

# CHAPTER 2

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## 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 in a business?
3. How do enterprise applications, intranets, and collaboration and communication systems improve organizational performance?
4. What is the difference between e-business, e-commerce, and e-government?
5. What is the role of the information systems function in a business?

### **OPENING CASE: THE TATA NANO MAKES HISTORY USING DIGITAL MANUFACTURING**

The opening case, “The Tata Nano Makes History Using Digital Manufacturing,” illustrates how much companies today rely on information systems for running their business, driving growth and profitability. Rather than staying with its outdated manufacturing processes based on several manual efforts, Tata Motors wisely chose to implement a completely new system that could help it automate more business processes and integrate functions into a single environment. It adopted the Dassault Systems’ Digital Enterprise Lean Manufacturing Interactive Application software that automates processes in product design and production engineering planning. The software enabled the company to plan manufacturing processes, design plant layouts, and then simulate the repercussions of those plans. The data it provides to Tata’s enterprise resource planning system helps the company save money and time by reducing its reliance on expensive physical prototypes. Much of the planning work was accomplished via computers so design changes were easier and cheaper to incorporate into the prototypes.

This vignette is a great way to launch a discussion about the necessity of using information systems to automate and integrate business processes from the early stages of planning on into actual production. It’s important to note that Tata Motors was

confronted with both a problem and an opportunity. It chose to take advantage of the opportunities through increased use of information technology and systems.

## 2.1

## BUSINESS PROCESSES AND INFORMATION SYSTEMS

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What would happen if you walked into work one day and the management told the employees they could do anything, anything at all, that they wanted to do that day. If Jimmy from production decided he wanted to work in sales and marketing he could. If Sally, who normally works in accounting, wanted to spend the day in shipping she could do that too. No one would have to follow any rules or any set procedures. They could accomplish the work any way that they chose.

Sally decides that she doesn't want to use FedEx to ship out the products that day even though the company has a contract that saves them lots of money. She decides to use an alternate shipping service that will cost the company more and slow down the shipment significantly. She doesn't see a need to tell accounting about the change.

Jimmy decides not to use the same old packing materials when he's preparing glass bowls for movement across the country. He determines that it is faster if he just plops the bowls into a box, closes the lid, and sends it down the line. Unfortunately, his co-worker Tim (who doesn't know anything about Jimmy's decision) is responsible for answering customer complaints.

Bill in accounting decides that he needs a pay raise to help pay for his upcoming vacation. Normally he would be required to get his supervisor's approval to change any pay record but since there aren't any established procedures he can just go ahead and enter the new salary data in the system. While he's at it, he gives ten of his friends pay raises also. While Bill's friends may like the idea, the rest of the employees in the company are pretty upset.

As we discussed in Chapter 1, the "digital firm" means more than just plunking down computers that have all the latest bells and whistles on every desk. The digital firm must connect each functional area and each management level to one another. Data input to the system in manufacturing must be made available to sales, accounting, and shipping. Managers in the human resources department must have access to appropriate information regardless of its origin. Information integration is the key to the digital firm.

As we go through this chapter, we'll look at the types of information systems organizations used at each management level.

## BUSINESS PROCESSES

You can imagine from the above scenario how quickly chaos would develop in the organization without established business processes that integrate functions throughout

an organization. Processes that deliver the best product for the lowest cost in the most efficient manner are imperative to success.

The way a business organizes its workflows, the method it uses to accomplish tasks, and the way it coordinates its activities among employees, customers, and suppliers determines its business processes.

Organizations, from the smallest one- or two-person group to the largest you can imagine, must have orderly processes that all divisions can understand. No part of the organization can work in isolation from any other part.

Some processes may have contributed to the organization's success and now outgrown their usefulness. Information systems can help an organization recognize processes that may need to be changed. An information system could be used to automate some of those processes or determine that they are no longer needed. And a successful organization will use an information system to determine which processes are working well.

Table 2-1 describes some typical business processes for each of the functional areas of business. We will see later in the chapter how these businesses processes are supported by enterprise systems.

**TABLE 2-1 EXAMPLES OF FUNCTIONAL BUSINESS PROCESSES**

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

The key to using information systems to analyze, change, automate, or delete processes is that the organization must determine the appropriateness of the recommendations and must determine the right questions. Throwing a new-fangled computer system at the supposed problem is not the answer. And answering the wrong question with a good answer can be far more devastating to the bottom line than not doing anything at all. In other words, if the system says a process should be changed but it truly doesn't make

sense to change it, then don't. The system should supply recommendations; humans still have the ultimate decision-making responsibility.

## HOW INFORMATION TECHNOLOGY ENHANCES BUSINESS PROCESSES: EFFICIENCY AND TRANSFORMATION

Information systems enhance business processes in two ways:

- Increasing the efficiency of existing processes.
- Enabling entirely new processes that are capable of transforming the business.

Information can even transform the way the business works and drive entirely new business models. Think about the how Amazon, Dell, and Apple Inc. have utilized entirely new business processes based on new business models that would be totally inconceivable without information technology.

### **2.2** HOW INFORMATION SYSTEMS SERVE MANAGEMENT

This section focuses on how information systems serve various management levels in companies. It's important that they understand how one system helps serve other systems and that ultimately, all of them 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 basis 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. You'll see at the end of this discussion the integral role each type of system plays — from determining which kind of candy bar to make (strategic level systems); to how many people the company will need to make the candy bar (management level systems); to tracking customer orders (operational level systems). Within these three levels we'll discuss the four major types of systems typically used to make an organization successful.

### **Transaction Processing Systems**

The operational level of the organization include various units such as order processing, material movement control, payroll, accounts payable, and employee record keeping. This level is responsible for daily operations. The information systems used in this level of the organization are **transaction processing systems (TPS)**, so called because they record the routine transactions that take place in everyday operations. TPS combine data in various ways to fulfill the hundreds of information needs a company requires to be successful. The data are very detailed at this level.

If you use an example of a candy bar manufacturing company, a TPS will record how many pounds of sugar are used in making the candy bar. It also records the time it takes from beginning to end to make the candy bar. And it can record the number of people working on the assembly line when a candy bar is made and what functions they perform.

People using transaction processing systems usually need information to help them answer routine questions such as: "How many candy bars did we produce yesterday?" or "How much sugar do we have on hand for today's production run?"

A TPS will record the sales and marketing transactions as well. The system will record not just the number of dollars used in the marketing program, but also how many stores are actually stocking the candy bar and where the product is located inside the stores.

You have to remember that a lot of work is required to get the product from the manufacturing plant to the store shelves. How much did the company pay to package the product, store the product, and ship the candy bar to the stores? All that data can be recorded in a TPS, right down to how many truck drivers were required to deliver the product to the local convenience store.

As you can visualize, the operational level of an organization also includes functions not directly associated with the actual production of the candy bar, but vital in keeping the company running smoothly. The people in accounting may not be pouring the chocolate over the nuts on the assembly line, but those workers that do appreciate the fact that they get a paycheque every two weeks. Production workers also like to know that the human resource division is keeping track of training programs that may help them advance

within the company. Each of these divisions requires an information system that helps it keep track of the many details that make the production worker happy and productive. The best transaction processing system will be integrated throughout the organization to supply useful information to those who need it when they need it.

**Bottom Line: The transaction processing system records the data from everyday operations throughout every division or department in the organization. Each division/department is tied together through the TPS to provide useful information to management levels throughout the company.**

### **Management Information Systems and Decision-Support Systems**

Think about the functions of managers that you may have learned about in other classes: directing, controlling, communicating, planning, and decision making. Each manager takes on these roles countless times in a day. Managers review endless amounts of data that make their jobs easier and more efficient.

Those using management information systems (MIS) (here, you should differentiate the term usage here from its usage as a field of study in Chapter 1) require information on a periodic basis instead of on a daily recurring basis like those using a transaction processing system. Managers also require information on an exception basis. That is, they need to know if production is higher or lower than the targeted rate or if they are over or under their budgets. They also need to know about trends instead of straight numbers. The questions they may ask of the system would be: “How far behind in production are we for this quarter?” or “How many more workers would we need if we increased production by 10 000 candy bars per quarter?” or “If we adopt a new recipe, what positions are open for the 25 excess workers and what skills do they possess that the company can use elsewhere?”

In the old days, managers had to perform many functions without the aid of technology. If they wanted to know how many candy bars were produced in a month, they had to wait until that one piece of information was produced in a report published at the end of the quarter. If there was a problem getting a shipment out to the convenience store, the shipping manager may not have known about it until a customer cancelled her account six months later. The human resources department manager would likely not be able to find out about new job opportunities in a different part of the company until after the workers were laid off and had found other employment. Worse yet, production might have to stop the assembly lines because accounting hadn't purchased enough supplies to cover the increase in the number of candy bars rolling off the line.

Before integrated systems, managers received periodic printed reports that gave them lots of data, but often didn't supply information that they could utilize to make timely decisions. Planning was sometimes a wasted effort because the information the managers needed just wasn't there when they needed it.

With the integration of information systems up and down the management levels, and throughout the corporation, managers can often get needed information in a real-time

mode. The data are kept online, the system can gather the precise information managers need to make a decision, and the information can be cross integrated into all departments of the company. All divisions in the company can see what's going on throughout the corporation. Information can be passed from department to department so that they are all working "on the same page."

The MIS will draw data from the transaction processing system to help managers answer structured questions such as: "How much more sugar must we purchase if we increase production from 5 000 candy bars to 7 000?"

The human resources department alone can place vast amounts of personnel information, including job opportunities within the organization, on an intranet that workers can access when *they* find it convenient.

For the candy bar example, with the improved management information systems available, accounting managers will know that they must increase their purchases of sugar and milk to support the new recipe. The shipping manager will know in time to plan for the new size wrapper she will require. The sales and marketing manager can know almost instantaneously that shipments may be delayed and so can call the convenience store manager ahead of time to let her know.

The greatest advantage of the new management information systems is that managers no longer have to wait until a specific time of the month or quarter to receive the information they need to perform their daily functions. The system can be configured to push the data to the appropriate manager instantaneously instead of relying on the managers to seek it out. And, managers can structure the reports to get only that information they deem necessary at the time.

**Bottom Line: A management information system is used by managers throughout the organization to help them in directing, planning, coordinating, communicating, and decision making. The MIS will help answer structured questions on a periodic basis.**

**Decision-support systems (DSS)** also serve the management level of an organization, but in a somewhat different way from an MIS. An MIS uses internal data to supply useful information. A DSS uses internal data but also combines it with external data to help analyze various decisions management must make. Analyzing complex, interactive decisions is the primary reason for a company to use a DSS.

The sales and marketing management of the candy bar company would use a DSS to answer a semistructured question such as: "What price should we charge for the candy bar so that we can maximize our profits, minimize our costs, and still remain competitive?" Using a DSS, the manager in charge of the manufacturing division could determine the best answer to this semistructured question: "How does the change in the size and packaging of the candy bar affect the other products we produce, not just in shipping, but also on the display shelf at the convenience store?"

You'll notice we describe decisions at this level as semistructured. Not all decisions required for an organization to function smoothly are cut-and-dried. There are a lot of gray areas in successfully managing an organization and the larger the company, the more diverse the decision-making process becomes.

As a company is affected not only by what goes on solely within the company, but also by external forces not under its control, decision-support systems can help upper-level management. What happens to the pricing structure and availability of the raw materials for the candy bar if civil war breaks out in the sugar producing countries of Central America? The price of electricity can greatly affect the profit and loss of the candy bar. Fluctuating gasoline prices affect the profit margins by increasing or decreasing the distribution costs of the product. All these external events can be put into context in a decision-support system so that management can make effective decisions.

Decision-support systems also help those functions of an organization that may not be directly related to manufacturing the products. Remember the workers who were no longer required in manufacturing? What is the best way for the human resources department to handle this situation? Perhaps there is a planned increase in production coming up in the next quarter that will require the use of these workers. The human resources manager could use a decision-support system to determine if it is better to keep them on the payroll even if they won't be fully utilized for the next three months. When the unemployment rate is fairly low the company may have difficulty hiring new workers when they need them. Or perhaps the workers have specialized skills that aren't easy to find, so the company will actually save money in the long run by keeping these employees on the books.

**Bottom line: Decision-support systems are used for complex “what-if” questions that require internal and external data. Decisions at this management level are mostly semistructured so the information system must respond to the unique requirements of the executives.**

**Executive support systems (ESS)** are used at the very upper echelons of management. At the strategic level, the typical decision is very unstructured. Often there is no specific question, but rather a series of undefined situations executives may face. There are no easy, definable answers. These executives require summarized, historical information gleaned from all other levels of the organization, coupled with large amounts of external data gathered from many sources.

Let's assume that the new candy bar is the most successful, most popular candy bar ever made. (You could say its success is due to the effective use of the previous three information systems!). Competition cannot create a product that comes close to the success of this company. So, there is an offer to buy the candy bar company and



executives can use their executive support system to determine if this offer is in the best interest of all. They can analyze the information gathered from all of the internal information systems and couple that with external data to help them make the decision. With an ESS, company executives can make their decision based on information, not on emotion.

As executives are very busy, and many haven't been using computers that long, executive support systems must be easy to use and the information must be easily manipulated. The ESS must be able to incorporate external information with internal data to offer concise, complete information for the imprecise and incomplete scenarios executives face. And most importantly, the systems must have a fast response time.

Senior executives often access information through the use of a **portal**. Basically, a portal is a Web interface designed to present integrated personalized business content from a variety of sources.

**Bottom Line: An executive support system helps managers make strategic decisions affecting the entire company. The decisions use internal and external data to give executives the information they need to determine the proper course of action in unstructured situations.**

## WINDOW ON TECHNOLOGY: Air Canada Takes Off with Maintenix

### TO THINK ABOUT QUESTIONS

**1. What problems does Air Canada hope that Maintenix will solve?**

Air Canada's old legacy systems were not able to interact with one another or with the finance and inventory systems. The inefficiencies of these systems were costing the airline engineers time and money that could have been used on maintaining planes.

**2. How does Maintenix improve operational efficiency and decision-making?**

The Maintenix information system provides integrated, intelligent aviation maintenance, repair, and operations software. That leads the way to enhanced visibility of fleet-wide data, timelier decision making, support of Air Canada's existing business model, and increased operational efficiencies. The Maintenix system is accessible via the Web and easy to deploy to all stations around the world. It reduces repetitive tasks and time chasing missing or incomplete information by allowing maintenance, engineering, and finance divisions to easily share information. Wireless deployment also makes Maintenix more effective, since aviation technicians, equipment, and parts are always on the move.

**3. Give examples of three decisions supported by the Maintenix system. What information do the Maintenix modules provide to support each of these decisions?**

Three decisions supported by the Maintenix system may include:

- *Is Part A compatible with Part B?* The maintenance engineering module establishes the configuration hierarchy, rules, and maintenance program that all of the other modules depend upon. A company uses this module to describe machinery components, part relationships and compatibility rules.
- *Is a qualified technician located on site to perform necessary maintenance?* The line maintenance module matches a dynamic list of maintenance work requirements against finite resources at various locations. The module allows a company to ensure that qualified technicians are available before they schedule maintenance.
- *Are the right parts, in the right quantity, available on site for maintenance?* The materials management module ensures the minimum amount of each part is always in inventory without causing engineers to be short on parts at any time.

## MIS IN ACTION QUESTIONS

Visit the MXI Technologies Web site ([www.mxi.com](http://www.mxi.com)) and examine the Maintenix modules for heavy maintenance, shop maintenance, and finance modules (*answers copied from Web site*).

**1. How could an airline benefit from implementing these modules?**

**Heavy maintenance module:** Managing the maintenance of aviation assets is a complex problem that involves matching a large and dynamic list of maintenance work requirements against finite sets of resources (e.g. people, hangars, specialized tools, and equipment). Heavy Maintenance has the additional complexity of dealing with a wide variety of tasks, including removal and testing of most components on the aircraft, causing diverse part, tool and labour skill requirements. Maintenix provides functionality for all aspects of Heavy Maintenance management:

- Heavy Maintenance Visit Planning
- Heavy Maintenance Production Planning & Control
- Heavy Maintenance Execution

**Benefits**

- Optimized Heavy Maintenance visit planning, production & control
- Improved work packaging using pre-defined plan templates and aircraft-specific maintenance plans
- Inclusion of ALL requirements (scheduled, OOPs, DMIs, MELs, ADs, and SBs) in the plan
- Accurate analysis and forecasting of Non-Routines (NRs) based on actual NRs from previous visits

- Real-time work-in-progress monitoring, allowing immediate impact assessment of NRs, bottlenecks, and any other delays
- Ability to conduct post-check analysis to improve planning of future checks

**Shop maintenance module:** There are many challenges confronting the management of a component or assembly shop. Above and beyond simply managing the efficient utilization of labour resources, shops must be able to put themselves in the context of the entire supply chain of an organization, understanding the demand that is pulling components or assemblies through the shop. Furthermore, the shop itself is deeply concerned with the technical data surrounding the inventory being repaired or overhauled, and is a key provider of this data to the Technical Records and Reliability groups within the organization.

Maintenix® has a very detailed level of serialized tracking of inventory, which provides a strong foundation for solving these difficult problems. From “cradle to grave,” the history of the component – from everywhere it has been installed to everything that has been installed on it – is tracked. Moreover, Maintenix understands the pivotal role that the Shop plays in the supply chain, and provides unprecedented visibility into the demand that drives the shop activities. In all, Maintenix provides a complete solution for the management and control of component or assembly shops.

- Shop Control
- Shop Production Planning
- Shop Maintenance Execution
- Tool Control & GSE

#### Benefits

- Visibility both up and down the supply chain
- "Pull" philosophy allows Shop to align work to aircraft demand
- Controllers gain real-time visibility into work-in-process
- Powerful tools to leverage return on experience

**Finance module:** Accurate financial numbers are critical in ensuring the health of an aviation organization. Governments and shareholders alike are demanding increasing financial accountability from companies worldwide. Gathering accurate average unit prices for inventory, managing discrepancies from purchase order to invoice, tracking maintenance labour costs, and measuring and analyzing your organization's Key Performance Indicators (KPIs) are just some of the features Maintenix® provides to impart strong financial visibility. Maintenix delivers detailed financial data in accordance with today's best practices, such as Sarbanes-Oxley, aimed at allowing accurate analysis of an organization's financial state, as well as enabling improved budget forecasting.

- Procurement & Invoice Receipt
- Sales Orders & Invoice Generation
- Maintenance Cost Tracking
- Financial Reporting

- Financial Analysis

#### Benefits

- Aviation-oriented procurement options such as borrows and exchanges
- Unprecedented maintenance cost tracking
- Quick & Easy Invoice generation
- Powerful budgeting and KPI analysis tools

## 2. Give an example of a decision that each of these modules supports?

Answers will vary from student to student. Here is an example from each module:

#### Heavy maintenance module:

- Question: When will maintenance on a particular aircraft be completed so it can be returned to the flight schedule?
- Answer: The ability of the Maintenix software to monitor real-time work-in-progress will help answer this question.

#### Shop maintenance module:

- Question: Is a particular tool being used more often at one location than at other comparable locations?
- Answer: The Tool Control software component of the Maintenix program can track tool usage and offer comparisons between locations.

#### Finance module:

- Question: Are maintenance labour costs higher at one location compared to other locations? If so, what organizational element is causing it?
- Answer: The Maintenix software provides management with maintenance cost tracking so it can answer detailed questions such as this.

## WINDOW ON ORGANIZATIONS: INFORMATION SYSTEMS HELP KIA SOLVE ITS QUALITY PROBLEMS

Korean car manufacturer Kia Motors started selling in the North American market, promising high-quality vehicles at prices well below the competition. In 1994, Kia sold 12 163 cars, and by 2004, Kia had sold 270 000 cars. From a marketing end standpoint, Kia has been a phenomenal success. But until 2002 Kia ranked at the bottom of J.D. Power and Associates' annual initial-quality survey of new vehicle owners. In 1997 when the average North American car had 1.1 defects per vehicle, Kia had 2.75. In 2002 Kia had improved to 2.12 defects per vehicle, but the industry average was 1.33. Kia had a long way to go, and it was affecting its ability to sell cars, retain customers, and keep operational costs down.

Like all manufacturers of vehicles sold in North America, Kia had to create a system by December 1, 2003 to report any defects, accidents, or injuries involving its vehicles to the U.S. National Highway Traffic Safety Administration (NHTSA).

Kia Motors uses a manufacturing and production system to help in identifying sources of defects in their automobiles. Kia uses the information from the system to improve its production processes to eliminate or reduce defects. Improving vehicle quality lowers Kia's costs for warranty repairs while increasing customer satisfaction.

## TO THINK ABOUT QUESTIONS

### 1. Why was it so difficult for Kia to identify sources of defects in the cars it produced?

The information required to track defects was scattered among multiple systems. Fragmentation of this information in different systems prevented Kia from getting a complete picture of defects. Kia could have created some software on the fly that merely pushed the required information out of these systems, but then the information would have to be collated manually. This solution would have been very time consuming and also limit Kia's flexibility in what it could do with the information.

### 2. What was the business impact of Kia not having an information system to track defects?

Like many companies today, Kia Motors has come to rely on information systems for running their business. Without a system for tracking and identifying defects, Kia did not know how serious its quality control problem was until customer complaints piled up. The high incidence of defects in Kia products affected marketplace perceptions of the Kia brand, customer retention rates, and Kia's ability to continue ramping up sales. Kia's quality problems obviously affected its profitability and long-term survival.

### 3. What other business processes besides manufacturing and production were affected?

The new information systems helped Kia pinpoint sources of defects and determine what percentage of its vehicles was likely to have problems. The company then used this information to improve its production processes before the problems became more widespread, thus lowering costs for warranty repairs. The information also helped Kia determine the most cost-effective strategy for dealing with its quality problems.

The new systems not only assisted Kia in detecting quality problems, it also enabled them to increase profitability and even strategic advantage.

**4. How did Kia's new defect-reporting system improve the way it ran its business?**

Kia developed a system that extracted the required data from all the systems, integrated the data, and then analyzed them, with capabilities for displaying overall trends and for drilling down into details.

**5. What management, organization, and technology issues did Kia have to address when it adopted its new quality control system?**

Management — develop a system to report any defects, accidents, or injuries involving its vehicles to the U.S. National Highway Traffic Safety Administration (NHTSA). Kia management had to also monitor customer complaints.

Organization — develop quality improvement solutions and monitor defects.

Technology — implement Infogain software to identify potential problems. This software needed to be integrated with a number of different systems run by Kia's warranty, parts, consumer, and legal affairs departments.

**6. What new business processes were enabled by Kia's new quality control system?**

Better information from the new system helps Kia pinpoint the sources of defects so it can improve its production processes before defects become too widespread, thus lowering its costs for warranty repairs. Higher levels of quality and a lower incidence of repairs also increase customer satisfaction and make it more likely that both new and existing customers will purchase from Kia.

## **MIS IN ACTION QUESTIONS**

1. Visit the Autobytel Web site and select a Kia model to research. Investigate the retail price, warranties, and any relevant reviews and safety data. Select a comparable model (suggested by Autobytel) from another automobile manufacturer and gather the same data for that make and model.
2. Visit the J.D. Power Web site and explore the Brand Ratings section. Examine Kia's overall quality rating and the quality ratings for overall quality manufacturing, mechanical quality manufacturing, and body and interior quality manufacturing. Compare Kia's quality ratings to the quality ratings for the competing automaker you have been researching.
3. Create a table comparing the two cars you have selected on the basis of price, warranties, and quality. Would you select the Kia? Why or why not?

<http://www.autobytel.com>

<http://www.jdpower.com>

<http://www.autobytel.com>

**2.3****SYSTEMS THAT SPAN THE ENTERPRISE**

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It's not unusual to find an organization with three or more different information systems that act as islands. The systems don't exchange information very well, if at all.

Accounting and finance may have a system that serves their needs very well, but they can't collect information from the system used by manufacturing and production. Sales and marketing is doing its own thing with its system and losing valuable information from the other systems, which could help it do a better job.

**ENTERPRISE APPLICATIONS**

No business can afford disjointed information systems that don't work together to produce a coherent picture of the entire organization. All the functions of a business must be integrated across traditional lines of demarcation. Islands of information can be devastating to a company if data cannot be shared throughout the company. Even worse, the islands of information can create problems if each faction of an enterprise has differing information that conflicts with other islands of information. These kinds of problems are what gave rise to **enterprise applications** that share the same data anywhere it's needed in an organization. As networks of all kinds take hold, from the Internet to intranets to extranets, Web-based enterprise applications are increasingly widespread.

The following sections are an overview of four major enterprise applications: enterprise, supply chain management, customer relationship management, and knowledge management systems. We'll also study each of these systems in depth in future chapters.

**Enterprise systems** (also known as *enterprise resource planning (ERP)* systems) are used to bridge the communication gap between all departments and all users of information within a company. If production enters information about its processes, the data are available to accounting, sales, and human resources. If sales and marketing is planning a new advertising campaign, anyone anywhere within the organization will have access to that information. Enterprise systems truly allow a company to use information as a vital resource and enhance the bottom line.

The greatest enticement of enterprise systems is the chance to cut costs firm-wide and enhance the ability to pass information throughout the organization. The biggest drawbacks to building enterprise information systems are time, money, and people. Because the installation of the system is so invasive, it takes a tremendous amount of time to install the hardware and software, train people to use it, and rework business processes that will then inevitably change. Many companies find it more trouble than they care to handle.

Even if you properly manage your processes, wring out excess costs from every corner of the organization, and above all, have the best products at the lowest cost, if you don't have any customers to purchase the products what good is all the rest? Managing your

customers and getting products or services to them efficiently and effectively is the real key to success.

**Supply chain management** offers new opportunities for companies to integrate with suppliers and customers and lower costs for everyone Table 2-6 lists the benefits of using a supply chain management system to get the right product in the correct quantity to the right place with the least cost.

**TABLE 2-6 HOW INFORMATION SYSTEMS FACILITATE SUPPLY CHAIN MANAGEMENT**

Information from supply chain management systems helps firms
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

Although supply chain management systems have drastically improved over the last few years, there are still some problems associated with them. The bullwhip effect of each level of supplier is most evident in those systems that are not truly integrated from beginning to end. About the only way to combat this problem is for absolutely every level of supplier to be included in the management system. Even though this is the most desirable situation, it's also very expensive and not likely to happen.

### Customer Relationship Management Systems

Do you wait for the customer to complain about your poor service before you take a critical look at your business processes? Do you spend more time and money acquiring new customers than you do in keeping your existing ones? Does each functional area of your organization have a completely different and separate viewpoint of your customers? Does your sales and marketing department make promises to your customers that manufacturing and production can't possibly keep? If you answered yes to one or more of these questions you're in serious need of a good **customer relationship management** system.

CRM technology isn't just a nice looking Web site for customers to click through or more reports dumped on managers' desks that they don't have time to review. CRM systems involve business processes in all the functional areas and every management level of a firm. The ideal CRM system provides end-to-end customer care from receipt of order through product delivery.



Because of technological limitations in the past, many companies created islands of information in the various functional areas. CRM can help a firm cut the costs of keeping good customers by supplying the entire organization with a consolidated view of the customers' needs. Unprofitable customers are more easily identified with a CRM system and the time and energy spent can be retargeted to more profitable customers.

### **Knowledge Management Systems**

You may not think of a knowledge management system as an integral part of the overall information system of an organization. Most of the other systems have been recognized for many years, but this one may be thought of as relatively new. **Knowledge management systems (KMS)** enable organizations to better manage processes for capturing and applying knowledge and expertise.

Knowledge workers are those who promote the creation of new knowledge and integrate it into the organization. Research scientists may discover new methods of mixing sugar and cocoa beans and dairy products to make a better chocolate. Maybe a team of engineers will develop a new method of packaging the candy bar to make it easier to open. The legal knowledge workers may spend their time determining the copyright protections that could be afforded to the product name.

**Bottom Line: Integrating functions and business processes cut costs and allow systems development that involves the whole firm or industry. Customer resource management and supply chain management give a company the added advantages of end-to-end customer care. Enterprise systems have many challenges but the benefits, when executed properly, is enormous. Knowledge management systems allow an organization to fully integrate their newly acquired knowledge into the current systems.**

## **INTRANETS AND EXTRANETS**

Enterprise applications are often costly to implement. Companies that do not have the resources to invest in enterprise applications can still achieve some measure of information integration by using intranets and extranets.

Intranets and extranets use Internet technology and standards to assemble information from various systems and present it to the user in a Web page format. Extranets make portions of private corporate intranets available to outsiders.

Even though the Internet as a whole has existed since 1969, the World Wide Web didn't exist until around 1993–1994. Now you can't pick up a magazine or a newspaper, turn on the television or radio, even drive by a billboard, without some kind of reference to "dot-com." Businesses are rushing to the Internet in an effort to keep up with the competition or to create whole new businesses. Now organizations struggle with such issues as how to design and develop a Web site or how to determine a fair e-mail policy for employees.

## E-BUSINESS, E-COMMERCE AND E-GOVERNMENT

Electronic market systems are allowing businesses to take advantage of technology to create new methods of buying and selling. For awhile it seemed as though the middleman was going out of business because of the new direct connections between customers and merchants. Although this is true in some industries, new opportunities are springing up for the middleman in other areas. We'll look at this issue in more detail later.

Amazon.com, the largest retailer on the Internet, originally lost millions of dollars a year and yet today is one of the best success stories in **electronic commerce**. When Jeff Bezos, CEO of Amazon.com was asked what he had learned from the dot-com crash he replied, "The company is not the stock. The clearest way I can describe it is that back in the year 1999, when the stock market was booming and Amazon stock prices were booming, we had about 14 million customers buy from us in that year. In 2000, when the stock was busting, we had about 20 million customers buying from us. So if the stock is the company, somebody forgot to tell the customers." (*BusinessWeek*, April 30, 2001)

There are many opportunities as well as challenges associated with developing electronic commerce and **electronic business** (using the internet for business processes) and **electronic government** applications. Governments are moving many of their services to the Internet: Canadians can now apply for passports online, and renew their drivers' licenses on the Internet.

### 2.4

### THE INFORMATION SYSTEMS FUNCTION IN BUSINESS

Many people focus on the job losses due to technological advances and changes. On the other hand, many new jobs have been created because of technology. **Information systems departments**, previously a tiny group of people usually assigned to the financial group, have moved into the mainstream of most companies.

## THE INFORMATION SYSTEMS DEPARTMENT

**Programmers** have taken on more important positions within organizations. They must understand not only the technical side of computing, but they must also know the business processes within the company so they can adapt the technology to the needs of the business. **Systems analysts** serve as the bridge between the information systems group and the rest of the organization. Heading this group of people are the **information systems managers**. Their importance to businesses has grown as the emphasis on technology's role within organizations has grown. Just as most organizations have a Chief Financial Officer, the position of **Chief Information Officer** has been created to handle the myriad of problems and opportunities businesses face in today's technologically driven environment.

**End users** represent the departments for which the systems are developed, and the success of the information systems is strongly correlated with the involvement of the end users. Increasingly, end users are developing their own systems using end-user friendly software.

## ORGANIZING THE INFORMATION SYSTEMS FUNCTION

There are alternative ways of organizing the IT function within a firm. A very small company will not have a formal information systems group. Large companies will have a separate information systems department, which may be organized along several different lines, depending on the nature and interests of the firm. Each functional area of the business may have its own information systems department, overseen by a corporate CIO. The information systems function may be run as a separate department similar to the other functional departments. A third arrangement found in very large firms with multiple divisions and product lines is to have an information systems department for each division reporting to a high-level central information systems group and CIO.

**Bottom Line: Organizations and information systems influence each other. Each organization shares common characteristics that the information system can enhance. On the other hand, each organization has unique characteristics that should be taken into account when incorporating technology. The organization should determine how the technology is incorporated and not let the information system totally dictate the organizational structure.**

## SUMMARY

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

A business process is a logically related set of activities that define how specific business tasks are performed, and a business can be viewed as a collection of business processes. Business processes are concrete workflows of material, information, and knowledge. They also represent unique ways in which organizations coordinate work, information, and knowledge, and the ways in which management chooses to coordinate work. Managers need to pay attention to business processes because they determine how well the organization can execute its business, and thus be a potential source of strategic success or failure. Although each of the major business functions has its own set of business processes, many other business processes are cross-functional, such as order fulfillment. Information systems can help organizations achieve greater efficiencies by automating parts of these processes or by helping organizations redesign and streamline them. Firms can become more flexible and efficient by coordinating their business processes closely, and, in some cases, integrating these processes so they are focused on efficient management of resources and customer service.

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

There are four major types of information systems in contemporary organizations serving operational, middle, and senior management. 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. MIS and DSS provide middle management with reports and access to the organization's current performance and historical records. Most MIS reports condense information from TPS and are not highly analytical. DSS support management decisions when these decisions are unique, rapidly changing, and not specified easily in advance. They have more advanced analytical models and data analysis capabilities than MIS and often draw on information from external as well as internal sources. ESS support senior management by providing data of greatest importance to senior management decision makers, often in the form of graphs and charts delivered via portals. They have limited analytical capabilities but can draw on sophisticated graphics software and many sources of internal and external information.

**3. *How do enterprise applications, intranets, and collaboration and communication systems improve organizational performance?***

Enterprise applications, such as enterprise systems, supply chain management systems, customer relationship management systems, and knowledge management systems are designed to support organization-wide process coordination and integration so that the organization can operate efficiently. They span multiple functions and business processes and may be tied to the business processes of other organizations. Enterprise systems integrate the key internal business processes of a firm into a single software system so that information can flow throughout the organization, improve coordination, efficiency, 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 uses information systems to coordinate all of the business processes surrounding the firm's interactions with its customers to optimize firm revenue and customer satisfaction. Knowledge management systems enable firms to optimize the creation, sharing, and distribution of knowledge to improve business processes and management decisions.

Intranets and extranets use Internet technology and standards to assemble information from various systems and present it to the user in a Web page format. Extranets make portions of private corporate intranets available to outsiders.

**4. *What is the difference between e-business, e-commerce, and e-government?***

E-business (electronic business) refers to the use of digital technology and the Internet to execute a firm's business processes. It includes internal business processes and processes for coordination with suppliers and other external entities. E-commerce (electronic commerce) is the part of e-business dealing with the purchase and sale of

goods over the Internet, including support activities such as marketing and customer support. 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 government bodies.

### ***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. The information systems department is responsible for maintaining the hardware, software, data storage, and networks that comprise the firm's IT infrastructure. The information systems department consists of specialists, such as programmers, systems analysts, project leaders, and information systems managers, and is often headed by a CIO.

There are alternative ways of organizing the IT function within a firm. A very small company will not have a formal information systems group. Large companies will have a separate information systems department, which may be organized along several different lines, depending on the nature and interests of the firm. Each functional area of the business may have its own information systems department, overseen by a corporate CIO. The information systems function may be run as a separate department similar to the other functional departments. A third arrangement found in very large firms with multiple divisions and product lines is to have an information systems department for each division reporting to a high-level central information systems group and CIO.

## **KEY TERMS**

The following alphabetical list identifies the key terms discussed in this chapter.

***Chief information officer (CIO)*** — senior manager in charge of the information systems function in the firm.

***Customer relationship management (CRM) systems*** — business and technology discipline that uses information systems to coordinate all of the business processes surrounding the firm's interactions with its customers in sales, marketing, and service.

***Decision-support systems (DSS)*** — information systems at the organization's management level that combine data and sophisticated analytical models or data analysis tools to support semistructured and unstructured decision making.

***Electronic business (e-business)*** — the use of the Internet and digital technology to execute all the business processes in the enterprise. Includes e-commerce as well as processes for the internal management of the firm and for coordination with suppliers and other business partners.

**Electronic commerce (e-commerce)** — the process of buying and selling goods and services electronically, involving transactions using the Internet, networks, and other digital technologies.

**End users** — representative of departments outside the information systems group for whom applications are developed.

**Enterprise applications** — a system that can coordinate activities, decisions, and knowledge across many different functions, levels, and business management systems, and knowledge management systems.

**Enterprise systems** — integrated enterprise-wide information systems that coordinate key internal processes of the firm.

**Executive support systems (ESS)** — information systems at the organization's strategic level designed to address unstructured decision making through advanced graphics and communications.

**Finance and accounting information systems** — systems used to keep track of the firm's financial assets and fund flows.

**Human resources information systems** — systems that maintain employee records, track employee skills, job performance, and training; and support planning for employee compensation and career development.

**Information systems department** — the formal organizational unit that is responsible for the information systems function in the organization.

**Information systems managers** — leaders of the various specialists in the information systems department.

**Interorganizational system** — information systems that automate the flow of information across organizational boundaries and link a company to its customers, distributors, or suppliers.

**Knowledge management systems (KMS)** — systems that support the creation, capture, storage, and dissemination of firm expertise and knowledge.

**Management information systems (MIS)** — the study of information systems focusing on their use in business and management.

**Manufacturing and production information systems** — systems that deal with the planning, development, and production of products and services and with controlling the flow of production.

**Portal** — Web interface for presenting integrated personalized content from a variety of sources. Also refers to a Web site service that provides an initial point of entry to the Web.

**Programmers** — highly trained technical specialists who write computer software instructions.

**Sales and marketing information systems** — systems that help the firm identify customers for the firm's products or services, develop products and services to meet their needs, promote these products and services, sell the products and services, and provide ongoing customer support.

**Supply chain management (SCM) systems** — information systems that automate the flow of information between a firm and its suppliers to optimize the planning, sourcing, manufacturing, and delivery of products and services.

**Systems analysts** — the analysis of a problem that the organization will try to solve with an information system.

**Transaction processing systems (TPS)** — computerized systems that perform and record the daily routine transactions necessary to conduct the business; they serve the organization's operational level.

## REVIEW QUESTIONS

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

**Define business processes and describe their relationship to business performance.**

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. Why are information systems so essential for running and managing a business today?**

**Describe the characteristics of transaction processing systems (TPS) and the role 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 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 of MIS. 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 DSS and explain how DSS differ from ESS.**

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.

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 information from internal MIS and DSS.
- ESS are designed for ease-of-use and rely heavily on graphical presentations of data.

**Describe the relationship between TPS, MIS, DSS, and ESS.**

Ideally, all four systems use the same basic data. TPS are a major source of internal data for other systems, especially MIS and DSS. Internal data from TPS and MIS combine with external data to provide a source of analysis for DSS and ESS. All four systems are designed to give managers of all organizational levels and complete, consolidated view of the firm.

**3. How do enterprise applications, collaboration and communication systems, and intranets 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 and describe how they change the way an organization works?**

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.

This changes the workflow of an organization:

- 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.

**Define supply chain management systems and describe how they benefit businesses.**

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 provide 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

**Define customer relationship management systems and describe how they benefit businesses.**

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 helps firms increase the effectiveness of their marketing campaigns and provide higher-quality customer service and support.

**Describe the role of knowledge management systems in the enterprise.**

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.

- 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.

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

In an increasingly globalized economy, 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. Enterprise-wide information systems 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 e-mail), calendars, and audio-visual tools members can use to meet face-to-face.
- E-mail 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.

**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. What is the difference between e-business, e-commerce, and e-government?**

**Distinguish between e-business and e-commerce.**

E-business refers to the use of digital technology and the Internet to execute a firm's business processes. It includes internal business processes and processes for coordination with suppliers, customers, business partners, and government regulators.

E-commerce is a narrower part of e-business dealing with the purchase and sale of goods and services over the Internet, including support activities such as marketing and customer support.

**Define and describe e-government.**

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 governmental bodies.

**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), 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. **Adopting an enterprise application is a key business decision as well as a technology decision. Do you agree? Why or why not? Who should make this decision?**

Adopting an enterprise application is certainly a key business decision for companies today. In order to survive and remain competitive, firms have little choice but to adopt these systems. Along with the software to accomplish key objectives, firms require appropriate technology platforms.

Enterprise applications, such as enterprise systems, supply chain management systems, customer relationship management systems, and knowledge management systems, are designed to support organization-wide process coordination and integration to help an organization operate efficiently. They span multiple functions and business processes and may be tied to the business processes of other organizations. Enterprise systems integrate the key internal business processes of a firm into a single software system so information flows throughout the organization, thereby improving coordination, efficiency, and decision-making.

A decision of this magnitude generally falls to senior managers who make strategic decisions to ensure the long-term survival of the company.

## COLLABORATION AND TEAMWORK: DESCRIBING MANAGEMENT DECISIONS AND SYSTEMS

**With a group of three or four other students, find a description of a -manager of a corporation in *The Globe and Mail*, *Canadian Business*, or another business magazine. Write a description 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 presentation software to present your findings to the class.**

As students will select different companies, group answers will vary. General comments for facilitating project preparation are provided below.

Clearly, students would not list TPS as a system that would be used by a senior manager. It would be acceptable if they listed a senior manager as one holding a position within the Management Level Systems or the Strategic Level Systems. That would depend on their interpretation of the term “senior manager”. What should be identifiable in the answer is that the 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. The higher the level, the more aggregated are the data presented, and the greater the need for data from outside the organization. The operational level manager requires more detailed data than does the senior manager. In addition, the form in which the data presented to the senior manager is generally more graphical (easy to see trends, comparisons, etc.).

## **LEARNING TRACK MODULES**

1. Systems from a Functional Perspective
2. Challenges of Using Business Information Systems

### **Hands-on MIS: Projects**

#### **Management Decision Problems**

##### **1. Ben's Lumber**

The delay in getting a quote to a customer can lead to lost sales and a perception that Ben's Lumber is unprofessional and inefficient.

The situation is made complex because neither Ben's Lumber nor the supplier has up-to-date price information. Therefore both parties need to coordinate to find a solution that will allow Ben to access the prices directly.

The supplier could place the prices in a file (e.g. spreadsheet) and keep those prices up-to-date. The supplier would then have to make the file accessible over the Internet, or an extranet. These decisions would have to be made by the supplier.

Ben would have to have a computer and an Internet connection installed. This would allow Ben to access the file from the supplier immediately when a customer comes into the store.

## **2. David's Hardware**

Improper inventory management is costing David and Kathleen lost sales, as well as inefficient use of store space and potential rent costs.

They need to implement an inventory control system; a package can be purchased for small business use. This would capture data when inventory is purchased as well as when a sale is made.

Reports can be produced that flag items that need to be ordered, sales of each item (for re-ordering), and total sales and profits (for taxation). In addition, they can run reports that identify any exceptions to normal events and make decisions based on these, such as: high selling items (purchase more, placement on shelves), inventory loss due to theft (decide on a shoplifting policy), items that are not selling (offer incentives, inventory placement in store), days of the week when sales are high (hire extra staff).

This system can help the store decrease the cost of inventory and provide information that can improve sales, increase customer satisfaction, improve staffing, and provide better financial management.

## **IMPROVING DECISION MAKING: USING A SPREADSHEET TO SELECT SUPPLIERS**

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 Microsoft Excel software to filter the data based on several different criteria to select the best supplies for your company.

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

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 if you can benefit from better supply chain management. On the 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. 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, total cost of each order, vendors' accounts payable terms, promised shipping date, promised transit time, 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. Prepare a report to support your recommendations.

The data for this exercise is found in the file named Ch02\_Suppliers.xls in the Chapter 2 folder.

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 favorable payment terms.

Students may add additional columns for calculating the actual delivery time for each order. The Actual Delivery Time can be calculated by subtracting the Order Date from the Arrival Date. These numbers are useful when trying to determine who is the vendor with the best delivery track record. Students can use the DAVERAGE function to determine the average delivery time for each vendor.

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 number (or description). This filtered list can then be sorted by item cost and vendor number. The MIN function can also be used.

A sample solution is in the file named Ch02\_Select\_Suppliers.xls in the Chapter 2 folder.

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

The MapQuest ([www.mapquest.com](http://www.mapquest.com)) Web site includes interactive capabilities for planning a trip, as well as a service offering maps of numerous cities around the world, down to the street level. The software on the site can calculate the distance between two points and provide itemized driving direction to any location. You can also click maps of your starting and ending locations to see detailed street maps and places of interest.

**You have just started working as a dispatcher for Cross-Country Transport, a new trucking and delivery service based in Winnipeg, Manitoba. Your first assignment is to plan a delivery of office equipment and furniture from Montreal, Quebec (at the corner of Rue Stanley and Rue Ste.-Catherine O) to Lethbridge, Alberta (at the corner of 3<sup>rd</sup> Avenue South and 6<sup>th</sup> Street South). 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? Prepare a one-page analysis of this problem and your answer.**

You can also ask students to compare MapQuest with Google Maps. One suggestion for improvement is to allow a person to plan a trip based on the number of hours they want to drive, allowing for stopovers, favourite restaurants and hotel offers en route.

## **CASE STUDY**

### **ZELLERS MERCHANDISES BETTER THROUGH INFORMATION SYSTEMS AND BUSINESS INTELLIGENCE**

- 1. Describe and diagram the previous process for inventory control and the new process. What are the differences between the new and old processes?**

Old system was a manual system: clerks would check the shelves and write down any items that were low, and then record the inventory records in a spreadsheet.

The first computerized system allowed Zellers to track inventory but still did not provide all the information that management needed.

Now, the new system integrates the point-of-sale registers with the supply chain. Inventory items are tracked from the time they arrive in the warehouse, through the warehouse, onto the shelves, through the purchasing by customers. New items are ordered automatically to replenish depleted stock. In addition, inventory could be allocated to any Zellers store.

- 2. What improvement may be seen with the implementation of LID 3? How do wireless devices and wireless transmission help this process?**

- Productivity is improved
- Better management decisions based on more timely and accurate reporting
- Reduced inventory costs
- Better access to reports by all employees throughout the organization
- No stock-outs
- Better presentations of products in the store
- Better customer service

Wireless devices are important in recording the movement of inventory in just-in-time fashion, and ensuring that the centralized database is current.

**3. Should all retail stores switch to inventory management control systems such as LID 3? Why or why not?**

The system is best designed for a large retail store, with multiple warehouses and many suppliers. However, the concepts of the system can be used by any retailer. The important concepts are that retailers need to monitor and control inventory to reduce costs, improve efficiency, and to provide good customer service. A computerized system is critical in reaching these goals.

**4. What management, organization, and technical factors would you want to take into account before implementing a new inventory control system?**

*Management:*

Management support, financial and leadership  
Support for staff training and personnel reassignments

*Organizational:*

New roles for employees  
Employees may have more control  
Skill with technology

*Technical:*

Computer readiness  
Knowledge of databases  
Network availability  
Supplier readiness  
Point-of-sale technology