Global E-Business and Collaboration

LEARNING OBJECTIVES

STUDENT LEARNING OBJECTIVES

After completing this chapter, you will be able to answer the following questions:

1. What are the major features of a business that are important for understanding the role of information systems?
2. How do systems serve the various levels of management in a business?
3. How do enterprise applications and intranets improve organizational performance?
4. Why are systems for collaboration and teamwork so important and what technologies do they use?
5. What is the role of the information systems function in a business?
THE TATA NANO MAKES HISTORY USING DIGITAL MANUFACTURING

On March 23, 2009, India’s Tata Motors rolled out its Nano car. It was an historic moment, because the Nano was the cheapest auto ever made at that time, with a price tag around US $2,500. The Nano joined Ford’s Model T as a car within reach of millions of people who previously could not afford one. With a top speed of 105 kilometers (65 miles) per hour, the Nano has a two-cylinder engine; four-speed manual transmission; no air conditioning, electric windows, or power steering; and fuel efficiency of 50 miles per gallon.

Tata Motors started its Nano project in 2003, when a team was charged with creating a car that would cost no more than about US $2,500 without compromising on safety, aesthetics, or value to the customer. It was a Herculean task. Tata met the challenge by using digital manufacturing (DM) systems to dramatically shorten the time required to design the new product and bring it to market. The ability to develop and produce new products with many different variations within a very short time span is a key competitive advantage in the automotive industry.
Until a few years ago, it would have been impossible to design and produce the Nano at this price. Tata Motors had outdated manufacturing processes. Manual effort was required to create and maintain processes, plants, and product design, resulting in longer lead times to choose the appropriate tools for an operation. The company had to create programs manually for assembly line robots, a process that was error-prone and time-consuming. Such delays had a number of negative consequences: Data used to plan a vehicle became useless over time, and the company was unable to easily change its product mix, roll out a new product on an existing production line, or schedule the assembly of two different products on the same line.

All that changed in July 2005 when Tata Motors switched to digital manufacturing using Dassault Systemes’ Digital Enterprise Lean Manufacturing Interactive Application (DELMIA). Digital manufacturing automates processes in product design and production engineering planning, enabling Tata to plan manufacturing processes, design plant layouts, and then simulate the repercussions of those plans, including the impact of new manufacturing techniques and changes of products on existing production lines. It provides data to Tata’s SAP enterprise resource planning system, which costs out a product, an assembly, or a sub-assembly. Digital manufacturing also simulates the movements of people working on the shop floor so that planners can design more efficient work processes. Companies using digital manufacturing can model products and operations and make changes to them on the computer. This cuts down on the use of expensive physical prototypes, which must be rebuilt each time a design changes.

According to T. N. Umamaheshwaran, who headed Tata Motors’ digital manufacturing program, “We can’t imagine what would take place at a new plant, if we did not have DM Tools. Two years before the first stone of a plant is laid, we already start working on it. We don’t even know where the site will be, but we know what it will take to make 750 cars a day.”

As a result of adopting digital manufacturing, Tata Motors has reduced time-to-market for new passenger cars by at least six months. The company can now rapidly identify areas of “work overload” and constraints while quickly adapting assembly lines to accommodate multiple automobile variations. The ability to simulate facilities and processes has reduced the cost of physical rework. Manufacturing and facilities planning now take 30 percent less time, with a 20 percent reduction in the cost of the manufacturing planning process. For certain functions, the time to design an entire process end-to-end has been reduced by over 50 percent.


The experience of Tata Motors illustrates how much companies today rely on information systems to run their businesses and drive innovation, growth, and profitability. It also shows the importance of collaboration and teamwork in a company’s ability to innovate, execute, and improve overall business performance.

The chapter-opening diagram calls attention to important points raised by this case and this chapter. Tata Motors was confronted with both a problem and an opportunity. The company operates in a highly competitive industry where the manufacturers are expected to bring new car models with many different variations to market very quickly, but it was slowed down by relying too much on manual processes. Tata management identified opportunities to use information systems to improve business performance and also to enter a new marketspace—specifically consumers in India and other developing countries who wanted cars but could not afford them.

Management decided to design and develop a car for this market and to switch to digital manufacturing for all of its auto production. Technology alone would not have provided a solution. The company had to revise many of its manufacturing processes to support digital
manufacturing. Once that was accomplished, Dassault’s DELMIA software proved invaluable for modeling designs, factories, and production processes and for coordinating information between processes. Digital manufacturing systems increased flexibility and efficiency while decreasing production costs, and made it possible to pioneer in low-cost cars such as the Nano.

### 2.1 Components of a Business

A **business** is a formal organization whose aim is to produce products or provide services for a profit—that is, to sell products at a price greater than the costs of production. Customers are willing to pay this price because they believe they receive a value greater than or equal to the sale price. Business firms purchase inputs and resources from the larger environment (suppliers who are often other firms). Employees of the business firm transform these inputs by adding value to them in the production process.

There are of course nonprofit firms and government agencies that are complex formal organizations that produce services and products but do not operate in order to produce a profit. Nevertheless, even these kinds of organizations consume resources from their environments, add value to these inputs, and deliver their outputs to constituents and customers. In general, the information systems found in government and nonprofit organizations are remarkably similar to those found in private industry.

**ORGANIZING A BUSINESS: BASIC BUSINESS FUNCTIONS**

Imagine that you wanted to set up your own business. Simply deciding to go into business is the most important decision, but next is the question of what product or service to produce (and hopefully sell). The decision of what to produce is called a **strategic choice** because it determines your likely customers, the kinds of employees you will need, the production methods and facilities needed, the marketing themes, and many other choices.
Once you decide what to produce, what kind of organization do you need? First, you need to develop a production division—an arrangement of people, machines, and business processes (procedures) that will produce the product. Second, you need a sales and marketing group who will attract customers, sell the product, and keep track of after-sales issues, such as warranties and maintenance. Third, once you generate sales, you will need a finance and accounting group to keep track of financial transactions, such as orders, invoices, disbursements, and payroll. In addition, this group will seek out sources of credit and finance. Finally, you will need a group of people to focus on recruiting, hiring, training, and retaining employees. Figure 2-1 summarizes the four basic functions found in every business.

If you were an entrepreneur or your business was very small with only a few employees, you would not need, and probably could not afford, all these separate groups of people. Instead, in small firms, you would be performing all these functions yourself or with a few others. No wonder small firms have a high mortality rate! In any event, even in small firms, the four basic functions of a firm are required. Larger firms often will have separate departments for each function: production and manufacturing, sales and marketing, finance and accounting, and human resources.

Figure 2-1 is also useful for thinking about the basic entities that make up a business. The five basic entities in a business with which it must deal are: suppliers, customers, employees, invoices/payments, and, of course, products and services. There are many other entities that a business must manage and monitor, but these are the basic ones at the foundation of any business.

**BUSINESS PROCESSES**

Once you identify the basic business functions and entities for your business, your next job is to describe exactly how you want your employees to perform these functions. What specific tasks do you want your sales personnel to perform, in what order, and on what schedule? What steps do you want production employees to follow as they transform raw resources into finished products? How will customer orders be fulfilled? How will vendor bills be paid?

The actual steps and tasks that describe how work is organized in a business are called **business processes**. A business process is a logically related set of activities that define how specific business tasks are performed. Business processes also refer to the unique ways in which work, information, and knowledge are coordinated in a specific organization.
Every business can be seen as a collection of business processes. Some of these processes are part of larger encompassing processes. (In the chapter-opening case on Tata Motors, for instance, designing a new car model, manufacturing components, and assembling the finished car are all part of the overall production process.) Many business processes are tied to a specific functional area. For example, the sales and marketing function would be responsible for identifying customers, and the human resources function would be responsible for hiring employees. Table 2.1 describes some typical business processes for each of the functional areas of business.

Other business processes cross many different functional areas and require coordination across departments. Consider the seemingly simple business process of fulfilling a customer order (see Figure 2-2). Initially, the sales department receives a sales order. The order will pass first to accounting to ensure the customer can pay for the order either by a credit verification or request for immediate payment prior to shipping. Once the customer credit is established, the production department has to pull the product from inventory or produce the product. After the product is shipped, the sales department informs the customer that the product is shipped.

<table>
<thead>
<tr>
<th>Functional Area</th>
<th>Business Process</th>
</tr>
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<tbody>
<tr>
<td>Manufacturing and production</td>
<td>Assembling the product</td>
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<td></td>
<td>Checking for quality</td>
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<td></td>
<td>Producing bills of materials</td>
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<tr>
<td>Sales and marketing</td>
<td>Identifying customers</td>
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<td></td>
<td>Making customers aware of the product</td>
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<td></td>
<td>Selling the product</td>
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<tr>
<td>Finance and accounting</td>
<td>Paying creditors</td>
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<td>Creating financial statements</td>
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<td></td>
<td>Managing cash accounts</td>
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<tr>
<td>Human resources</td>
<td>Hiring employees</td>
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<td></td>
<td>Evaluating employees’ job performance</td>
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<td></td>
<td>Enrolling employees in benefits plans</td>
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</tbody>
</table>

**Figure 2-2**

The Order Fulfillment Process

Fulfilling a customer order involves a complex set of steps that requires the close coordination of the sales, accounting, and manufacturing functions.
product. Then the product will need to be shipped (and this may require working with a logistics firm, such as UPS or FedEx). A bill or invoice will then have to be generated by the accounting department, and a notice will be sent to the customer indicating that the product has shipped. Sales will have to be notified of the shipment and prepare to support the customer by answering calls or fulfilling warranty claims.

What at first appears to be a simple process, fulfilling an order, turns out to be a very complicated series of business processes that require the close coordination of major functional groups in a firm. Moreover, to efficiently perform all these steps in the order fulfillment process requires a great deal of information and the rapid flow of information within the firm, with business partners such as delivery firms, and with the customer. The particular order fulfillment process we have just described is not only cross-functional, it is also interorganizational because it includes interactions with delivery firms and customers who are outside the boundaries of the organization. Ordering raw materials or components from suppliers would be another interorganizational business process.

To a large extent, the efficiency of a business firm depends on how well its internal and interorganizational business processes are designed and coordinated. A company’s business processes can be a source of competitive strength if they enable the company to innovate or to execute better than its rivals. Business processes can also be liabilities if they are based on outdated ways of working that impede organizational responsiveness and efficiency. The chapter-opening case on Tata Motors product development and manufacturing processes clearly illustrates these points.

How Information Technology Enhances Business Processes

Exactly how do information systems enhance business processes? Information systems automate many steps in business processes that were formerly performed manually, such as checking a client’s credit, or generating an invoice and shipping order. But today, information technology can do much more. New technology can actually change the flow of information, making it possible for many more people to access and share information, replacing sequential steps with tasks that can be performed simultaneously, and eliminating delays in decision making. It can even transform the way the business works and drive new business models. Ordering a book online from Amazon.com and downloading a music track from iTunes are entirely new business processes based on new business models that are inconceivable without information technology.

That’s why it’s so important to pay close attention to business processes, both in your information systems course and in your future career. By analyzing business processes, you can achieve a very clear understanding of how a business actually works. Moreover, by conducting a business process analysis, you will also begin to understand how to change the business to make it more efficient or effective. Throughout this book we examine business processes with a view to understanding how they might be changed, or replaced, by using information technology to achieve greater efficiency, innovation, and customer service. Chapter 3 discusses the business impact of using information technology to redesign business processes, and MyMISLab has a Learning Track with more detailed coverage of this topic.

MANAGING A BUSINESS AND FIRM HIERARCHIES

What is missing from Figures 2-1 and 2-2 is any notion of how to coordinate and control the four major functions, their departments, and their business processes. Each of these functional departments has its own goals and processes, and they obviously need to cooperate in order for the whole business to succeed. Business firms, like all organizations, achieve coordination by hiring managers whose responsibility is to ensure all the various parts of an organization work together. Firms coordinate the work of employees in various divisions by developing a hierarchy in which authority (responsibility and accountability) is concentrated at the top.

The hierarchy of management is composed of senior management, which makes long-range strategic decisions about products and services as well as ensures financial
performance of the firm; middle management, which carries out the programs and plans of senior management; and operational management, which is responsible for monitoring the daily activities of the business. Knowledge workers, such as engineers, scientists, or architects, design products or services and create new knowledge for the firm, whereas data workers, such as secretaries or clerks, assist with administrative work at all levels of the firm. Production or service workers actually produce the product and deliver the service (Figure 2-3).

Each of these groups has different needs for information given their different responsibilities. Senior managers need summary information that can quickly inform them about the overall performance of the firm, such as gross sales revenues, sales by product group and region, and overall profitability. Middle managers need more specific information on the results of specific functional areas and departments of the firm, such as sales contacts by the sales force, production statistics for specific factories or product lines, employment levels and costs, and sales revenues for each month or even each day. Operational managers need transaction-level information, such as the number of parts in inventory each day or the number of hours logged on Tuesday by each employee. Knowledge workers may need access to external scientific databases or internal databases with organizational knowledge. Finally, production workers need access to information from production machines, and service workers need access to customer records in order to take orders and answer questions from customers.

THE BUSINESS ENVIRONMENT

So far we have talked about business as if it operated in a vacuum. Nothing could be further from the truth. In fact, business firms depend heavily on their environments to supply capital, labor, customers, new technology, services and products, stable markets and legal systems, and general educational resources. Even a pizza parlor cannot survive long without a supportive environment that delivers the cheese, tomato sauce, and flour!

Figure 2-4 summarizes the key actors in the environment of every business. To stay in business, a firm must monitor changes in its environment and share information with the key entities in that environment. For instance, a firm must respond to political shifts, respond to changes in the overall economy (such as changes in labor rates and price inflation), keep track of new technologies, and respond to changes in the global business environment (such as foreign exchange rates). In its immediate environment, firms need to track and share information with suppliers, customers, stockholders, regulators, and logistic partners (such as shipping firms).
Business environments are constantly changing: New developments in technology, politics, customer preferences, and regulations happen all the time. In general, when businesses fail, it is often because they failed to respond adequately to changes in their environments.

Changes in technology, such as the Internet, are forcing entire industries and leading firms to change their business models or suffer failure. Apple’s iTunes and other online music download services are making the music industry’s traditional business model based on distributing music on CDs obsolete. Another example is the photography business. Digital photography has forced Eastman Kodak to downsize and move into digital cameras and Internet photography services because most of the consumer marketplace no longer wants to use traditional cameras with film.

THE ROLE OF INFORMATION SYSTEMS IN A BUSINESS

Until now we have not mentioned information systems. But from the brief review of business functions, entities, and environments, you can see the critical role that information plays in the life of a business. Up until the mid 1950s, firms managed all this information and information flow with paper records. During the past 50 years, more and more business information and the flow of information among key business actors in the environment has been computerized.

Businesses invest in information systems as a way to cope with and manage their internal production functions and to cope with the demands of key actors in their environments. Specifically, as we noted in Chapter 1, firms invest in information systems for the following business objectives:

- To achieve operational excellence (productivity, efficiency, agility)
- To develop new products and services
- To attain customer intimacy and service (continuous marketing, sales, and service; customization and personalization)
- To improve decision making (accuracy and speed)
- To achieve competitive advantage
- To ensure survival
2.2 Types of Business Information Systems

Now it is time to look more closely at how businesses use information systems to achieve these goals. Because there are different interests, specialties, and levels in an organization, there are different kinds of systems. No single system can provide all the information an organization needs.

A typical business organization will have systems supporting processes for each of the major business functions—systems for sales and marketing, manufacturing and production, finance and accounting, and human resources. You can find examples of systems for each of these business functions in the Learning Tracks for this chapter. Functional systems that operated independently of each other are becoming a thing of the past because they could not easily share information to support cross-functional business processes. They are being replaced with large-scale cross-functional systems that integrate the activities of related business processes and organizational units. We describe these integrated cross-functional applications later in this section.

A typical firm will also have different systems supporting the decision making needs of each of the main management groups we described earlier. Operational management, middle management, and senior management each use a specific type of system to support the decisions they must make to run the company. Let’s look at these systems and the types of decisions they support.

SYSTEMS FOR DIFFERENT LEVELS OF MANAGEMENT

A business firm has systems to support decision making and activities at different levels of the organization. Each of the main management groups we described earlier uses a different type of system to deliver the information required to manage the company. These systems can be classified as transaction processing systems, management information systems, decision-support systems, and systems for executive support.

Transaction Processing Systems

Operational managers need systems that keep track of the elementary activities and transactions of the organization, such as sales, receipts, cash deposits, payroll, credit decisions, and the flow of materials in a factory. Transaction processing systems (TPS) provide this kind of information. A transaction processing system is a computerized system that performs and records the daily routine transactions necessary to conduct business, such as sales order entry, hotel reservations, payroll, employee record keeping, and shipping.

The principal purpose of systems at this level is to answer routine questions and to track the flow of transactions through the organization. How many parts are in inventory? What happened to Mr. Williams’s payment? To answer these kinds of questions, information generally must be easily available, current, and accurate.

At the operational level, tasks, resources, and goals are predefined and highly structured. The decision to grant credit to a customer, for instance, is made by a lower-level supervisor according to predefined criteria. All that must be determined is whether the customer meets the criteria.

Figure 2-5 illustrates a TPS for payroll processing. A payroll system keeps track of money paid to employees. An employee time sheet with the employee’s name, social security number, and number of hours worked per week represents a single transaction for this system. Once this transaction is input into the system, it updates the system’s file (or database—see Chapter 5) that permanently maintains employee information for the organization. The data in the system are combined in different ways to create reports of interest to management and government agencies and to send paychecks to employees.
Managers need TPS to monitor the status of internal operations and the firm’s relations with the external environment. TPS are also major producers of information for the other systems and business functions. For example, the payroll system illustrated in Figure 2-5, along with other accounting TPS, supplies data to the company’s general ledger system, which is responsible for maintaining records of the firm’s income and expenses and for producing reports such as income statements and balance sheets. It also supplies employee payment history data for insurance, pension, and other benefits calculations to the firm’s human resources function and employee payment data to government agencies such as the U.S. Internal Revenue Service and Social Security Administration.

Transaction processing systems are often so central to a business that TPS failure for a few hours can lead to a firm’s demise and perhaps that of other firms linked to it. Imagine what would happen to UPS if its package tracking system were not working! What would the airlines do without their computerized reservation systems?

Management Information Systems and Decision-Support Systems
Middle management needs systems to help with monitoring, controlling, decision-making, and administrative activities. The principal question addressed by such systems is this: Are things working well?

In Chapter 1, we define management information systems as the study of information systems in business and management. The term management information systems (MIS) also designates a specific category of information systems serving middle management. MIS provide middle managers with reports on the organization’s current performance. This information is used to monitor and control the business and predict future performance.

MIS summarize and report on the company’s basic operations using data supplied by transaction processing systems. The basic transaction data from TPS are compressed and usually presented in reports that are produced on a regular schedule. Today, many of these reports are delivered online. Figure 2-6 shows how a typical MIS transforms transaction-level data from inventory, production, and accounting into MIS files that are used to provide managers with reports. Figure 2-7 shows a sample report from this system.
MIS serve managers primarily interested in weekly, monthly, and yearly results, although some MIS enable managers to drill down to see daily or hourly data if required. MIS generally provide answers to routine questions that have been specified in advance and have a predefined procedure for answering them. For instance, MIS reports might list the total pounds of lettuce used this quarter by a fast-food chain or, as illustrated in Figure 2-7, compare total annual sales figures for specific products to planned targets. These systems generally are not flexible and have little analytical capability. Most MIS use simple routines, such as summaries and comparisons, as opposed to sophisticated mathematical models or statistical techniques.

Decision-support systems (DSS) support nonroutine decision making for middle management. They focus on problems that are unique and rapidly changing, for which the procedure for arriving at a solution may not be fully predefined in advance. They try to answer questions such as these: What would be the impact on production schedules if we were to double sales in the month of December? What would happen to our return on investment if a factory schedule were delayed for six months?
Although DSS use internal information from TPS and MIS, they often bring in information from external sources, such as current stock prices or product prices of competitors. These systems use a variety of models to analyze data, or they condense large amounts of data into a form in which decision makers can analyze them. DSS are designed so that users can work with them directly; these systems explicitly include user-friendly software.

An interesting, small, but powerful, DSS is the voyage-estimating system of a subsidiary of a large American metals company that exists primarily to carry bulk cargoes of coal, oil, ores, and finished products for its parent company. The firm owns some vessels, charters others, and bids for shipping contracts in the open market to carry general cargo. A voyage-estimating system calculates financial and technical voyage details. Financial calculations include ship/time costs (fuel, labor, capital), freight rates for various types of cargo, and port expenses. Technical details include a myriad of factors, such as ship cargo capacity, speed, port distances, fuel and water consumption, and loading patterns (location of cargo for different ports).

The system can answer questions such as the following: Given a customer delivery schedule and an offered freight rate, which vessel should be assigned at what rate to maximize profits? What is the optimal speed at which a particular vessel can optimize its profit and still meet its delivery schedule? What is the optimal loading pattern for a ship bound for the U.S. West Coast from Malaysia? Figure 2-8 illustrates the DSS built for this company. The system operates on a powerful desktop personal computer, providing a system of menus that makes it easy for users to enter data or obtain information.

This voyage-estimating DSS draws heavily on analytical models. Other types of DSS are less model-driven, focusing instead on extracting useful information to support decision making from massive quantities of data. For example, Intrawest—the largest ski operator in North America—collects and stores large amounts of customer data from its Web site, call center, lodging reservations, ski schools, and ski equipment rental stores. It uses special software to analyze these data to determine the value, revenue potential, and loyalty of each customer so managers can make better decisions on how to target their marketing programs. The system segments customers into seven categories based on needs, attitudes, and behaviors, ranging from “passionate experts” to “value-minded family vacationers.” The company then e-mails video clips that would appeal to each segment to encourage more visits to its resorts.

Sometimes you’ll hear DSS referred to as business intelligence systems because they focus on helping users make better business decisions. You’ll learn more about them in Chapters 5 and 10.

Figure 2-8
Voyage-Estimating Decision-Support System
This DSS operates on a powerful PC. It is used daily by managers who must develop bids on shipping contracts.
Executive Support Systems for Senior Management

Senior managers need systems that address strategic issues and long-term trends, both in the firm and in the external environment. They are concerned with questions such as these: What will employment levels be in five years? What are the long-term industry cost trends, and where does our firm fit in? What products should we be making in five years? What new acquisitions would protect us from cyclical business swings?

Executive support systems (ESS) help senior management make these decisions. ESS address nonroutine decisions requiring judgment, evaluation, and insight because there is no agreed-on procedure for arriving at a solution. ESS present graphs and data from many sources through an interface that is easy for senior managers to use. Often the information is delivered to senior executives through a portal, which uses a Web interface to present integrated personalized business content. You will learn more about other applications of portals in Chapters 9 and 10.

ESS are designed to incorporate data about external events, such as new tax laws or competitors, but they also draw summarized information from internal MIS and DSS. They filter, compress, and track critical data, displaying the data of greatest importance to senior managers. For example, the CEO of Leiner Health Products, the largest manufacturer of private-label vitamins and supplements in the United States, has an ESS that provides on his desktop a minute-to-minute view of the firm’s financial performance as measured by working capital, accounts receivable, accounts payable, cash flow, and inventory. The information is presented in the form of a digital dashboard, which displays on a single screen graphs and charts of key performance indicators for managing a company. Digital dashboards are becoming an increasingly popular tool for management decision makers.

Figure 2-9 illustrates a model of an ESS. It consists of workstations with menus, interactive graphics, and communications capabilities that can be used to access historical and competitive data from internal corporate systems and external databases such as Dow Jones Factiva or the Gallup Poll. More details on leading-edge applications of DSS and ESS can be found in Chapter 10.

The Interactive Session on Organizations describes real-world examples of several of these types of systems used by a company that is attempting to grow from a successful local restaurant into a nationwide fast-food chain. Note the types of systems illustrated by this case and the role they play in improving both operations and decision making.
In 1936, Johnny Colera began selling hot dogs at his lunch counter in Jamestown, New York. Thanks to his special chili sauce and savvy business management, his restaurant, named Johnny’s Lunch, became a huge success and a local institution. Johnny’s Lunch offers good food, low prices, top-notch service, and a unique store atmosphere, featuring Johnny’s Hots hot dogs, burgers, fries, onion rings, and shakes, as well as less common options like homemade rice pudding.

The restaurant now wants to grow into a national QSR (quick-service restaurant, or fast food) leader similar to McDonald’s. The company is currently led by two of Colera’s grandchildren, Anthony and John Calamunci, and a newly assembled team of executives with experience in the QSR industry.

Growing the company from its humble origins into a national presence faces significant challenges. One will be to retain the restaurant’s small-town, local flavor as franchises proliferate across the country. Accomplishing this goal will require a coordinated effort.

Another challenge for Johnny’s Lunch will be to sustain growth despite the impact of a weak economy. Analysts predict that the slow economy will threaten growth potential for QRSl; it’s estimated that the sector’s annual growth will slow to 2% or 3%, down from much higher rates during more promising times. The company hopes that familiar and cheap food will translate to success even in an economic downturn during 2009 and beyond.

Management wanted to expand to 30-50 restaurants by the end of 2008, with a goal of as many as 3,000 locations nationwide in the following 5 years. There are only 3,300 hot dog restaurants in the country, and the most prominent chains like Nathan’s Famous and Wienerschnitzel have only 180 and 250 outlets, respectively. Johnny’s Lunch and industry analysts believe that there is room for the explosive growth the company is planning.

Johnny’s Lunch hopes to overcome these challenges with the help of state-of-the-art technology, including sophisticated mapping technology to scout locations, state-of-the-art point-of-sale (POS) systems, and inventory management systems that ensure freshness and reduce costs.

Pitney Bowes MapInfo has allowed Johnny’s to take a scientific approach to choosing spots for new restaurants. MapInfo’s Predictive Analytics group interviewed 800 customers at the original Jamestown restaurant to identify the types of customers Johnny’s Lunch attracted. Half were families; most were ages 16–24 or over 60 and had lower-middle to upper-middle class incomes. The interviews also determined the distribution of customers coming into the restaurant from work, home, shopping, or some other location.

MapInfo’s Smart Site Solutions analytics technology helped Johnny’s Lunch use this information to pinpoint potential markets and to identify the optimal number of sites within the market to maximize sales. Smart Site Solutions separated the country into many designated market areas (DMAs) showing the level of competition, demographics, and characteristics of prospective franchise locations. Pitney Bowes consultants determined which of 72 “clusters”, or neighborhood types, best match the restaurant’s optimal target areas from a variety of perspectives. Using this data within the Smart Site Solutions model allowed Johnny’s Lunch to identify approximately 4,500 optimal trade areas across the country. The executive team believes that these areas possess the best opportunities for successful Johnny’s Lunch franchises.

Using data such as trade area size, buffer distance between stores, customer profile, and more, Smart Site Solutions created a model that predicted the potential success of various sites. The processes allowed Johnny’s Lunch to identify sites without a wealth of historical sales data. Target spots include strip malls in facilities ranging from 1,400–1,800 feet, as opposed to freestanding locations, which tend to cost more to set up. The company also hopes that its franchises will be placed alongside well-known national brands, which will give Johnny’s Lunch immediate credibility among consumers.

Another area in which Johnny’s Lunch is using advanced technology to spur growth is its POS system. A POS system captures sales transaction data at the actual physical location where goods or services are bought or sold through electronic cash registers or handheld scanners. Company executives have selected the MICROS 3700 POS system from MICROS Systems as the system all their franchises will use as Johnny’s Lunch expands. A good POS system helps monitor inventory, control waste, and adhere to government regulations (for example, if food takes too long to prepare, if a cashier voids excessive transactions, or if any violations of labor laws occur, the system will alert employees). The MICROS system does all this and provides several other advantages. The system has impressed Johnny’s Lunch with how easy it is to understand and use, and MICROS is a large company with national reach and vendor locations throughout the country. This means that as Johnny’s
Johnny’s Lunch’s business model and business strategy. What challenges does Johnny’s Lunch face as it begins its expansion?

2. What systems has the company used or plans to use to overcome these challenges? What types of systems are they? What role will each play in helping Johnny’s Lunch overcome these challenges?

3. What other kinds of systems described in this chapter might help Johnny’s Lunch as it expands?

4. Do you believe Johnny’s Lunch will be successful in its attempts to expand nationally? Why or why not?

CASE STUDY QUESTIONS

1. Describe Johnny’s Lunch’s business model and business strategy. What challenges does Johnny’s Lunch face as it begins its expansion?

2. What systems has the company used or plans to use to overcome these challenges? What types of systems are they? What role will each play in helping Johnny’s Lunch overcome these challenges?

3. What other kinds of systems described in this chapter might help Johnny’s Lunch as it expands?

4. Do you believe Johnny’s Lunch will be successful in its attempts to expand nationally? Why or why not?

SYSTEMS THAT SPAN THE ENTERPRISE

Reviewing all the different types of systems we have just described, you might wonder how a business can manage all the information in these different systems. You might also wonder how costly it is to maintain so many different systems. And you might wonder how all these different systems can share information and how managers and employees are able to coordinate their work. In fact, these are all important questions for businesses today.

Enterprise Applications

Getting all the different kinds of systems in a company to work together has proven a major challenge. Typically, corporations are put together both through normal “organic” growth and through acquisition of smaller firms. Over a period of time, corporations end up with a collection of systems, most of them older, and face the challenge of getting them all to “talk” with one another and work together as one corporate system. There are several solutions to this problem.

One solution is to implement enterprise applications, which are systems that span functional areas, focus on executing business processes across the business firm, and include all levels of management. Enterprise applications help businesses become more flexible and productive by coordinating their business processes more closely and integrating groups of processes so they focus on efficient management of resources and customer service.
There are four major enterprise applications: enterprise systems, supply chain management systems, customer relationship management systems, and knowledge management systems. Each of these enterprise applications integrates a related set of functions and business processes to enhance the performance of the organization as a whole. Figure 2-10 shows that the architecture for these enterprise applications encompasses processes spanning the entire organization and, in some cases, extending beyond the organization to customers, suppliers, and other key business partners.

**Enterprise Systems** Firms use enterprise systems, also known as enterprise resource planning (ERP) systems, to integrate business processes in manufacturing and production, finance and accounting, sales and marketing, and human resources into a single software system. Information that was previously fragmented in many different systems is stored in a single comprehensive data repository where it can be used by many different parts of the business.

For example, when a customer places an order, the order data flow automatically to other parts of the company that are affected by them. The order transaction triggers the warehouse to pick the ordered products and schedule shipment. The warehouse informs the factory to replenish whatever has been depleted. The accounting department is notified to send the customer an invoice. Customer service representatives track the progress of the order through every step to inform customers about the status of their orders. Managers are able to use firm-wide information to make more precise and timely decisions about daily operations and longer-term planning.

**Supply Chain Management Systems** Firms use supply chain management (SCM) systems to help manage relationships with their suppliers. These systems help suppliers, purchasing firms, distributors, and logistics companies share information about orders, produc-
tion, inventory levels, and delivery of products and services so that they can source, produce, and deliver goods and services efficiently. The ultimate objective is to get the right amount of their products from their source to their point of consumption in the least amount of time and at the lowest cost. These systems increase firm profitability by lowering the costs of moving and making products and by enabling managers to make better decisions about how to organize and schedule sourcing, production, and distribution.

Supply chain management systems are one type of interorganizational system because they automate the flow of information across organizational boundaries. You will find examples of other types of interorganizational information systems throughout this text because such systems make it possible for firms to link electronically to customers and to outsource their work to other companies.

Customer Relationship Management Systems Firms use customer relationship management (CRM) systems to help manage their relationships with their customers. CRM systems provide information to coordinate all of the business processes that deal with customers in sales, marketing, and service to optimize revenue, customer satisfaction, and customer retention. This information helps firms identify, attract, and retain the most profitable customers; provide better service to existing customers; and increase sales.

Knowledge Management Systems Some firms perform better than others because they have better knowledge about how to create, produce, and deliver products and services. This firm knowledge is difficult to imitate, unique, and can be leveraged into long-term strategic benefits. Knowledge management systems (KMS) enable organizations to better manage processes for capturing and applying knowledge and expertise. These systems collect all relevant knowledge and experience in the firm, and make it available wherever and whenever it is needed to improve business processes and management decisions. They also link the firm to external sources of knowledge.

We examine enterprise systems and systems for supply chain management and customer relationship management in greater detail in Chapter 8. We discuss collaboration systems that support knowledge management in this chapter and cover other types of knowledge management applications in Chapter 10.

INTRANETS AND EXTRANETS

Enterprise applications create deep-seated changes in the way the firm conducts its business, and they offer many opportunities to integrate the important business data into a single system. They are also costly and difficult to implement. Companies also use intranets and extranets to integrate data, customers, vendors, and their own business processes.

Intranets are simply internal company Web sites that are accessible only by employees. The term ‘intranet’ is used to refer to the fact that it is an internal network, in contrast to the Internet which is a network between organizations and other networks. Intranets use the same technologies and techniques as the larger Internet, and they often are simply a private access area in a larger company Web site. Likewise with extranets. Extranets are company Web sites that are accessible usually only to vendors and suppliers, and used to coordinate the movement of supplies to the firm’s production apparatus. Many universities use intranets to keep students informed, and to distribute class content and administrative messages to students taking a specific class. These intranets are accessible only to members of the university community, not the general public using the Internet.

Intranets and extranets deserve mention here as one of the tools firms use to increase integration and expedite the flow of information within the firm, and with customers and suppliers. We describe the technology for intranets and extranets in more detail in Chapter 6.

An intranet typically centers on a portal that provides a single point of access to information from several different systems and to documents using a Web interface. Such portals can be customized to suit the information needs of specific business groups and individual users if required. They usually feature e-mail, collaboration tools, and tools for searching for internal corporate systems and documents.
For example, SwissAir’s corporate intranet for sales provides its salespeople with sales leads, fares, statistics, libraries of best practices, access to incentive programs, discussion groups, and collaborative workspaces. The intranet includes a Sales Ticket capability that displays bulletins about unfilled airplane seats around the world to help the sales staff work with colleagues and with travel agents who can help them fill those seats.

**E-BUSINESS, E-COMMERCE, AND E-GOVERNMENT**

The systems and technologies we have just described are transforming firms’ relationships with customers, employees, suppliers, and logistic partners into digital relationships using networks and the Internet. So much business is now enabled by or based upon digital networks that we use the terms *electronic business* and *electronic commerce* frequently throughout this text.

*Electronic business*, or *e-business*, refers to the use of digital technology and the Internet to execute the major business processes in the enterprise. E-business includes activities for the internal management of the firm and for coordination with suppliers and other business partners. It also includes *electronic commerce*, or *e-commerce*. E-commerce is the part of e-business that deals with the buying and selling of goods and services over the Internet. It also encompasses activities supporting those market transactions, such as advertising, marketing, customer support, security, delivery, and payment.

The technologies associated with e-business have also brought about similar changes in the public sector. Governments on all levels are using Internet technology to deliver information and services to citizens, employees, and businesses with which they work. *E-government* refers to the application of the Internet and networking technologies to digitally enable government and public sector agencies’ relationships with citizens, businesses, and other arms of government. In addition to improving delivery of government services, e-government can make government operations more efficient and also empower citizens by giving them easier access to information and the ability to network electronically with other citizens. For example, citizens in some states can renew their driver’s licenses or apply for unemployment benefits online, and the Internet has become a powerful tool for instantly mobilizing interest groups for political action and fund-raising.

**2.3 Systems for Collaboration and Teamwork**

With all these systems and information, you might wonder how is it possible to make sense out of them? How do people working in firms pull it all together, work towards common goals, and coordinate plans and actions? Information systems can’t make decisions, hire or fire people, sign contracts, agree on deals, or adjust the price of goods to the marketplace. In addition to the types of systems we have just described, businesses need special systems to support collaboration and teamwork.

**WHAT IS COLLABORATION?**

Collaboration is working with others to achieve shared and explicit goals. Collaboration focuses on task or mission accomplishment and usually takes place in a business, or other organization, and between businesses. You collaborate with a colleague in Tokyo having expertise on a topic about which you know nothing. You collaborate with many colleagues in publishing a company blog. If you’re in a law firm, you collaborate with accountants in an accounting firm in servicing the needs of a client with tax problems. Collaboration can be short-lived, lasting a few minutes, or longer term, depending on the nature of the task and the relationship among participants. Collaboration can be one-to-one or many-to-many.

Employees may collaborate in informal groups that are not a formal part of the business firm’s organizational structure or they may be organized into formal teams. Teams are part
of the organization’s business structure for getting things done. Teams have a specific mission that someone in the business assigned to them. They have a job to complete. The members of the team need to collaborate on the accomplishment of specific tasks and collectively achieve the team mission. The team mission might be to “win the game,” or “increase online sales by 10%,” or “prevent insulating foam from falling off a space shuttle.” Teams are often short-lived, depending on the problems they tackle and the length of time needed to find a solution and accomplish the mission.

Collaboration and teamwork are more important today than ever for a variety of reasons.

- **Changing nature of work.** The nature of work has changed from factory manufacturing and pre-computer office work where each stage in the production process occurred independently of one another, and was coordinated by supervisors. Work was organized into silos. Within a silo, work passed from one machine tool station to another, from one desktop to another, until the finished product was completed. Today, the kinds of jobs we have require much closer coordination and interaction among the parties involved in producing the service or product. A recent report from the consulting firm McKinsey and Company argued that 41 percent of the U.S. labor force is now composed of jobs where interaction (talking, e-mailing, presenting, and persuading) is the primary value-adding activity. Moreover, “interaction” jobs are the fastest growing: 70 percent of all new jobs created since 1998 are “interaction” jobs. Even in factories, workers today often work in production groups, or pods.

- **Growth of professional work.** “Interaction” jobs tend to be professional jobs in the service sector that require close coordination, and collaboration. Professional jobs require substantial education, and the sharing of information and opinions to get work done. Each actor on the job brings specialized expertise to the problem, and all the actors need to take one another into account in order to accomplish the job.

- **Changing organization of the firm.** For most of the industrial age, managers organized work in a hierarchical fashion. Orders came down the hierarchy, and responses moved back up the hierarchy. Today, work is organized into groups and teams, who are expected to develop their own methods for accomplishing the task. Senior managers observe and measure results, but are much less likely to issue detailed orders or operating procedures. In part this is because expertise has been pushed down in the organization, as have decision making powers.

- **Changing scope of the firm.** The work of the firm has changed a single location to multiple locations—offices or factories throughout a region, a nation, or even around the globe. For instance, Henry Ford developed the first mass-production automobile plant at a single Dearborn, Michigan factory. In 2010, Ford will produce about 3 million automobiles and employ over 200,000 employees at 88 plants and facilities worldwide. With this kind of global presence, the need for close coordination of design, production, marketing, distribution, and service obviously takes on new importance and scale. Large global companies need to have teams working on a global basis.

- **Emphasis on innovation.** While we tend to think of innovations in business and science as coming from great individuals, but more common is that these great individuals are working with a team of brilliant colleagues, and all have been preceded by a long line of earlier innovators and innovations. Think of Bill Gates and Steve Jobs (founders of Microsoft and Apple), both of whom are highly regarded innovators, and both of whom built strong collaborative teams to nurture and support innovation in their firms. Their initial innovations derived from close collaboration with colleagues and partners. Innovation in other words is a group and social process, and most innovations derive
from collaboration among individuals in a lab, a business, or government agencies. Strong collaborative practices and technologies are believed to increase the rate and quality of innovation.

- **Changing culture of work and business.** Most research on collaboration supports the notion that diverse teams produce better outputs, faster, than individuals working on their own. Popular notions of the crowd (“crowdsourcing,” and the “wisdom of crowds”) also provide cultural support for collaboration and teamwork.

### BUSINESS BENEFITS OF COLLABORATION AND TEAMWORK

There are many articles and books that have been written about collaboration, some of them by business executives and consultants, and a great many by academic researchers in a variety of businesses. Nearly all of this research is anecdotal. Nevertheless, among both business and academic communities there is a general belief that the more a business firm is “collaborative,” the more successful it will be, and that collaboration within and among firms is more essential than in the past. According to Jaclyn Kostner, Ph.D., an expert on high-performance virtual collaboration, “Collaboration can positively impact each of the gold standards of performance—profitability, profit growth, and sales growth—to determine a company’s overall performance in the marketplace” (Frost and White, 2007). A rare study of the value of collaboration found that the overall economic benefit of collaboration was significant: for every word seen by an employee in e-mails from others, $70 of additional revenue was generated (Aral, Brynjolfsson, and Van Alstyne, 2007).

Table 2.2 summarizes some of the benefits of collaboration identified by previous writers and scholars.

Figure 2-11 graphically illustrates how collaboration is believed to impact business performance.

<table>
<thead>
<tr>
<th>Benefit</th>
<th>Rationale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Productivity</td>
<td>People working together can complete a complex task faster than the same number of people working in isolation from one another. There will be fewer errors.</td>
</tr>
<tr>
<td>Quality</td>
<td>People working collaboratively can communicate errors, and corrective actions faster than if they work in isolation. There will be a reduction in buffers and time delay among production units.</td>
</tr>
<tr>
<td>Innovation</td>
<td>People working collaboratively in groups can come up with more innovative ideas for products, services, and administration than the same number working in isolation from one another. There are advantages in group diversity and “the wisdom of crowds.”</td>
</tr>
<tr>
<td>Customer service</td>
<td>People working together in teams can solve customer complaints and issues faster and more effectively than if they were working in isolation from one another.</td>
</tr>
<tr>
<td>Financial performance (profitability, sales, and sales growth)</td>
<td>As a result of all of the above, collaborative firms have superior sales, sales growth, and financial performance.</td>
</tr>
</tbody>
</table>
While there are many presumed benefits to collaboration, you really need a supportive business firm culture and the right decentralized structure before you can achieve meaningful collaboration. You also need a healthy investment in collaborative technologies. We now examine these requirements.

BUILDING A COLLABORATIVE CULTURE

Collaboration won’t take place spontaneously in a business firm, especially if there is no supportive culture. Business firms, especially large firms, had in the past a reputation for being “command and control” organizations where the top leaders thought up all the really important matters, and then ordered lower level employees to execute senior management plans. The job of middle management supposedly was to pass messages back and forth, up and down the hierarchy.

To some extent this is a caricature of how firms used to behave in the 1950s to 1990s, but caricatures often have some truth. Command and control firms required lower-level employees to carry out orders without asking too many questions, with no responsibility to improve processes, and with no rewards for teamwork or team performance. If your workgroup needed help from another work group, that was something for the bosses to figure out. You never communicated horizontally, always vertically, so management could control the process. As long as employees showed up for work, and performed the job satisfactorily, that’s all that was required. Together, the expectations of management and employees formed a culture, a set of assumptions about common goals and how people should behave. It is surprising how many business firms still operate this way.

A collaborative business culture is very different. Senior managers are responsible for achieving results, but rely on teams of employees to achieve and implement the results. Policies, products, designs, processes, and systems are much more dependent on teams at all levels of the organization to devise, to create, and to build. Teams are rewarded for their performance, and individuals are rewarded for their performance in a team. You might be a brilliant star on a failed team and receive only half the rewards. The function of middle managers is to build the teams, coordinate their work, and monitor their performance. In a
collaborative culture, senior management establishes collaboration and teamwork as vital to the organization, and it actually implements collaboration for the senior ranks of the business as well.

**TOOLS AND TECHNOLOGIES FOR COLLABORATION AND TEAMWORK**

A collaborative, team-oriented culture won’t produce benefits if there are no information systems in place to enable collaboration. Currently there are hundreds of tools designed to deal with the fact that, in order to succeed in our jobs, we are all much more dependent on one another, our fellow employees, customers, suppliers and managers. Table 2.3 lists the most important types of collaboration software tools. Some high-end tools like IBM’s Lotus Notes are expensive, but powerful enough for global firms. Others are available online for free (or with premium versions for a modest fee) and are suitable for small businesses. Let’s look more closely at some of these tools.

**E-mail and Instant Messaging (IM)**

Worldwide, one in six people in the world, about 1.4 billion, use e-mail. There are also about 47 billion instant messages sent every day, 10 billion of which originate in business networks. E-mail and instant messaging have been embraced by corporations as a major communication and collaboration tool supporting interaction jobs. Their software operates on computers, cell phones, and other wireless handheld devices and includes features for sharing files as well as transmitting messages. Many instant messaging systems allow users to engage in real-time conversations with multiple participants simultaneously. Gartner technology consultants predict that with in a few years, instant messaging will be the “de facto tool” for voice, video, and text chat for 95 percent of employees in big companies.

**Social Networking**

We’ve all visited social networking sites such as MySpace, Facebook, and Friendster, which feature tools to help people share their interests and interact. Social networking tools are quickly becoming a corporate tool for sharing ideas and collaborating among interaction-based jobs in the firm. Social networking sites such as Linkedin.com provide networking services to business professionals, while other niche sites have sprung up to serve lawyers, doctors, engineers, and even dentists. IBM built a Community Tools component into its Lotus Notes collaboration software to add social networking features. Users are able to submit questions to others in the company and receive answers via instant messaging.

**TABLE 2.3**

Fifteen Categories of Collaborative Software Tools

| E-mail and instant messaging | White boarding |
| Collaborative writing | Web presenting |
| Collaborative reviewing/editing | Work scheduling |
| Event scheduling | Document sharing (including wikis) |
| File sharing | Mind mapping |
| Screen sharing | Large-audience Webinars |
| Audio conferencing | Co-browsing |
| Video conferencing | |

*Source: Mindmeister.com, 2009*
**Wikis**

Wikis are a type of Web site that makes it easy for users to contribute and edit text content and graphics without any knowledge of Web page development or programming techniques. The most well-known wiki is Wikipedia, the largest collaboratively edited reference project in the world. It relies on volunteers, makes no money and accepts no advertising. Wikipedia is the ninth most visited site in the United States (Amazon is tenth), with over 64 million unique visitors each month. Wikipedia is the world’s most successful online encyclopedia.

Wikis are ideal tools for storing and sharing company knowledge and insights. Enterprise software vendor SAP AG has a wiki that acts as a base of information for people outside the company, such as customers and software developers who build programs that interact with SAP software. In the past, those people asked and sometimes answered questions in an informal way on SAP online forums, but that was an inefficient system, with people asking and answering the same questions over and over.

At Intel Corporation, employees built their own internal wiki, and it has been edited over 100,000 times and viewed more than 27 million times by Intel employees. The most common search is for the meaning of Intel acronyms such as EASE for “employee access support environment” and POR for “plan of record.” Other popular resources include a page about software engineering processes at the company. Wikis are destined to become the major repository for unstructured corporate knowledge in the next five years in part because they are so much less costly than formal knowledge management systems and they can be much more dynamic and current.

**Virtual Worlds**

Virtual worlds, such as Second Life, are online 3-D environments populated by “residents” who have built graphical representations of themselves known as avatars. Organizations such as IBM and Insead, an international business school with campuses in France and Singapore, are using this virtual world to house online meetings, training sessions, and “lounges.” Real-world people represented by avatars meet, interact, and exchange ideas at these virtual locations. Communication takes place in the form of text messages similar to instant messages.

**Internet-Based Collaboration Environments**

There are now suites of software products providing multi-function platforms for workgroup collaboration among teams of employees who work together from many different locations. These include Internet-based audio conferencing and video conferencing systems, online software services such as Google Apps/Google Sites, and corporate collaboration systems such as Lotus Notes, Socialtext, and Microsoft SharePoint.

**Virtual Meeting Systems**

For many businesses, including investment banking, accounting, law, technology services, and management consulting, extensive travel is a fact of life. The expenses incurred by business travel have been steadily rising in recent years, primarily due to increasing energy costs. In an effort to reduce travel expenses, many companies, both large and small, are adopting videoconferencing and Web conferencing technologies. Companies such as Heinz, General Electric, Pepsico, and Wachovia are using virtual meeting systems for product briefings, training courses, strategy sessions, and even inspirational chats.

An important feature of leading-edge, high-end videoconferencing systems is telepresence technology, which allows a person to give the appearance of being present at a location other than his or her true physical location. The Interactive Session on Technology describes telepresence and other technologies for hosting these “virtual” meetings. You can also find video cases on this topic.
Instead of taking that 6:30 a.m. flight to make a round of meetings in Dallas, wouldn’t it be great if you could attend these events without leaving your desktop? Today you can, thanks to technologies for videoconferencing and for hosting online meetings over the Web. A June 2008 report issued by the Global e-Sustainability Initiative and the Climate Group estimated that up to 20 percent of business travel could be replaced by virtual meeting technology.

A videoconference allows individuals at two or more locations to communicate through two-way video and audio transmissions at the same time. The critical feature of videoconferencing is the digital compression of audio and video streams by a device called a codec. Those streams are then divided into packets and transmitted over a network or the Internet. Until recently, the technology has been plagued by poor audio and video performance in the past, usually related to the speed at which the streams were transmitted, and its cost was prohibitively high for all but the largest and most powerful corporations. Most companies deemed videoconferencing as a poor substitute for face-to-face meetings.

However, vast improvements in videoconferencing and associated technologies have renewed interest in this way of working. Videoconferencing is now growing at an annual rate of 30 percent. Proponents of the technology claim that it does more than simply reduce costs. It allows for “better” meetings as well: It’s easier to meet with partners, suppliers, subsidiaries, and colleagues from within the office or around the world on a more frequent basis, which in most cases simply cannot be reasonably accomplished through travel. You can also meet with contacts that you wouldn’t be able to meet at all without videoconferencing technology.

For example, Rip Curl, a Costa Mesa, California producer of surfing equipment, uses videoconferencing to help its designers, marketers, and manufacturers collaborate on new products. Executive recruiting firm Korn/Ferry International uses video interviews to screen potential candidates before presenting them to clients.

Today’s state-of-the-art videoconferencing systems display sharp high-definition TV images. The top-of-the-line videoconferencing technology is known as telepresence. Telepresence strives to make users feel as if they are actually present in a location different from their own. You can sit across a table from a large screen showing someone who looks quite real and life-size, but may be in Brussels or Hong Kong. Only the handshake and exchange of business cards are missing. Telepresence products provide the highest-quality videoconferencing available on the market to date. Only a handful of companies, such as Cisco, HP, and Polycom, supply these products. Prices for fully equipped telepresence rooms can run to $500,000.

Companies able to afford this technology report large savings. For example, technology consulting firm Accenture reports that it eliminated expenditures for 240 international trips and 120 domestic flights in a single month. The ability to reach customers and partners is also dramatically increased. Other business travelers report tenfold increases in the number of customers and partners they are able to reach for a fraction of the previous price per person. Cisco has over 200 telepresence rooms and predicts that it saves $100 million in travel costs each year.

Videoconferencing products have not traditionally been feasible for small businesses, but another company, LifeSize, has introduced an affordable line of products for as low as $5,000. Reviews of the LifeSize product indicate that when a great deal of movement occurs in a frame, the screen blurs and distorts somewhat. But overall, the product is easy to use and will allow many smaller companies to use a high-quality videoconferencing product.

There are even some free Internet-based options like Skype videoconferencing and ooVoo. These products are of lower quality than traditional videoconferencing products, and they are proprietary, meaning they can only talk to others using that very same system. Most videoconferencing and telepresence products are able to interact with a variety of other devices. Higher-end systems include features like multiparty conferencing, video mail with unlimited storage, no long-distance fees, and a detailed call history.

Companies of all sizes are finding Web-based online meeting tools such as WebEx, Microsoft Office Live Meeting, and Adobe Acrobat Connect especially helpful for training and sales presentations. These products enable participants to share documents and presentations in conjunction with audio conferencing and live video via Webcam. Cornerstone Information systems, a Bloomington, Indiana business software company with 60 employees, cut its travel costs by 60 percent and the average time to close a new sale by 30 percent by performing many product demonstrations online.

Before setting up videoconferencing or telepresence, it’s important for a company to make sure it really needs the technology to ensure that it will be a profitable venture. Companies should determine how
their employees conduct meetings, how they communicate and with what technologies, how much travel they do, and their network’s capabilities. There are still plenty of times when face-to-face interaction is more desirable, and often traveling to meet a client is essential for cultivating clients and closing sales.

Videoconferencing figures to have an impact on the business world in other ways, as well. More employees may be able to work closer to home and balance their work and personal lives more efficiently; traditional office environments and corporate headquarters may shrink or disappear; and freelancers, contractors, and workers from other countries will become a larger portion of the global economy.


**CASE STUDY QUESTIONS**

1. One consulting firm has predicted that video and Web conferencing will make business travel extinct. Do you agree? Why or why not?

2. What is the distinction between videoconferencing and telepresence?

3. What are the ways in which videoconferencing provides value to a business? Would you consider it smart management? Explain your answer.

4. If you were in charge of a small business, would you choose to implement videoconferencing? What factors would you consider in your decision?

**MIS IN ACTION**

Explore the WebEx Web site (www.webex.com) and note all of its capabilities for both small and large businesses.

1. List and describe its capabilities for small, medium and large businesses. How useful is WebEx? How can it help companies save time and money?

2. Compare WebEx video capabilities with the videoconferencing capabilities described in this case.

3. Describe the steps you would take to prepare for a Web conference as opposed to a face-to-face conference.

**Google Apps/Google Sites**

One of the most widely used “free” online services for collaboration is Google Apps/Google Sites. Google Sites (formerly JotSpot) allows users to quickly create online group-editable Web sites. Google Sites is one part of the larger Google Apps suite of tools. Google Sites users can design and populate Web sites in minutes and can, without any advanced technical skills, post a variety of files including calendars, text, spreadsheets, and videos for private, group, or public viewing and editing.

Google Apps work with Google Sites and include the typical desktop productivity office software tools (word processing, spreadsheets, presentation, contact management, messaging, and mail). A Premier edition charging businesses $50 per year for each user offers 25 gigabytes of mail storage, a 99.9% percent uptime guarantee for e-mail, tools to integrate with the firm’s existing infrastructure, and 24/7 phone support. Table 2.4 describes some of the capabilities of Google Apps/Google Sites.

Google is in the process of finalizing an additional Web-based platform for collaboration and communication called Google Wave. Google Wave has strong real-time and collaborative features. “Waves” are “equal parts conversation and document,” in which any participant of a wave can reply anywhere in the message, edit the content, and add or remove participants at any point in the process. Users are able to see responses from other participants on their “wave” while typing occurs. Thus, waves not only can function as e-mail and threaded discussions but also as an instant messaging service. (A threaded discussion consists of series of messages in response to an initial message or topic.) Google will let people run their own Wave servers.
Microsoft SharePoint  Microsoft SharePoint is the most widely adopted collaboration system for small and medium-sized firms that use Microsoft server and networking products. Several larger firms have adopted it as well. SharePoint is a browser-based collaboration and document management platform, combined with a powerful search engine that is installed on corporate servers.

SharePoint has a Web-based interface and close integration with everyday tools such as Microsoft Office desktop software products. Microsoft’s strategy is to take advantage of its “ownership” of the desktop through its Microsoft Office and Windows products. For Microsoft, the path towards enterprise-wide collaboration starts with the Office desktop and Microsoft network servers. SharePoint software makes it possible for employees to share their Office documents and collaborate on projects using Office documents as the foundation.

SharePoint products and technologies provide a platform for Web-based collaboration at the enterprise level. SharePoint can be used to host Web sites that organize and store information in one central location to enable teams to coordinate work activities, collaborate on and publish documents, maintain task lists, implement workflows, and share information via wikis and blogs. Because SharePoint stores and organizes information in one place, users can find relevant information quickly and efficiently while working together closely on tasks, projects, and documents.

Here is a list of SharePoint’s major capabilities:

- Provides a single workspace for teams to coordinate schedules, organize documents, and participate in discussions, within the organization or over an extranet.
- Facilitates creation and management of documents with the ability to control versions, view past revisions, and enforce document-specific security and maintain document libraries.
- Provides announcements, alerts, and discussion boards to inform users when actions are required or changes are made to existing documentation or information.
- Supports personalized content and both personal and public views of documents and applications.
- Provides templates for blogs and wikis to help teams share information and brainstorm.
- Provides tools to manage document libraries, lists, calendars, tasks, and discussion boards offline, and to synchronize changes when reconnected to the network.
- Provides enterprise search tools for locating people, expertise, and content.

**TABLE 2.4**

<table>
<thead>
<tr>
<th>Google Apps/Google Sites Capability</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Google Calendar</td>
<td>Private and shared calendars; multiple calendars.</td>
</tr>
<tr>
<td>Google Gmail</td>
<td>Google’s free online e-mail service, with mobile access capabilities.</td>
</tr>
<tr>
<td>Google Talk</td>
<td>Instant messaging, text and voice chat</td>
</tr>
<tr>
<td>Google Docs</td>
<td>Online word processing, electronic presentation software, spreadsheets; online editing, sharing, publishing</td>
</tr>
<tr>
<td>Google Sites</td>
<td>Team collaboration sites for sharing of documents, schedules, calendars, searching documents; creation of group wikis</td>
</tr>
<tr>
<td>Google Video</td>
<td>Firm-wide video sharing and commenting capability</td>
</tr>
</tbody>
</table>
Ampacet, a specialty chemical manufacturer with global research and development (R&D) activities, adopted Microsoft Office SharePoint Server 2007 along with Microsoft Office 2007 to expedite, coordinate, and centralize its product development process. The company has 5 major R&D facilities and 17 manufacturing sites in multiple locations worldwide that had operated somewhat independently—and inefficiently—in developing new products. The SharePoint server provided community Web sites for team collaboration where R&D staff could easily collect, share, and manage product development information with other facilities around the world. SharePoint features for automated workflows enabled Ampacet to create a consistent process across the company for organizing new product development data and a central repository for Microsoft Excel spreadsheets, dashboards, and other R&D project documents (Microsoft, 2009).

Lotus Notes For very large firms (Fortune 1000 and Russell 2000 firms) the most widely used collaboration tool is IBM’s Lotus Notes. Lotus Notes was an early example of groupware, a collaborative software system with capabilities for sharing calendars, collective writing and editing, shared database access, and electronic meetings, with each participant able to see and display information from others and other activities. Notes is now Web-enabled with enhancements for social networking (Lotus Connections) and a scripting and application development environment so that users can build custom applications to suit their unique needs.

IBM Software Group defines Lotus Notes as an “integrated desktop client option for accessing business e-mail, calendars, and applications on an IBM Lotus Domino server.” The Notes software installed on the user’s client computer allows the machine to be used as a platform for e-mail, instant messaging (working with Lotus Sametime), Web browsing, and calendar/resource reservation work, as well as for interacting with collaborative applications. Today, Notes also provides blogs, wikis, RSS aggregators, CRM, and help desk systems.

Thousands of employees at hundreds of large firms such as the Toshiba, Air France, and Global Hyatt Corporation use IBM Lotus Notes as their primary collaboration and teamwork tools. Firmwide installations of Lotus Notes can cost millions of dollars a year for a large Fortune 1000 firm, whereas Google Apps/Google Sites comes in a limited free version or a more sophisticated premium version for $50 per user/per year. A client-server product like Lotus Notes inherently involves the central IS department, and it is a major implementation effort. Online software services are therefore attractive because they do not require any installation on corporate servers, or even the IS department to be involved. Nevertheless, existing online tools like the Google collaboration services are not as powerful as those found in Lotus Notes, and it is unclear whether they could scale to the size of a global firm (at least for now).

Very large firms adopt IBM Lotus Notes because it promises higher levels of security and reliability, and the sense that the firm retains control over sensitive information. For example, EuroChem, the largest agrochemical company in Russia and one of Europe’s top three fertilizer producers, uses Lotus Notes to create a single standard platform for collaboration and document management. The software facilitates cooperation and collaboration among geographically dispersed regional production centers and provides a secure automated platform for document exchange. With Lotus Notes, EuroChem is able to register and control all documents, to establish routing paths for document approval, and to maintain a full history of all movements and changes. Security features allow the company to create a personalized work environment for each user and to prevent unauthorized users from accessing sensitive information (IBM, 2009).

Large firms in general do not feel secure using popular online software services for “strategic” applications because of the implicit security concerns, and the dependency on external vendor’s computing resources. Most experts agree, however, that these concerns will diminish as experience with online tools grows, and the sophistication of online software service suppliers increases to protect security and reduce vulnerability. Table 2.5 describes additional popular online collaboration tools.
TABLE 2.5
Other Popular Online Collaboration Tools

<table>
<thead>
<tr>
<th>Tool</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Socialtext</td>
<td>An enterprise server-based collaboration environment which provides social networking, Twitter-like micro-blogging, wiki workspaces, with integrated weblogs, distributed spreadsheets, and a personal home page for every user. Connectors to Microsoft SharePoint and Lotus Connections are also available. More emphasis on social networking than Office tools.</td>
</tr>
<tr>
<td>Zoho Notebook</td>
<td>Collecting and collaborating on text, line drawings, images, Web pages, video, RSS feeds. Project management (task management, work flow, reports, time tracking, forums, and file sharing). Free or $5/project/month for premium service.</td>
</tr>
<tr>
<td>Bluetie</td>
<td>Online collaboration with e-mail, scheduling, to-do lists, contact management, file sharing. Free for less than 20 users, $4.99 user/month after that.</td>
</tr>
<tr>
<td>Basecamp</td>
<td>Sharing to-do lists, files, message boards, milestone tracking. Free for a single project, $12/month for three projects with 200 megabytes of storage.</td>
</tr>
<tr>
<td>Onehub</td>
<td>Sharing documents, calendars, Web bookmarks; e-mail integration and IM. Manage hub resources; bulletin board.</td>
</tr>
<tr>
<td>WorkZone</td>
<td>Collaboration with file sharing; project management; customization; security.</td>
</tr>
</tbody>
</table>

Onehub enables teams to create online workspaces called Hubs to share information, documents, and files from one central location. Tiny widget programs are available for customizing these workspaces by adding capabilities for uploading and moving files, displaying contacts and task lists, and embedding videos.
Evaluating and Selecting Collaboration Software Tools

With so many collaboration tools and services available, how do you choose the right collaboration technology for your firm? To answer this question, you need a framework for understanding just what problems these tools are designed to solve. One framework that has been helpful for us to talk about collaboration tools is the time/space collaboration matrix developed in the early 1990s by a number of collaborative work scholars (Figure 2-12).

The time/space matrix focuses on two dimensions of the collaboration problem: time and space. For instance, you need to collaborate with people in different time zones and you cannot all meet at the same time. Midnight in New York is noon in Bombay, so this makes it difficult to have a video conference (the people in New York are too tired). Time is clearly an obstacle to collaboration on a global scale.

Place (location) also inhibits collaboration in large global or even national and regional firms. Assembling people for a physical meeting is made difficult by the physical dispersion of distributed firms (firms with more than one location), the cost of travel, and the time limitations of managers.

The collaboration technologies we have just described are ways of overcoming the limitations of time and space. Using this time/space framework will help you to choose the most appropriate collaboration and teamwork tools for your firm. Note that some tools are applicable in more than one time/place scenario. For example, Internet collaboration suites such as Lotus Notes have capabilities for both synchronous (instant messaging, electronic meeting tools) and asynchronous (e-mail, wikis, document editing) interactions.

Here’s a “to-do” list to get started. If you follow these six steps, you should be led to investing in the correct collaboration software for your firm at a price you can afford, and within your risk tolerance.

1. What are the collaboration challenges facing the firm in terms of time and space? Locate your firm in the time/space matrix. Your firm can occupy more than one cell in the matrix. Different collaboration tools will be needed for each situation.
2. Within each cell of the matrix where your firm faces challenges, exactly what kinds of solutions are available? Make a list of vendor products.
3. Analyze each of the products in terms of their cost and benefits to your firm. Be sure to include the costs of training in your cost estimates, and the costs of involving the information systems department if needed.
4. Identify the risks to security and vulnerability involved with each of the products. Is your firm willing to put proprietary information into the hands of external service providers over the Internet? Is your firm willing to risk its important operations to systems controlled by other firms? What are the financial risks facing your vendors? Will they be here in three to five years? What would be the cost of making a switch to another vendor in the event the vendor firm fails?

5. Seek the help of potential users to identify implementation and training issues. Some of these tools are easier to use than others.

6. Make your selection of candidate tools, and invite the vendors to make presentations.

### 2.4 The Information Systems Function in Business

We’ve seen that businesses need information systems to operate today and that they use many different kinds of systems. But who is responsible for running these systems? Who is responsible for making sure the hardware, software, and other technologies used by these systems are running properly and are up to date? End users manage their systems from a business standpoint, but managing the technology requires a special information systems function.

In all but the smallest of firms, the information systems department is the formal organizational unit responsible for information technology services. The information systems department is responsible for maintaining the hardware, software, data storage, and networks that comprise the firm’s IT infrastructure. We describe IT infrastructure in detail in Chapter 4.

#### THE INFORMATION SYSTEMS DEPARTMENT

The information systems department consists of specialists, such as programmers, systems analysts, project leaders, and information systems managers. **Programmers** are highly trained technical specialists who write the software instructions for computers. **Systems analysts** constitute the principal liaisons between the information systems groups and the rest of the organization. It is the systems analyst’s job to translate business problems and requirements into information requirements and systems. **Information systems managers** are leaders of teams of programmers and analysts, project managers, physical facility managers, telecommunications managers, or database specialists. They are also managers of computer operations and data entry staff. Also, external specialists, such as hardware vendors and manufacturers, software firms, and consultants, frequently participate in the day-to-day operations and long-term planning of information systems.

In many companies, the information systems department is headed by a **chief information officer (CIO)**. The CIO is a senior manager who oversees the use of information technology in the firm. Today’s CIOs are expected to have a strong business background as well as information systems expertise and to play a leadership role in integrating technology into the firm’s business strategy. Large firms today also have positions for a chief security officer, chief knowledge officer, and chief privacy officer, all of whom work closely with the CIO.

The **chief security officer (CSO)** is in charge of information systems security for the firm and is responsible for enforcing the firm’s information security policy (see Chapter 7). (Sometimes this position is called the chief information security officer [CISO] where information systems security is separated from physical security.) The CSO is responsible for educating and training users and information systems specialists about security, keeping management aware of security threats and breakdowns, and maintaining the tools and policies chosen to implement security.

Information systems security and the need to safeguard personal data have become so important that corporations collecting vast quantities of personal data have established positions for a **chief privacy officer (CPO)**. The CPO is responsible for ensuring that the company complies with existing data privacy laws.
The chief knowledge officer (CKO) is responsible for the firm’s knowledge management program. The CKO helps design programs and systems to find new sources of knowledge or to make better use of existing knowledge in organizational and management processes. End users are representatives of departments outside of the information systems group for whom applications are developed. These users are playing an increasingly large role in the design and development of information systems.

In the early years of computing, the information systems group was composed mostly of programmers who performed highly specialized but limited technical functions. Today, a growing proportion of staff members are systems analysts and network specialists, with the information systems department acting as a powerful change agent in the organization. The information systems department suggests new business strategies and new information-based products and services, and coordinates both the development of the technology and the planned changes in the organization.

INFORMATION SYSTEMS SERVICES

Services provided by the information systems department include the following:

• Computing platforms provide computing services that connect employees, customers, and suppliers into a coherent digital environment, including large mainframes, desktop and laptop computers, and mobile handheld devices.

• Telecommunications services provide data, voice, and video connectivity to employees, customers, and suppliers.

• Data management services store and manage corporate data, and provide capabilities for analyzing the data.

• Application software services provide development and support services for the firm’s business systems, including enterprise-wide capabilities, such as enterprise resource planning, customer relationship management, supply chain management, and knowledge management systems, that are shared by all business units.

• Physical facilities management services develop and manage the physical installations required for computing, telecommunications, and data management services.

• IT management services plan and develop the infrastructure, coordinate with the business units for IT services, manage accounting for the IT expenditure, and provide project management services.

• IT standards services provide the firm and its business units with policies that determine which information technology will be used, when, and how.

• IT educational services provide training in system use to employees and offer managers training in how to plan for and manage IT investments.

• IT research and development services provide the firm with research on potential future information systems projects and investments that could help the firm differentiate itself in the marketplace.

In the past, firms generally built their own software and managed their own computing facilities. As our discussion of collaboration systems has shown, many firms are turning to external vendors to provide these services (see also Chapters 4 and 11) and are using their information systems departments to manage these service providers.

2.5 Hands-On MIS Projects

The projects in this section give you hands-on experience analyzing opportunities to improve business processes with new information system applications, using a spreadsheet to improve decision making about suppliers, and using Internet software to plan efficient transportation routes.
MANAGEMENT DECISION PROBLEMS

1. Don’s Lumber Company on the Hudson River is one of the oldest retail lumber yards in New York State. It features a large selection of materials for flooring, decks, moldings, windows, siding, and roofing. The prices of lumber and other building materials are constantly changing. When a customer inquires about the price on pre-finished wood flooring, sales representatives consult a manual price sheet and then call the supplier for the most recent price. The supplier in turn uses a manual price sheet, which has been updated each day. Often the supplier must call back Don’s sales reps because the company does not have the newest pricing information immediately on hand. Assess the business impact of this situation, describe how this process could be improved with information technology, and identify the decisions that would have to be made to implement a solution. Who would make those decisions?

2. Henry’s Hardware is a small family business in Sacramento, California. The owners must use every square foot of store space as profitably as possible. They have never kept detailed inventory or sales records. As soon as a shipment of goods arrives, the items are immediately placed on store shelves. Invoices from suppliers are only kept for tax purposes. When an item is sold, the item number and price are rung up at the cash register. The owners use their own judgment in identifying items that need to be reordered. What is the business impact of this situation? How could information systems help Henry and Kathleen run their business? What data should these systems capture? What decisions could the systems improve?

IMPROVING DECISION MAKING: USE A SPREADSHEET TO SELECT SUPPLIERS

Software skills: Spreadsheet date functions, data filtering, DAVERAGE function
Business skills: Analyzing supplier performance and pricing

In this exercise, you will learn how to use spreadsheet software to improve management decisions about selecting suppliers. You will start with raw transactional data about suppliers organized as a large spreadsheet list. You will use the spreadsheet software to filter the data based on several different criteria to select the best suppliers for your company.

You run a company that manufactures aircraft components. You have many competitors who are trying to offer lower prices and better service to customers, and you are trying to determine whether you can benefit from better supply chain management. In MyMISLab, you will find a spreadsheet file that contains a list of all of the items that your firm has ordered from its suppliers during the past three months. A sample is shown below, but MyMISLab
may have a more recent version of this spreadsheet for this exercise. The fields in the spreadsheet file include vendor name, vendor identification number, purchaser’s order number, item identification number and item description (for each item ordered from the vendor), cost per item, number of units of the item ordered (quantity), total cost of each order, vendor’s accounts payable terms, order date, and actual arrival date for each order.

Prepare a recommendation of how you can use the data in this spreadsheet database to improve your decisions about selecting suppliers. Some criteria to consider for identifying preferred suppliers include the supplier’s track record for on-time deliveries, suppliers offering the best accounts payable terms, and suppliers offering lower pricing when the same item can be provided by multiple suppliers. Use your spreadsheet software to prepare reports to support your recommendations.

ACHIEVING OPERATIONAL EXCELLENCE: USING INTERNET SOFTWARE TO PLAN EFFICIENT TRANSPORTATION ROUTES

In this exercise, you will use the same online software tool that businesses use to map out their transportation routes and select the most efficient route. The MapQuest (www.mapquest.com) Web site includes interactive capabilities for planning a trip. The software on this Web site can calculate the distance between two points and provide itemized driving directions to any location.

You have just started working as a dispatcher for Cross-Country Transport, a new trucking and delivery service based in Cleveland, Ohio. Your first assignment is to plan a delivery of office equipment and furniture from Elkhart, Indiana (at the corner of E. Indiana Ave. and Prairie Street) to Hagerstown, Maryland (corner of Eastern Blvd. N. and Potomac Ave.). To guide your trucker, you need to know the most efficient route between the two cities. Use MapQuest to find the route that is the shortest distance between the two cities. Use MapQuest again to find the route that takes the least time. Compare the results. Which route should Cross-Country use?

LEARNING TRACKS

The following Learning Tracks provide content relevant to topics covered in this chapter:

1. Systems from a Functional Perspective
2. IT Enables Collaboration and Teamwork
3. Challenges of Using Business Information Systems
4. Organizing the Information Systems Function

Review Summary

1 What are the major features of a business that are important for understanding the role of information systems? A business is a formal complex organization producing products or services for a profit. Businesses have specialized functions, such as finance and accounting, human resources, manufacturing and production, and sales and marketing. Business organizations are arranged hierarchically into levels of management. A business process is a logically related set of activities that define how specific business tasks are performed. Business firms must monitor and respond to their surrounding environments.
2 How do systems serve the various levels of management in a business? Systems serving operational management are transaction processing systems (TPS), such as payroll or order processing, that track the flow of the daily routine transactions necessary to conduct business. Management information systems (MIS) and decision-support systems (DSS) support middle management. Most MIS reports condense information from TPS and are not highly analytical. DSS support management decisions that are unique and rapidly changing using advanced analytical models and data analysis capabilities. Executive support systems (ESS) support senior management by providing data that are often in the form of graphs and charts delivered via portals using many sources of internal and external information.

3 How do enterprise applications and intranets improve organizational performance? Enterprise applications are designed to coordinate multiple functions and business processes. Enterprise systems integrate the key internal business processes of a firm into a single software system to improve coordination and decision making. Supply chain management systems help the firm manage its relationship with suppliers to optimize the planning, sourcing, manufacturing, and delivery of products and services. Customer relationship management (CRM) systems coordinate the business processes surrounding the firm’s customers. Knowledge management systems enable firms to optimize the creation, sharing, and distribution of knowledge. Intranets and extranets use Internet technology and standards to assemble information from disparate systems and present it to the user in a Web page format. Extranets make portions of private corporate intranets available to outsiders.

4 Why are systems for collaboration and teamwork so important and what technologies do they use? Collaboration is working with others to achieve shared and explicit goals. Collaboration and teamwork have become increasingly important in business because of globalization, the decentralization of decision making, and growth in jobs where interaction is the primary value-adding activity. Collaboration is believed to enhance innovation, productivity, quality, and customer service. Effective collaboration today requires a supportive organizational culture as well as information systems and tools for collaborative work. Collaboration tools include e-mail and instant messaging, wikis, videoconferencing systems, virtual worlds, social networking systems, cell phones, and Internet collaboration platforms such as Google Sites/Apps, Microsoft SharePoint, and Lotus Notes.

5 What is the role of the information systems function in a business? The information systems department is the formal organizational unit responsible for information technology services. It is responsible for maintaining the hardware, software, data storage, and networks that comprise the firm’s IT infrastructure. The department consists of specialists, such as programmers, systems analysts, project leaders, and information systems managers, and is often headed by a CIO.

Key Terms

- Business, 41
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- Chief information officer (CIO), 68
- Chief knowledge officer (CKO), 69
- Chief privacy officer (CPO), 68
- Chief security officer (CSO), 68
- Collaboration, 56
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- Data workers, 46
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- Electronic commerce (e-commerce), 56
- E-government, 56
- End users, 69
- Enterprise applications, 53
- Enterprise systems, 54
- Executive support systems (ESS), 51
- Information systems department, 68
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Management information systems (MIS), 48
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Operational management, 46
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Production or service workers, 45
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Transaction processing systems (TPS), 47
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Production or service workers, 45
Programmers, 68
Senior management, 45
Supply chain management (SCM) systems, 54
Systems analysts, 68
Teams, 57
Telepresence, 61
Transaction processing systems (TPS), 47

Review Questions

1. What are the major features of a business that are important for understanding the role of information systems?
   - Define a business and describe the major business functions.
   - Define business processes and describe the role they play in organizations.
   - Identify and describe the different levels in a business firm and their information needs.
   - Explain why environments are important for understanding a business.

2. How do systems serve the various levels of management in a business?
   - Describe the characteristics of transaction processing systems (TPS) and role they play in a business.
   - Describe the characteristics of management information systems (MIS) and explain how MIS differ from TPS and from DSS.
   - Describe the characteristics of decision support systems (DSS) and how they benefit businesses.
   - Describe the characteristics of executive support systems (ESS) and explain how these systems differ from DSS.

3. How do enterprise applications and intranets improve organizational performance?
   - Explain how enterprise applications improve organizational performance.
   - Define enterprise systems, supply chain management systems, customer relationship management systems, and knowledge management systems and describe their business benefits.
   - Explain how intranets and extranets help firms integrate information and business processes.

4. Why are systems for collaboration and teamwork so important and what technologies do they use?
   - Define collaboration and teamwork and explain why they have become so important in business today.
   - List and describe the business benefits of collaboration.
   - Describe a supportive organizational culture for collaboration.
   - List and describe the various types of collaboration and communication systems.

5. What is the role of the information systems function in a business?
   - Describe how the information systems function supports a business.
   - Compare the roles played by programmers, systems analysts, information systems managers, the chief information officer (CIO), chief security officer (CSO), and chief knowledge officer (CKO).
**Discussion Questions**

1. How could information systems be used to support the order fulfillment process illustrated in Figure 2-2? What are the most important pieces of information these systems should capture? Explain your answer.

2. Identify the steps that are performed in the process of selecting and checking out a book from your college library and the information that flows among these activities. Diagram the process. Are there any ways this process could be improved to improve the performance of your library or your school? Diagram the improved process.

**Video Cases**

Video Cases and Instructional Videos illustrating some of the concepts in this chapter are available. Contact your instructor to access these videos.

**Collaboration and Teamwork**

**Describing Management Decisions and Systems**

With a team of three or four other students, find a description of a manager in a corporation in BusinessWeek, Fortune, The Wall Street Journal, or another business publication or do your research on the Web. Gather information about what the manager’s company does and the role he or she plays in the company. Identify the organizational level and business function where this manager works. Make a list of the kinds of decisions this manager has to make and the kind of information the manager would need for those decisions. Suggest how information systems could supply this information. If possible, use Google Sites to post links to Web pages, team communication announcements, and work assignments. Try to use Google Docs to develop a presentation of your findings for the class.

**BUSINESS PROBLEM-SOLVING CASE**

**Innovation and Collaboration at Coca-Cola: It’s the Real Thing**

The Coca-Cola Company is the largest manufacturer, distributor, and marketer of nonalcoholic beverages, concentrates, and syrups in the world. Coca-Cola owns and maintains more than 450 brands, including Coke, Fanta, Sprite, Minute Maid, and Dasani water, some of which were obtained through acquisitions. The company’s corporate headquarters are in Atlanta, Georgia, but Coke has operations in over 200 countries worldwide.

Much of the company’s success is a result of its highly recognizable and trusted brand. The Coca-Cola brand is often considered to be the most valuable brand in the world. The brand also holds a unique and important place in American culture. The Coca-Cola brand gives the company a large competitive advantage in the nonalcoholic beverage market.

Coca-Cola sells its own beverages as well as concentrates and syrups to its bottling companies. Healthy partnerships with bottlers are critical to the financial well-being of the company. The company earned $31.9 billion in revenue in 2008, with more than 70 percent coming from outside the United States.

However, Coca-Cola’s continued success isn’t a foregone conclusion. The global beverage market is fast-changing, fad-driven, and difficult to control for very long. Fickle customers are constantly switching drinks, while emerging companies create niche products...
and chip away at Coke’s market share. To preserve its market leadership, Coca-Cola needs to constantly innovate and introduce new products more rapidly than its competitors. And it must continue to maintain its brands, its financial strength, its strong distribution system, and its global reach.

For Coke, some of the changes that most effectively fostered innovation and collaboration have come in the form of new information systems. One prominent example involved an overhaul to the company’s “digital asset management.” As Coke continued to expand its global presence, a growing amount of digital content was scattered in an unorganized fashion. Employees had to spend considerable time searching through a growing mountain of content regarding market demographics, sales figures, images, videos, and cultural information, as well as grapple with disorganized recordkeeping.

Coke’s strength is built on images, messages, and marketing savvy, but sales and marketing teams around the globe lacked simple access to this information. So Coke used IBM’s Content Manager software to create an online image library and digital archive containing images, documents, and videos, accessible by all employees via a standardized platform through the Web.

The company and its bottlers have made a concerted effort to upgrade their infrastructures to reach their goal of more effective collaboration. In March 2008, Coca-Cola Enterprises (CCE), the company’s largest bottling company, announced it would begin using Microsoft collaboration tools, including SharePoint Online for ad hoc team collaboration and content management, Live Meeting for Web conferencing, and Office Communications Server Online for unified communications. Until then, the company had used nonintegrated collaboration tools.

The integrated Microsoft products enhance communication and collaboration across the company. Executives are able to broadcast live video to all of the company’s knowledge workers. Employees can schedule LiveMeeting Web conferences using Microsoft Outlook or engage in a chat session using Office Communicator’s instant messaging tool and turn it into a phone call. SharePoint provides a platform for a new intranet featuring industry news, video and audio content, executive blogs, and employee polls. CCE eventually wants to extend collaboration capabilities to mobile devices used by its 30,000 employees who stock trucks and replenish vending machines.

Coke continued efforts to foster innovation via information technology by developing the Common Innovation Framework—a system that allows Coca-Cola employees worldwide to search for and reapply concepts used in developing and marketing all of the company’s 2,800 beverages. The system combines project management and business intelligence capabilities and is used to develop new beverages, design new equipment, and to create packaging concepts for new and established products. One business unit can mine product ideas by searching for beverage or brand concepts that worked well in other countries. The system helps the company recognize duplicate product ideas and allocate resources efficiently.

Coke Zero is an example of how the Common Innovation Framework is fueling innovation and collaboration at the company. Coke Zero is a recent smash hit for the company. It is marketed as a diet cola without the bitter aftertaste. The Common Innovation Framework allowed managers and personnel in disparate areas of the company and various regions (finance, legal, marketing, R&D) to view the practices that made it successful in other countries, and apply those concepts to future products. Japan is regarded as the most cutting-edge country when it comes to what will be popular; the Common Innovation Framework lets development teams in the United States and Europe see what’s popular in Japan and allows them to carry those trends over in their own markets.

Coke relies mostly on independent, local bottlers, but has significant investments in many bottling companies and even owns some bottlers outright. But because Coke owns a controlling stake in only a fraction of the total number of bottlers it uses for its products, it can be a challenge to get all of the approximately 300 bottling companies Coke deals with onto the same platform for the purpose of sharing information.

Coke’s Project Scale was implemented to standardize the way the company communicated with its bottlers and vice versa. Coke surveyed its largest bottlers and discovered that 90 percent of their business practices were shared, as well as that most bottlers had planned software upgrades in the upcoming several years. So Coke developed the Coke One bottler model, based on version 6.0 of SAP’s ERP platform. Coke One supports 650 business processes common to all bottlers, who were eager to implement the model because they were hoping to upgrade their software anyway.

Coke hoped that the end result of the program would be better communication between the parent company and its bottlers, and by the same token, a more streamlined supply chain and a more cordial relationship between the companies. Some larger bottlers struck their own partnership with other technology companies, as CCE did when they opted out of Coke One. But for smaller bottlers, the program represents readily available intellectual property and opportunities to get better deals, faster implementation of new processes, and higher capability. Project Scale has generally been regarded as a success since its implementation.

To cultivate ties with consumers, Coca-Cola created Mycokerewards.com: a social network that acquires...
members by appealing to their tastes in sports, music, entertainment, and beverages. The site is an interactive showcase for Coke products and a place where drinkers of any Coke-trademarked beverage can redeem points for items that interest them, in addition to networking with other Coke drinkers with similar interests.

Coke is also innovating within existing social networks like Facebook to market their products. Burn Energy Drinks, a Coke brand developed by Coca-Cola Europe, launched a groundbreaking application, Burn Alter Ego, which combines existing Facebook friendships, avatar mash-up photo technology, and party storytelling. The application allows users to develop a virtual persona which has a “nightlife” that is entirely separate from their own. The more you use your character, the more options you have in customizing your avatar. The application is supposed to add excitement and randomness to existing friendships, and in the process, the developers hope, create more buzz surrounding Burn Energy Drinks.

All of these initiatives to foster innovation and richer collaboration between Coca-Cola employees and consumers figure to help the company remain competitive going forward. But competing industry giant Pepsico has gained market share while Coke has lost ground in the past few years. Like Coca-Cola, it has expanded into faster-growing markets for non-carbonated beverages and health drinks, and it is a formidable challenger. Other smaller companies threaten to chip away at Coke’s dominance in the market. Hopefully, Coke’s investment in innovation and collaboration should stand the company in good stead in the years to come.


**Case Study Questions**

1. What is Coca-Cola’s business strategy? What is the relationship of collaboration and innovation to Coca-Cola’s business strategy?
2. How is Coca-Cola using collaboration systems to execute its business model and business strategy? List and describe the collaboration systems and technologies it is using.
3. Why is Coca-Cola’s relationship with its bottlers so important? What is Coke doing to improve its ability to collaborate with its bottlers?
4. What are Coca-Cola’s prospects for success in the future? Will information systems make a difference? Why or why not?