

CHAPTER 2

How Businesses Use Information Systems

LEARNING OBJECTIVES

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

1. What are business processes? How are they related to information systems?
2. How do information systems serve the various levels of management groups in a business?
3. How do systems that link the enterprise 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?

OPENING CASE: BLACKBERRYS ENABLE INTERMODAL TRANSFERS AT CN

The experience of CN in developing a new dispatch system illustrates how much organizations today, even those in traditional arenas such as shipping, rely on information systems to improve their performance and remain competitive. It also shows how much information systems make a difference in an organization's ability to innovate, execute, and in the case of business firms, grow profits and/ or reduce costs. The chapter-opening diagram calls attention to important points raised by this case and this chapter. The CN dispatch department was confronted with both a challenge and opportunity. Their rail and trucking systems were among the best in North America. There were opportunities for improving performance by changing intermodal transfers using information systems intensively for this purpose. Because RIM with its BlackBerry device is one of the world's leading information technology communication device providers, the company was a natural for using the most advanced information technology to continually improve CN's dispatch system's design and performance. But information technology alone would not have produced a winning system. The IT group had to revise many of the processes and procedures used in intermodal transfers to take advantage of the

technology, including training experienced drivers to use the BlackBerry app. CN reduced costs and improved customer service significantly because it had learned how to apply new technology to improve the processes involved in intermodal transfers.

Section 2.1, “Business Processes and Information Systems”

Table 2-1 may help students understand that every business, large and small, uses the same basic business processes. Referring back to this table may help as you examine information needs for each functional area. You could have students select a business with which they are familiar and identify some of the business processes involved in each of the basic functional areas.

Another good classroom exercise is to use Figure 2-1 to compare how the order fulfillment process can be accomplished sequentially, as the figure shows, versus simultaneously as a new information system would allow.

Section 2.2, “Types of Information Systems” This section focuses on how information systems serve various management levels in companies. The ultimate goal is for students to realize that one system helps serve other systems and, working together, all the systems serve the entire organization.

Type of System	Information Inputs	Information Outputs	Users
Transaction Processing Systems (TPS)	Transactions; daily events	Detailed reports; lists; summaries	Operations personnel; first-line supervisors
Management Information Systems (MIS)	Summary transaction data; high-volume data; simple models	Summary and exception reports	Middle managers
Decision Support Systems (DSS)	Optimized for data analysis, analytic models and data analysis tools.	Interactive; simulations; analysis	Professionals, staff managers
Executive Support Systems (ESS)	Aggregate data; external, internal	Projections; responses to queries	Senior managers

It is likely that students' main encounter will be with TPS systems when they first begin their careers. Stress the importance of accurate data at the TPS level since it serves as the initial source for the other systems.

Typically, DSS and ESS systems will be the least familiar. Students may better understand them if you ask these types of questions: Why do national retail chains open stores in certain locations and not others? How can a retail chain determine which type of clothing to stock at different geographic locations?

Most important, students need to understand that each type of information system supports the different kinds of decisions made at each managerial level.

It's quite possible that students feel overwhelmed by all the different kinds of information systems described in the first part of this section. "*Systems for Linking the Enterprise*" helps you tie together all of the information systems into a cohesive package and show how data and information can flow seamlessly through an organization.

Enterprise systems: Central to this section is the need to coordinate activities, decisions, and knowledge across the firm's different levels, functions, and business units. Enterprise systems use a single central data repository in order to supply all users with a consolidated view of employees, customers, suppliers, and vendors. The key to effectively using enterprise systems is to eliminate redundancy and duplication, not just in the information systems but also in business processes.

Supply chain management systems: Students should understand the importance of a business managing its relationships with suppliers through a free-flowing exchange of information. The concept may seem foreign to those students who think a company is a closed entity and shouldn't share data or information with anyone outside the organization. A review of a typical supply chain may be helpful: sourcing, producing, and delivering goods and services. It may also be helpful to engage the students in an exercise that lists all the entities involved in producing and delivering goods and services.

Customer relationship management systems: Ask students how many times they've quit doing business with a company because of poor customer service. Ask them how many times they've had to supply a business with the same information simply because they talked to a different department in the company. Discuss how important it is for every functional area in a business to have the same consolidated view of its customers to avoid these kinds of problems.

Knowledge management systems: Few, if any, students have probably had any experience with these systems. Point out that businesses are beginning to realize how much expertise and experience is locked away in employees' heads and that it's imperative to find a way to capture that information. Moreover, it's important that businesses find a way to make the expertise and experience available to a wide range of users. On the other hand, students should understand that employees are very reluctant to impart with their individual knowledge due to fear or self-preservation.

Intranets and Extranets: As Internet-based technologies continue to expand the basic platforms for disseminating information, smaller businesses that cannot afford to implement enterprise applications can turn to intranets and extranets. Your difficulty will be getting students to understand the difference between the two since they operate basically the same way. Intranets are limited to internal users; extranets are available to external users as well as internal users. Both are an inexpensive way to quickly disseminate information and data across functional lines and organizational boundaries.

E-business, e-commerce, and e-government: Have students give examples of their own experiences with each of these. Students are most often confused between e-business and e-commerce. Stress that e-business refers to the use of digital technology and the Internet to execute major business processes while e-commerce is more narrowly centered on the buying and selling of goods and services over the Internet.

WINDOW ON ORGANIZATIONS: Domino's sizzles with pizza tracker

CASE STUDY QUESTIONS

- 1. What kinds of systems are described in this case? Identify and describe the business processes each supports. Describe the inputs, processes, and outputs of these systems.**

Transaction processing system: the point of sale system captures purchase and payment data at a physical location where goods or services are bought and sold using computers, automated cash registers, scanners or other digital devices.

- Inputs: customer orders that describe the type of pizza crust, pizza ingredients and toppings, side orders, and delivery location data
- Processes: data updates the system's database
- Outputs: the number of pizza and side orders sold, cost numbers for ingredients, delivery information, customer information

Management information system:

- Inputs: data from the TPS
- Processes: transaction data from the TPS are summarized and presented in reports
- Outputs: amount of ingredients used, time to make the pizza, the time it takes to deliver it, delivery distances, profit and loss numbers for each menu item, customer demographic data, reports describing sales trends and employee performance

Decision Support system:

- Inputs: data from the TPS and external data
- Processes: analyze data
- Outputs: analyze sales data per menu item, analyze customer demographics, analyze past and potential sales trends

- 2. How do these systems help Domino's improve its business performance?**

Domino's proprietary point-of-sale system, Pulse, is an important asset in maintaining consistent and efficient management functions in each of its restaurants. Those stores using Pulse reported improved customer service, reduced mistakes, and shorter

training times. It's clear from industry analysts that the technology is working to cut costs and increase customer satisfaction.

3. How did the online pizza ordering system improve the process of ordering a Domino's pizza?

Domino's rolled out its state-of-the-art online ordering system, which includes Pizza Tracker. The system allows customers to watch a simulated photographic version of their pizza as they customize its size, sauces, and toppings. The image changes with each change a customer makes. Then, once customers place an order, they are able to view its progress online with Pizza Tracker. Pizza Tracker displays a horizontal bar that tracks an order's progress graphically. As a Domino's store completes each step of the order fulfillment process, a section of the bar becomes red. Even customers that place their orders via telephone can monitor their progress on the Web using Pizza Tracker at stores using Pulse Evolution. In 2010, Domino's introduced an online polling system to continuously upload information from local stores.

4. How effective are these systems in giving Domino's a competitive edge? Explain your answer.

The company's improved business processes are becoming a source of competitive strength because the systems enable the company to innovate and execute its operations more quickly than its rivals. Many of the steps in Domino's business processes are automated which changes the flow of information and makes it possible for more people to access and share information.

The technology is also supporting new business models like the online pizza ordering system. Even though Domino's main rivals, Pizza Hut and Papa John's have online ordering capabilities, they lack the Pizza Tracker technology and the simulated pizza features that Domino's has successfully implemented. Today, online orders account for almost 20% of all of Domino's orders, which is up from less than 15% in 2008.

What do you think?

Visit Domino's Web site and examine the order placement and Pizza Tracker features. Then answer the following questions:

1. What steps does Pizza Tracker display for the user? How does the Pizza Tracker improve the customer experience?

The Pizza Tracker displays five steps in the ordering process: Order Placed, Prep, Bake, Quality Check, and Out for Delivery. The Pizza Tracker features gives the anxious, hungry customer a way to track his/her order and determine how much longer it will be before the pizza arrives. The Tracker feature provides the customer with a sense of control over the process and provides valuable and interesting information.

2. Would the Pizza Tracker service influence you to order pizza from Domino's instead of a competing chain? Why or why not?

Answers will obviously vary among students since some people prefer a certain type and flavor of pizza while others value convenience or price when it comes to ordering pizza. The important thing to remember in the answer is that Domino's is trying to improve its competitive advantage by using information systems to create new innovations.

3. What improvements would you make to the order placement feature?

Answers will vary from student to student. The order placement feature is quite convenient for selecting the type of crust, the size, and various toppings and ingredients. One added feature might be to show incremental price changes as the customer makes selections from the various choices.

Section 2.3 “Systems for Collaboration and Teamwork”

Students have probably used most of these systems without even realizing their business value. Your task is to relate these increasingly common technologies to business processes and needs. Discuss how they can use cell phones, instant messaging, social networking sites, and wikis in a business setting to communicate, collaborate, and share ideas with team members, business partners, customers, and suppliers.

One exercise you can use to reinforce the usefulness of team collaboration is to have small student groups explore social networking sites or Twitter to see how many postings by businesses they can find. For instance, Twitter has tweets for Free Honey Bunches of Oats at Wal-Mart and a tweet for an article about General Electric's solar technology. Recently McDonalds used Twitter to solicit customer feedback; they were unprepared to address the negative comments.

Businesses also make use of YouTube.com to post videos of their products. This exercise will help demonstrate how businesses must constantly adapt their marketing strategies to reach customers. You can also generate a discussion about students' experience on these kinds of sites in relation to business uses and ask them to relate how effective these new methods of engaging customers are.

Table 2.2 emphasizes the benefits of collaboration while Figure 2-7 highlights the necessity of having the appropriate organization structure and culture, along with the right technology, to successfully use collaboration in an organization. Discuss how the absence of even one of these three can hinder or prevent collaboration. Ask students to draw on their own experiences to compare and contrast firms with a collaborative culture to those without.

Because most of the online collaborative tools listed in Table 2-5 are relatively unknown, you can have teams of students explore one or two of them and then present to the class a list of characteristics, capabilities, advantages and disadvantages, for each one.

Many times people and businesses decide which collaborative tools to use based on which ones they are most familiar with rather than which are the most appropriate tool for the task at hand.

You can have student teams evaluate one or more collaborative programs for an organization to which they belong like a sports team, class group, workplace or even their use in your classroom. Have them use the time/space matrix in Figure 2-8 and the information in the section "*Checklist for Managers: Evaluating and Selecting Collaboration Software Tools*" to help select the best tool.

Have students explore the use of business wikis first-hand by visiting SAP's Enterprise Solution Wiki at <https://wiki.sdn.sap.com/wiki/display/ESpackages/Home> or IBM's LotusNotes Wiki at <http://www-10.lotus.com/ldd/dominowiki.nsf/dx/wiki-help>. Both wikis will help demonstrate the usefulness of having so much knowledge at your fingertips plus the ease with which companies are gathering, storing, and disseminating knowledge. The home page of IBM's LotusNotes Wiki also has a great list of how to perform various wiki tasks. Students can see how easy it is to navigate wikis by reading these instructions.

WINDOW ON MANAGEMENT Virtual Meetings: Smart Management

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?**

It's doubtful that business travel will disappear altogether. However, it is becoming too expensive, time-consuming and a hassle for employees. It can be a very unproductive use of company resources in terms of time and money. Video and Web conferencing tools continue to improve and are becoming cheaper and easier to use – even for small businesses.

- 2. What is the distinction between videoconferencing and telepresence?**

Videoconferencing 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. The streams are divided into packets and transmitted over a network or the Internet.

Telepresence is the top-of-the-line videoconferencing technology that strives to make users feel as if they are actually present in a location different from their own. Users sit across a table from a large screen showing someone who looks quite real and life-

size, but may be in a different location. Telepresence products provide the highest-quality videoconferencing available to date.

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

The technology provides value to a business by allowing dramatic increases in the number of customers and partners they are able to reach for a fraction of the previous price per person. Companies can conduct online meetings that may be helpful for training and sales presentations, sharing documents and presentations, and providing online product demonstrations. Companies that make extensive use of telepresence claim that the technology not only saves time and expense but also helps them meet "green" environmental goals of reducing carbon emissions.

Anything that saves company resources, like time and money, while still providing good to excellent communication quality, should be considered smart management.

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

Students should use the section, "Checklist for Managers: Evaluating and Selecting Collaboration Software Tools" and Figure 2.8, The Time/Space Collaboration Tool Matrix, to help formulate an answer to this question.

Student answers will vary. Factors they should consider in their decision include:

- Does the company really need the technology?
- How will employees conduct meetings?
- What technologies will they use to communicate with others?
- How much travel do employees currently complete and how much will it be reduced?
- Does the company have the network capabilities to use videoconferencing?
- Which is cheaper in the short term – travel or video?
- Which is cheaper in the long term – travel or video?

What do you think?

Explore the WebEx Web site (www.webex.com) and answer the following questions.

(Much of the material in these answers is copied directly from the WebEx site):

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?

Capabilities for small & medium companies:

- Online meetings, online events, Web-touch sales, eLearning, shared workspaces, instant collaboration
- Webinars that provide an opportunity to train employees, customers, and channel partners on new products and services to accelerate time-to-market
- Web-touch sales can instantly bring decision makers and subject matter experts together so questions get answered quickly and the sales cycle gets shorter. Stay connected between meetings with a company sales portal. Get the reports and pipeline forecasts necessary to maximize the efforts of the sales force and meet sales quotas.

Capabilities for large businesses:

- WebEx makes it easy for global employees to work with colleagues over the web like they do in person. Cisco WebEx solutions allow employees to connect to each other across firewalls, across platforms, and across the globe.
- Companies get web meetings, instant messaging and virtual teams spaces in one place. These capabilities are delivered on an open platform that enables organizations to build collaboration into any business process.
- The technologies are easy to implement and easy to manage, without adding IT equipment or resources.

Companies save time and money because

- They don't have to build the applications themselves
- Someone else manages the technology
- Someone else provides the overhead in terms of technology, technicians, and system upgrades.

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

Most of the WebEx video capabilities are comparable to the videoconferencing capabilities described in the case. Listening to the WebEx corporate overview provides a quick introduction to the most popular features such as:

- Launch WebEx contacts from Outlook or other Web site formats
- Use Chat features within WebEx
- Use automatic invitation and attendance recording features
- Start sales calls from within Customer Relationship Management applications
- Edit contracts in real time
- Use built-in e-commerce capabilities
- Use remote support features to see and fix problems in real time

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

Preparing for a Web conference includes a few extra steps that you wouldn't have to worry about for a face-to-face conference:

- Ensure you are familiar with all the features of the videoconferencing software and hardware
- Practice using the site before an actual meeting to get comfortable with the technology
- Determine ahead of time who to call in case of technical problems
- Make sure files are easy to find and upload/download

Section 2.4. “The Information Systems Function in Business”

If possible, arrange a session with the school's information systems department to allow students to see first-hand how such a centre works and who is responsible for running the systems. Have the IS staff and students participate in a Question and Answer forum about how typical processes are handled. Many students have a better appreciation of how these complex centres work when they actually see one in operation rather than just reading about it. Stress to students that in all but the smallest of firms these systems are critical to the operational efficiency and sheer survival in a very competitive marketplace.

Most important, students should understand that the IS staff is responsible for the well-being of all users in an organization. Users and the IS staff are teammates not polarizing opposites.

Section 2.5. “Hands-on MIS”

MANAGEMENT DECISION PROBLEMS

1. Ben's Lumber Company: 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 Ben'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?

Manually updating price sheets leads to slower sales processes, pricing errors if sales reps are using outdated information, and customer dissatisfaction due to delays in obtaining information. By putting the data online using an extranet and updating it as necessary, sales reps consult the most current information immediately. That leads to faster sales and more satisfied customers. Necessary decisions include how much information to make available online, who will have access to it, and how to keep the information secure. Senior management would likely make these decisions.

2. David's Hardware: Owners do not keep automated, detailed inventory or sales records. Invoices are not maintained or tracked (other than for tax purposes). 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 the owners run their business? What data should these systems capture? What decisions could the systems improve?

The business impact includes lost sales, over- and under-ordering products, improper sales accounting and more costly inventory control. An information system could capture data that allows owners to maintain proper inventories, order only those products needed, and ensure proper sales accounting. Decisions on pricing, product levels, and inventory replenishment could be vastly improved based on data and not a best-guess venture.

Improving Decision Making: Using a Spreadsheet to Select Suppliers

Software skills: Spreadsheet date functions, data filtering, DAVERAGE functions.

Business skills: Analyzing supplier performance and pricing.

This exercise requires some student knowledge of spreadsheet database functions. At a minimum, students should know how to sort the database by various criteria such as item description, item cost, vendor number, vendor, name, or A/P terms. Students may need to be told that A/P Terms is expressed as the number of days that the customer has to pay the vendor for a purchase. In other words, 30 designates net 30 days. The vendor that allows customers the longest amount of time to pay for an order would, of course, offer the most favourable payment terms.

Students will need to add additional columns for calculating the actual delivery time for each order and the number of days the delivery is late. The Actual Delivery Time can be calculated by subtracting the Promised Ship Date from the Arrival Date. The number of days late can be calculated by subtracting the Promised Transit Time from the Actual Delivery Time. If the number of days late is negative, it indicates that the order arrived early.

These numbers are useful when trying to determine who is the vendor with the best on-time delivery track record. Students can use the DAVERAGE function to determine the average delivery time for each vendor. Students can also use one of the database functions to determine the vendor with the best accounts payable terms. To determine the vendor with the lowest prices for the same item when it is supplied by multiple vendors, students can filter the database using the item description. This filtered list can then be sorted by item cost and vendor number.

Achieving Operational Excellence: Using Internet Software to Plan Efficient Transportation Routes

Students should compare the shortest amount of time with the shortest difference. Encourage students to use the Advanced Tools option to quickly change back and forth between “shortest time” and “shortest distance.” To show how convenient these kinds of

online tools are, ask students to use a regular map and calculator to draw out the two routes.

Review Questions

1.What are business processes? How are they related to information systems?

Define business processes and describe the role they play in organizations.

A business process is a logically related set of activities that define how specific business tasks are performed. Business processes are the ways in which organizations coordinate and organize work activities, information, and knowledge to produce their valuable products or services.

How well a business performs depends on how well its business processes are designed and coordinated. Well-designed business processes can be a source of competitive strength for a company if it can use the processes to innovate or perform better than its rivals. Conversely, poorly designed or executed business processes can be a liability if they are based on outdated ways of working and impede responsiveness or efficiency.

Describe the relationship between information systems and business processes.

Information systems automate manual business processes and make an organization more efficient. Data and information are available to a wider range of decision-makers more quickly when information systems are used to change the flow of information. Tasks can be performed simultaneously rather than sequentially, speeding up the completion of business processes. Information systems can also drive new business models that perhaps wouldn't be possible without the technology.

2.How do systems serve the various levels of management in a business?

Describe the characteristics of transaction processing systems (TPS) and the roles they play in a business.

Transaction processing systems (TPS) are computerized systems that perform and record daily routine transactions necessary in conducting business; they serve the organization's operational level. The principal purpose of systems at this level is to answer routine questions and to track the flow of transactions through the organization.

- At the operational level, tasks, resources, and goals are predefined and highly structured.
- Managers need TPS to monitor the status of internal operations and the firm's relationship with its external environment.
- TPS are major producers of information for other types of systems.

- 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.

Describe the characteristics of management information systems (MIS) and explain how MIS differ from TPS and from DSS.

Middle management needs systems to help with monitoring, controlling, decision-making, and administrative activities.

- 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 the company's basic operations using data supplied by TPSs. The basic transaction data from TPS are compressed and usually presented in reports that are produced on a regular schedule.
- 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.
- MIS 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.

MIS differs from TPS in that MIS deals with summarized and compressed data from the TPS.

While MIS have an internal orientation, DSS will often use data from external sources, as well as data from TPS and MIS. DSS supports "what-if" analyses rather than a long-term structured analysis inherent in MIS systems. MIS are generally not flexible and provide little analytical capabilities. In contrast, DSS are designed for analytical purposes and are flexible.

Describe the characteristics of decision support systems (DSS) and how they benefit businesses.

Decision-support systems (DSS) support nonroutine decision-making for middle managers.

- DSS provide sophisticated analytical models and data analysis tools to support semistructured and unstructured decision-making activities.
- DSS use data from TPS, MIS, and external sources, in condensed form, allowing decision makers to perform "what-if" analysis.
- DSS focus on problems that are unique and rapidly changing; procedures for arriving at a solution may not be fully predefined.
- DSS are designed so that users can work with them directly; these systems include interactive, user-friendly software.

Describe the characteristics of executive support systems (ESS) and explain how these systems differ from DSS.

Executive support systems help senior managers address strategic issues and long-term trends, both in the firm and in the external environment.

- ESS address nonroutine decisions requiring judgment, evaluation, and insight because there is no agreed-on procedure for arriving at a solution.
- ESS provide a generalized computing and communications capacity that can be applied to a changing array of problems.
- 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.
- ESS are designed for ease-of-use and rely heavily on graphical presentations of data.

3.How do systems that link the enterprise improve organizational performance?

Explain how enterprise applications improve organizational performance.

An organization operates in an ever-increasing competitive and global environment. The successful organization focuses on the efficient execution of its processes, customer service, and speed to market. Enterprise applications provide an organization with a consolidated view of its operations across different functions, levels, and business units. Enterprise applications allow an organization to efficiently exchange information among its functional areas, business units, suppliers, and customers.

Define enterprise systems, supply chain management systems, customer relationship management systems, and knowledge management systems and describe their business benefits.

Enterprise systems integrate the key business processes of an organization into a single central data repository. This makes it possible for information that was previously fragmented in different systems to be shared across the firm and for different parts of the business to work more closely together.

Business benefits include:

- Information flows seamlessly throughout an organization, improving coordination, efficiency, and decision making.
- Gives companies the flexibility to respond rapidly to customer requests while producing and stocking only that inventory necessary to fulfill existing orders.
- Increases customer satisfaction by improving product shipments, minimizing costs, and improving a firm's performance.

- Improves decision making by improving the quality of information for all levels of management. That leads to better analyses of overall business performance, more accurate sales and production forecasts, and higher profitability.

In short, **supply chain management systems** help businesses better manage relationships with their suppliers. Objective of SCM: Get the right amount of products from the companies' source to their point of consumption with the least amount of time and with the lowest cost. SCM provides information to help suppliers, purchasing firms, distributors, and logistics companies share information about orders, production, inventory levels, and delivery of products and services so that they can source, produce, and deliver goods and services efficiently. SCM helps organizations achieve great efficiencies by automating parts of these processes or by helping organizations rethink and streamline these processes. SCM is important to a business because through its efficiency it can coordinate, schedule, and control the delivery of products and services to customers.

Business benefits include:

- Decide when and what to produce, store, and move
- Rapidly communicate orders
- Track the status of orders
- Check inventory availability and monitor inventory levels
- Reduce inventory, transportation, and warehousing costs
- Track shipments
- Plan production based on actual customer demand
- Rapidly communicate changes in product design

Customer relationship management systems enable a business to better manage its relationships with existing and potential customers. With the growth of the Web, potential customers can easily comparison shop for retail and wholesale goods and even raw materials, so treating customers better has become very important.

Business benefits include:

- CRM systems provide information to coordinate all 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.
- CRM systems consolidate customer data from multiple sources and provide analytical tools for answering questions such as: What is the value of a particular customer to the firm over his/her lifetime?
- CRM tools integrate a business's customer-related processes and consolidate customer information from multiple communication channels, giving the customer a consolidated view of the company.
- Detailed and accurate knowledge of customers and their preferences help firms increase the effectiveness of their marketing campaigns and provide higher-quality customer service and support.

Knowledge management systems 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.

Business benefits include:

- KMS support processes for acquiring, storing, distributing, and applying knowledge, as well as processes for creating new knowledge and integrating it into the organization.
- KMS include enterprise-wide systems for managing and distributing documents, graphics, and other digital knowledge objects; systems for creating corporate knowledge directories of employees with special areas of expertise; office systems for distributing knowledge and information; and knowledge work systems to facilitate knowledge creation.
- KMS use intelligent techniques that codify knowledge and experience for use by other members of the organization and tools for knowledge discovery that recognize patterns and important relationships in large pools of data.

Explain how intranets and extranets help firms integrate information and business processes.

Because intranets and extranets share the same technology and software platforms as the Internet, they are easy and inexpensive ways for companies to increase integration and expedite the flow of information within the company (intranets alone) and with customers and suppliers (extranets). They provide ways to distribute information and store corporate policies, programs, and data. Both types of nets can be customized by users and provide a single point of access to information from several different systems. Businesses can connect the nets to transaction processing systems easily and quickly. Interfaces between the nets and TPS, MIS, DSS, and ESS systems provide input and output for users.

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.

Collaboration is working with others to achieve shared and explicit goals. It focuses on task or mission accomplishment and usually takes place in a business, or other organizations, and between businesses. Collaboration can be short-lived or longer term, depending on the nature of the task and the relationship among participants. It can be one-to-one or many-to-many.

Teamwork is part of the organization's business structure for getting things done. Teams have a specific mission. The members of a team need to collaborate on the accomplishment of specific tasks and collectively achieve the team mission. 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 important because:

- *Changing nature of work.* More jobs are becoming “interaction” jobs. These kinds of jobs require face-to-face interaction with other employees, managers, vendors, and customers. They require systems that allow the interaction workers to communicate, collaborate and share ideas.
- *Growth of professional work.* Professional jobs in the service sector require close coordination and collaboration.
- *Changing organization of the firm.* Work is no longer organized in a hierarchical fashion as much as it is now organized into groups and teams who are expected to develop their own methods for accomplishing tasks.
- *Changing scope of the firm.* Work is more geographically separated than before.
- *Emphasis on innovation.* Innovation stems more from groups and teams than it does from a single individual.
- *Changing culture of work and business.* Diverse teams produce better outputs, faster, than individuals working on their own.

List and describe the business benefits of collaboration.

The general belief is that the more a business firm is collaborative in nature, the more successful it will be and that collaboration within and among firms is more essential than in the past. The overall economic benefit of collaboration is significant.

The business benefits of collaboration are listed in Table 2.2:

- *Productivity:* people working together accomplish tasks faster, with fewer errors, than those working alone.
- *Quality:* people can communicate errors and correct them faster when working together versus working alone.
- *Innovation:* people working in groups can generate more innovative ideas than if they were working alone.
- *Customer service:* people working in teams can solve customer complaints and issues faster and more effectively versus working in isolation.
- *Financial performance:* collaborative firms have superior sales, sales growth, and financial performance.

Describe a supportive organization culture and business processes for collaboration.

Historically, organizations were built on hierarchies which did not allow much decision making, planning, and organizing at lower levels of management or by

employees. Communications were generally vertical through management levels rather than horizontal between groups of employees.

A collaborative culture relies on teams of employees to implement and achieve results for goals set by senior managers. 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. Rather than employees being rewarded for individual results, they are rewarded based on their performance in a team. The function of middle managers in a collaborative business culture 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.

List and describe the various types of collaboration and communication systems.

Table 2-3 lists fifteen categories of collaborative software tools. Some of the more common enterprise-wide information systems that businesses can use to support interaction jobs include:

- Internet-based collaboration environments like Lotus Notes, Groove, and WebEx provide online storage space for documents, team communications (separated from email), calendars, and audio-visual tools members can use to meet face-to-face.
- Email and Instant Messaging (IM) are reliable methods for communicating whenever and wherever around the globe.
- Cell phones and wireless handhelds give professionals and other employees an easy way to talk with one another, with customers and vendors, and with managers. These devices have grown exponentially in sheer numbers and in applications available.
- Social networking is no longer just “social.” Businesses are realizing the value of providing easy ways for interaction workers to share ideas and collaborate with each other.
- Wikis are ideal tools for storing and sharing company knowledge and insights. They are often easier to use and cheaper than more proprietary knowledge management systems. They also provide a more dynamic and current repository of knowledge than other systems.
- Virtual worlds house online meetings, training sessions, and “lounges” where real-world people meet, interact, and exchange ideas.
- Google Apps/Google sites allow users to quickly create online group-editable Web sites that include calendars, text, spreadsheets, and videos for private, group, or public viewing and editing.
- Microsoft SharePoint software makes it possible for employees to share their Office documents and collaborate on projects using Office documents as the foundation.

5. What is the role of the information systems function in a business?

Describe how the information systems function supports a business.

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.

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).

- 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. The systems analyst's job is to translate business problems and requirements into information requirements and systems.
- Information systems managers lead teams of programmers and analysts, project managers, physical facility managers, telecommunications managers, or database specialists.
- Chief information officer (CIO) is a senior manager who oversees the use of information technology in the firm.
- Chief security officer (CSO) is responsible for information systems security in the firm and has the principle responsibility for enforcing the firm's information security policy. The CSO is responsible for educating and training users and IS specialists about security, keeping management aware of security threats and breakdowns, and maintaining the tools and policies chosen to implement security.
- Chief knowledge officer (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.

Discussion Questions

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

Today's systems are built to electronically coordinate all the business functions in an enterprise. The sales function begins the process by completing a sales order, electronically inputting the data into the system. The sales system updates daily sales totals and decreases inventory. The accounting department electronically receives the order and runs a credit check. If the credit is not approved, system sends an exception notification to an accounting specialist and the sales person. If credit is approved, the order is sent to the manufacturing and production system and product assembly begins. When the product is completed, electronic shipping documents are prepared

and logistics is notified. When the product is shipped, electronic notifications are sent to Sales, Manufacturing and Production, Accounting, and the customer. The system electronically bills the customer.

2. **Identify the steps that are performed in the process of selecting and checking a book out 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.**

Students should rely on information from Section 2.1, Business Processes and Information Systems, and specifically the information from “*Business Processes*,” to answer this question. Figure 2-2 should serve as a guide for diagramming the library fulfillment process as it currently may exist. Information from “*How Information Technology Enhances Business Processes*” can help students diagram the improved process.

3. **How might the CN dispatch team have used collaboration systems to improve the design and performance of the dispatch system? Which system features would be the most important for these tasks?**

First, students should use Table 2-3 to evaluate various collaboration systems, and Figure 2-8 to help them choose the most appropriate collaboration and teamwork tools for the tasks. They should then use the "to-do" list to make sure they choose the correct collaboration software at an affordable price and within the team's risk tolerance.

The BMW team required collaboration systems to perform the following tasks: Using presentation graphics, sharing data analysis, training the crew, changing and refining the design of the vessel, and revising processes and procedures. The tools necessary to carry out those tasks include:

- email and instant messaging
- collaborative writing
- collaborative reviewing/editing
- file sharing
- audio and videoconferencing
- document sharing
- large audience Webinars

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 *The Globe and Mail*, *Maclean's*, *Canadian Business*, *BusinessWeek*, 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 that a 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.

Group answers will vary because students will select different companies and different managerial levels. The major element of this project is making sure the students select the appropriate type of information system for the level of management that they are evaluating.

Clearly, students would not list TPS as a system that would be used by a senior manager. It would be acceptable if they suggested a senior manager using an MIS, DSS, or ESS. What should be apparent in the answer is that an executive senior manager is mainly focused on the long-term direction and viability of the company. A few things that students might mention would be that a senior executive would be concentrating on issues such as plant expansion or closures, foreign market opportunities, or new markets at home, changes in market trends and interest rates, overall economic outlook, changes in stocks prices, threats or opportunities that may be taking place in the market, and political changes.

CASE STUDY: COLLABORATION AND INNOVATION AT PROCTER AND GAMBLE

1. What is Procter & Gamble's business strategy? What is the relationship of collaboration and innovation to that business strategy?

P&G's business operations are divided into three main units: Beauty Care, Household Care, and Health and Well-Being, each of which are further subdivided into more specific units. In each of these divisions, P&G has three main focuses as a business:

- maintain the popularity of its existing brands, via advertising and marketing;
- extend its brands to related products by developing new products under those brands;
- innovate and create new brands entirely from scratch.

Having R&D teams spread throughout 30 sites globally, P&G is in strong need of collaboration tools that allow researchers, marketers, and managers to easily gather, store, and share knowledge and information. At 3.4 percent of revenue, P&G spends more than twice the industry average on innovation to support its business strategies.

2. How is P&G using collaboration systems to execute its business model and business strategy? List and describe the collaboration systems and technologies it is using and the benefits of each.

To support the business strategy of innovating and creating new brands entirely from scratch, P&G must find the right tools to support collaboration and innovation. Some of the collaboration system the company's employees and partners use are:

- Social networking and collaborative tools popularized by Web 2.0: Allows researchers and scientists from inside and outside the company to work together more easily and efficiently while reducing research and development costs.
- Microsoft services that include instant messaging, unified communications, Microsoft Live Communications Server functionality, Web conferencing with Live Meeting, and content management with SharePoint: Reduces the time and effort necessary to share data and information between employees and others involved in the company's R&D effort. For instance, marketers can access data from researchers and create highly targeted ad campaigns.

3. Why were some collaborative technologies slow to catch on at P&G?

P&G is no different than most companies when it comes to introducing new systems to employees who are used to the comfort of familiar methods and tools. In short, most people resist change whenever they can. Email was the primary method of disseminating information among researchers and scientists. It was proving to be too slow and a very cumbersome way to reach those who needed the information most. Employees have resisted the new collaborative technologies claiming the tools have added more work rather than reducing it.

The networked collaborative tools and technologies P&G introduced rely on an ever-increasing number of people using them. The more people that engage in the network the better the network becomes. To make the new technologies successful, P&G employees had to grow the database of information and continually improve the knowledge base making it even more attractive to a wider audience of users.

4. Compare P&G's old and new processes for writing up and distributing the results of a research experiment.

Researchers used "old-fashioned" glue to compile information into traditional notebooks that were passed to only a few colleagues. An executive entered data into PowerPoint slides and emailed them to those he thought were interested in the information. The slides were emailed numerous times by others, with some receiving multiple copies of the same file.

P&G's IT department creates Microsoft SharePoint pages where researchers, executives, employees, and business partners can post documents, spreadsheets, slide presentations, and other forms of information for anyone to access and use. It's a much more efficient and effective method of collecting, storing, and disseminating information throughout the organization.

The company uses InnovationNet, a collaborative tool that allows users to access over five million research-related documents via a browser-based portal.

Rather than use cumbersome email exchanges, employees use blogs and other collaborative tools to communicate with each other.

5. Why is telepresence such a useful collaborative tool for a company like P&G?

Because P&G has employees located in more than 80 countries, it just doesn't make sense not to use telepresence technologies as a way to easily bring research and development teams together. P&G required Cisco to build individual studios to particular specifications that portrayed the distinct characteristics of each location. That helps make users more comfortable and more accurately reflects the diversity of employees at each location. Telepresence technologies have greatly improved over the years while the costs of implementing and operating the conference rooms have been significantly reduced. The usage of telepresence technologies throughout P&G ranges from 35 percent to 70 percent. The time it takes to make decisions has shrunk from days to minutes thanks to telepresence technologies.

6. Can you think of other ways P&G could use collaboration to foster innovation?

P& G could use intranets and extranets to collect information in one place and in one basic format. The nets would be accessible to anyone at any time. YouTube type videos and large audience Webinars can be used for training. Wikis can be used as a repository for knowledge management allowing information to be collaboratively reviewed and edited.