

Managerial assets:

* Strong senior management support for technology investment and change
* Incentives for management innovation
* Teamwork and collaborative work environments

Social assets:

* The Internet and telecommunications infrastructure
* IT-enriched educational programs raising labor force computer literacy
* Standards (both government and private sector) (Learning Objective 1-2: What is an information system? How does it work? What are its management, organization, and technology components? Why are complementary assets essential for ensuring that information systems provide genuine value for organizations? AACSB: Application of knowledge.)

**1-3 What academic disciplines are used to study information systems and how does each contribute to an understanding of information systems?**

**List and describe each discipline that contributes to a technical approach to information systems.**

A technical approach to information systems emphasizes mathematically-based models to study information systems and the physical technology and formal capabilities of information systems. Students should know the differences between computer science (theories of computability, computation methods, and data storage and access methods), management science (development of models for decision making and managerial practice), and operations research (mathematical techniques for optimizing organizational parameters such as transportation, inventory control, and transaction costs). (Learning Objective 1-3: What academic disciplines are used to study information systems and how does each contribute to an understanding of information systems? AACSB: Application of knowledge.)

**List and describe each discipline that contributes to a behavioral approach to information systems.**

A behavioral approach to information systems focuses on questions such as strategic business integration, behavioral problems of systems utilization, system design and implementation, social and organizational impacts of information systems, political impacts of information systems, and individual responses to information systems. Solutions to problems created by information technology are primarily changes in attitudes, management, organizational policy, and behavior. (Learning Objective 1-3: What academic disciplines are used to study information systems and how does each contribute to an understanding of information systems? AACSB: Application of knowledge.)

**Describe the sociotechnical perspective on information systems.**

A sociotechnical perspective combines the technical approach and behavioral approach to achieve optimal organizational performance. Technology must be changed and designed to fit organizational and individual needs and not the other way around. Organizations and individuals must also change through training, learning, and allowing technology to operate and prosper. (Learning Objective 1-3: What academic disciplines are used to study information systems and how does each contribute to an understanding of information systems? AACSB: Application of knowledge.)

**Discussion Questions**

**1-4 Information systems are too important to be left to computer specialists. Do you agree? Why or why not?**

Student answers to this question will vary.

**1-5 If you were setting up the website for a Major League Baseball team, what management, organization, and technology issues might you encounter?**

Student answers to this question will vary.

**1-6 What are some of the organizational, managerial, and social complementary assets that help make UPS’s information systems so successful?**

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**

**1-7 Snyder’s 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 1-2: What is an information system? How does it work? What are its management, organization, and technology components? Why are complementary assets essential for ensuring that information systems provide genuine value for organizations? AACSB: Analytical thinking.)

**1-8 Dollar General Corporation:** 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 an 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 1-1: How are information systems transforming business and why are they 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

**1-9** 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?**
* **Which times of the year should products be discounted?**

The answers to these questions can be found in the Microsoft Access File named: MIS15ch01\_solutionfile.mdb

(Learning Objective 1-2: What is an information system? How does it work? What are its management, organization, and technology components? Why are complementary assets essential for ensuring that information systems provide genuine value for organizations? 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

**1-10** 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 1-3: What academic disciplines are used to study information systems and how does each contribute to an understanding of information systems? AACSB: Written and oral communication, Analytical thinking, Reflective thinking, Application of knowledge.)

**Collaboration and Teamwork Project**

**1-11 In MyMISLab, 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.**

**Case Study: Are Farms Becoming Digital Firms?**

**1-12 List and describe the technologies used in this case study.**

Farmers are using global positioning system navigation systems running on tablet computers to manage equipment and issue instructions during planting and harvesting seasons. Farmers and agricultural companies are using data analysis technologies to determine the right kinds and amounts of seed to plant, how much fertilizer to add, and the right amount of water to use during the growing season. Computerized planting equipment follows recommendations from agricultural companies and historic data collected by farmers. (Learning Objective 1-3: What academic disciplines are used to study information systems and how does each contribute to an understanding of information systems? AACSB: Analytical thinking, Application of knowledge.)

**1-13 In what sense are U.S. farms now digital firms? Explain your answer.**

Prescriptive planting uses data provided by farmers on field boundaries, historic crop yields, and soil conditions to agricultural data analysis companies that analyze that data along with data about seed performance and soil types in different areas. The company sends a computer file with recommendations back to the farmer, who uploads the data into computerized planting equipment. The data analysis company monitors weather and other factors to advise farmers how to manage crops as they grow. (Learning Objective 1-3: What academic disciplines are used to study information systems and how does each contribute to an understanding of information systems? AACSB: Analytical thinking, Application of knowledge.)

**1-14 How is information technology changing the way farmers run their business?**

Data gathered from aircraft, self-driving tractors, and other forms of automated and remote sensors provide information to farmers about crop yields, soil moisture content and soil quality. Technology is helping save money and time while increasing crop yields. Prescriptive planting takes much of the guess work out of planting and harvesting crops. Just the right amount of seed and fertilizer are laid down to improve the average corn harvest thereby increasing profits. (Learning Objective 1-3: What academic disciplines are used to study information systems and how does each contribute to an understanding of information systems? AACSB: Analytical thinking, Application of knowledge.)

**1-15 How do the systems described in this case improve farming operations?**

Monsanto estimates that data-driven planting advice could increase worldwide crop production by about $20 billion a year. However, output from predictive planting system has not achieved those levels yet.

Regardless of whether the farm is big or small, the impact of the new data-driven software programs will be minimal in good years because yields would be high regardless of the decisions made. The technology is likely to have a bigger impact in years when conditions aren’t so propitious.

Many farmers are worried about the intrusion of big data into their once-insular businesses and are especially suspicious of what the big seed companies might do with the collected data. Other farmers worry about seed prices rising too much since the companies that developed predictive planting technology are the same ones that sell seeds. Farmers also fear that rivals could use the data to their own advantage. The American Farm Bureau Federation has warned members that seed companies touting higher crop yields from prescriptive planting have a vested interest in persuading farmers to plant more. (Learning Objective 1-3: What academic disciplines are used to study information systems and how does each contribute to an understanding of information systems? AACSB: Analytical thinking, Application of knowledge, Reflective thinking.)

**1-16 How do precision agriculture systems support decision making? Identify three different decisions that can be supported.**

Monsanto’s software application called FieldScripts takes into account variables such as the amount of sunlight and shade and variations in soil nitrogen and phosphorous content when determining the type and amount of seed to plant. The data are analyzed in conjunction with the genetic properties of the seeds and combines all the information with climate predictions. Precise planting instructions or scripts are delivered to iPads connected to planting equipment in the field. These kinds of tools allow farmers to pinpoint areas that need more or less fertilizer, saving them the cost of spreading fertilizer everywhere, while boosting their yields in areas that have performed poorly and reducing the amount of excess fertilizer that enters the water table.

Three decisions prescriptive planting supports include the amount of seed and the type of seed for the soil conditions; the amount of fertilizer to add in each area of the fields; weather and other factors to help farmers manage crops as they grow. (Learning Objective 1-3: What academic disciplines are used to study information systems and how does each contribute to an understanding of information systems? AACSB: Analytical thinking, Application of knowledge.)

**1-17 How helpful is precision agriculture to individual farmers and the agricultural industry? Explain your answer.**

Small farmers will be hard-pressed to afford the technology required by the new programs because of the cost of the service itself along with the cost of retrofitting existing planting equipment or buying more modern equipment that includes the electronic gear. Large farmers will have an easier time of purchasing the software and retrofitting their equipment. (Learning Objective 1-3: What academic disciplines are used to study information systems and how does each contribute to an understanding of information systems? AACSB: Analytical thinking, Application of knowledge, Reflective thinking.)

**1-18 What are the strategic objectives that firms try to achieve by investing in information systems and technologies? For each strategic objective, give an example of how a firm could use information systems to achieve the objective.**

Visit MyMISLab for suggested answers.

**1-19 Describe the complementary assets that firms need in order to optimize returns from their information system investments. For each type of complementary asset, give an example of a specific asset a firm should have.**

Visit MyMISLab for suggested answers.

**For an example illustrating the concepts found in this chapter, view the videos in**[**mymislab.com**](http://mymislab.com/)**.**