Chapter 1

The Information Age in Which You Live

Changing the Face of Business

LEARNING OUTCOMES

LO1 Define management information systems (MIS) and describe the three important organizational resources within it.

LO2 Describe how to use Porter's Five Forces Model to evaluate the relative attractiveness of and competitive pressures in an industry.

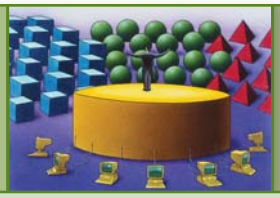
LO3 Compare and contrast Porter's three generic strategies; top line versus bottom line; and the run-grow-transform framework as approaches to the development of business strategy.

LO4 Describe the role of value chain analysis in identifying value-added and value-reducing processes.

LO5 List three major types of Enterprise Systems (ES) and describe how they can create value for an organization.

OPENING CASE STUDY

Identity Theft—Crime of the Information Age



Information systems are everywhere. We are entering an age of ubiquitous computing. We are no longer tethered to a machine plugged into a wall; we can get computing virtually anywhere. While this may seem like a good thing, nothing is free. We are also now more vulnerable than ever to the effects of criminal activity. If you think you don't need to pay attention to information systems and the computing that is going on around us everywhere, consider the following:

Thousands of Canadians have fallen victim to identity theft. PhoneBusters, a national anti-fraud call centre jointly operated by the Ontario Provincial Police and the Royal Canadian Mounted Police, reported 32,125 Canadian identity-theft victims amounting to a loss of just over $43 million between 2004

and 2006.[1] On the Internet you can find sites such as CardingWorld.cc, Dumps International, and TalkCash.net that sell such information and much more, including malware, software that can be used to infiltrate the identity management systems of organizations and steal personal information. A site called Dumps International appears to provide Canadian credit cards for sale ranging between $40 for a standard credit card up to $100 for the platinum card. These sites typically stay in existence for only about six months or so before having to change their names to elude law enforcement. Trend Micro, a global leader in network antivirus and Internet content security, has cited what people are willing to pay for data, such as

- $78–$294: billing data including account number, address, birth date, etc.
- $147: driver's license number
- $147: birth certificate
- $6–$24: credit card number with security code and expiration date
- $6: PayPal logon and password.

Therefore, identity theft should be high on your personal priority list. From an organizational point of view, identity management and the protection of identity information are usually at the top of the priority list. Unfortunately, hackers have found ways to steal identity information; they may spoof or phish you into giving away your personal information and they may unleash malware (the generalized term for malicious software such as viruses, worms, and Trojan horses) on organizational identity management systems to steal millions of identities. On January 17, 2007, TJX Cos., the U.S. parent firm of Canadian retailers Winners and HomeSense, reported the infiltration of its identity management systems, which may eventually affect over 40 million customers worldwide, 2 million of them being Canadian Visa card holders.

By some accounts, the black market for identity information is now a billion-dollar-a-year industry. Transactions occur daily with the buying and selling of identities, credit card information, and even brokerage accounts. One man stole numerous online brokerage accounts and used them to employ the old "pump-and-dump" stock scam. With his legitimate personal account he bought many shares of a penny stock. He then used the accounts he'd stolen to buy more shares of the same stock, which raised the price significantly. He then sold the shares in his legitimate personal account for a tidy profit of $82,000. We can tell you this story only because he got caught.

In today's digital world, computers can be used for all sorts of nefarious scams; they can also be used in many wonderful and legal ways—to increase profit, to reduce costs, to increase product and service quality, to reach suppliers and customers all over the world, and to benefit society in general. This book focuses on helping you learn to use technology for the sustained competitive advantage of your organization and for your personal productivity. Along the way, however, we will talk about the bad uses of technology and inform you of steps you can take to avoid being a victim of cyber crimes.[2]

Questions

1. Have you, a friend, or a family member been a victim of identity theft? If so, tell the story to your class.
2. How often do you buy your credit report? Did you know you get one for free annually?
3. Is technology good or bad?

Introduction

You live in the "digital age." You live, work, learn, play, drive, network, eat, and shop in a digital world. The influence of technology permeates everything you do. The average North American relies daily on hundreds of computers. Every part of your life depends on technology. Your TV, iPod, DVD player, car, and cell phone are all technology enabled and—more importantly—not "able" without technology. Technology is so pervasive in your life it is often considered "invasive." Here's a wild statistic: According to a worldwide survey conducted by *Time* magazine in 2005, 14 percent of cell phone users stated they had stopped having sex to take a phone call.[3] Hmmm ... The real unanswered question is whether cell phones have led to more or less personal intimacy. Cell technology has clearly led to an explosion of hitherto impossible personal communication (witness the number of cell phones pressed firmly to ears of shoppers in a mall, for example, and the number of text messages exchanged). While this intimacy is not experienced in person, it is, nonetheless, experienced. The jury is still out …

Your generation, specifically, the cohort of people born in the mid-to-late 1980s and very early 1990s, was born into a digital age unimaginable to those born in cohorts before yours. In the early 1990s, few people as yet had ever heard of the Internet, "surfing" was a term identified only as a water sport, and Microsoft was not the dominant software publisher for word processing, spreadsheet, presentation, or database management systems (DBMS—considered in depth in Chapter 3 and Extended Learning Module [ELM] F) applications. Viruses were seen only under a microscope, worms were used for fishing, and "spam" was just a canned meat. But all this changed in your first years on earth.

As you moved through your early teens, e-commerce exploded and then quickly imploded, transforming overnight Internet millionaires into overnight Internet paupers. You are probably more than familiar with unique and interesting IT terms such as podcasting, wiki, avatars, emoticons, spoofing, acorns, and phishing (now with a completely different kind of bait). Technology has been so much a part of your life that you may consider it more of a necessity than a convenience.

Generations of people before you witnessed the evolution and revolution of many other technologies, such as automobile and air travel, radio, television, and the telephone. Your generation has been at the centre of the digital revolution. Perhaps more than any technology before, digital technologies such as computers and the Internet have radically transformed the very fabric of society.

The reach of digital technologies is vast and wide. Technology touches your personal life every day. Equally so, digital technologies have dramatically altered the competitive landscape of business. Fifty of the *Fortune* top 500 companies in 2006 (that's one in every 10) were digital technology companies such as Cisco Systems, Hewlett-Packard, and Dell. Amazon.com ranked 272 on the *Fortune* list and eBay ranked 458—both of these companies have been around for only about 10 years.[4] In Extended Learning Module D (Careers in Business) we take an in-depth look at how Information Systems can be crucial in various careers in business. IT is everywhere. Pay close attention.

Technology companies are by no means the only ones interested in using technology effectively in the workplace. Every business you can name wrestles with management information systems on a daily basis. Broadly, *management information systems* (MIS) is both a business discipline that deals with the use of information technology (IT)—or computers, computer technology, or simply technology—and an academic field of study. Technology is so important to modern organizations because we are in the information age, a time when knowledge is power. Today, more than ever, businesses and organizations in every sector need information, information technology, and the overarching MIS function

to massage, assimilate, and distribute information and knowledge to create and sustain a competitive advantage and/or to deliver vital services.

As businesses approach the acquisition and use of technology, they do so very differently from you in your personal life. You find a cool piece of technology and quickly calculate in your head if you have enough money to purchase it. You may not get everything you want, such as a large hard disk or a really fast processor, but you can usually buy the personal technology you need. Businesses are different; they carefully scrutinize their technology purchases, seeking to find and justify a competitive advantage and a return on a big investment. Businesses ask questions such as:

1. Can this technology help streamline and lower the cost of our business processes while not sacrificing the quality we deliver to our customers?
2. Can this technology enable us to reach larger markets of customers, understand our customers better so we can deliver more tailored products and services to them, and/or help us design and develop products that are better than those of our competitors?
3. Can this technology enable us to innovate our business operations and move into completely new markets?

This book's goal is to introduce you to the fast-paced and ever-changing dynamics of information technology, focusing specifically on (1) how you—as an individual—can use technology to increase your productivity and (2) how organizations can use technology to increase profit, expand market share, serve the needs of society, eliminate time and location boundaries, and engage in a host of other worthy activities. We deliver on the first goal—increasing your personal productivity—through the use of our Extended Learning Modules (ELMs), which typically are hands-on, "can-do" explorations of technology such as how to use the decision support features in Excel (ELM H Decision Analysis with Spreadsheet Software), build a Web site (ELM E The World Wide Web and the Internet), and design and use a database and database management system ELM F and G (Designing Databases and Entity-Relationship Diagramming, and Implementing a Database with Microsoft Access).

We deliver on the second goal—explaining organizational uses of technology—in the book's chapters. We'll start in this very first chapter by stating that *business strategy drives technology decisions, not the reverse.* This is a "refinement approach" that moves from the big picture (the industry in which your business operates) to the details (the technologies you should choose). So, you start with the bigger view of your industry and continually refine your analysis until you arrive at the technologies you should use (see Figure 1.1 on the next page).

The steps are as follows:

1. Assess the state of competition and industry pressures affecting your organization.
2. Determine business strategies critical to successfully addressing those competitive and industry pressures.
3. Identify important business processes that support your chosen business strategies.
4. Finally, align technology tools with those important business processes.

So, you first need to understand the industry in which your business operates and the competitive forces affecting that industry. Decisions regarding business strategies, business processes, and finally technology, follow. Your organization must perform these steps in this order. If you don't understand the competitive nature of your industry, you can't determine business strategies that ensure success. If you don't then identify the most important business processes to support those business strategies, you will undoubtedly implement the wrong technologies and doom your organization to failure. It is our goal in this first chapter to help you through the first two steps above. The remaining chapters focus on further refinement of business strategies and the identification of important business processes—and the technology tools that support them.

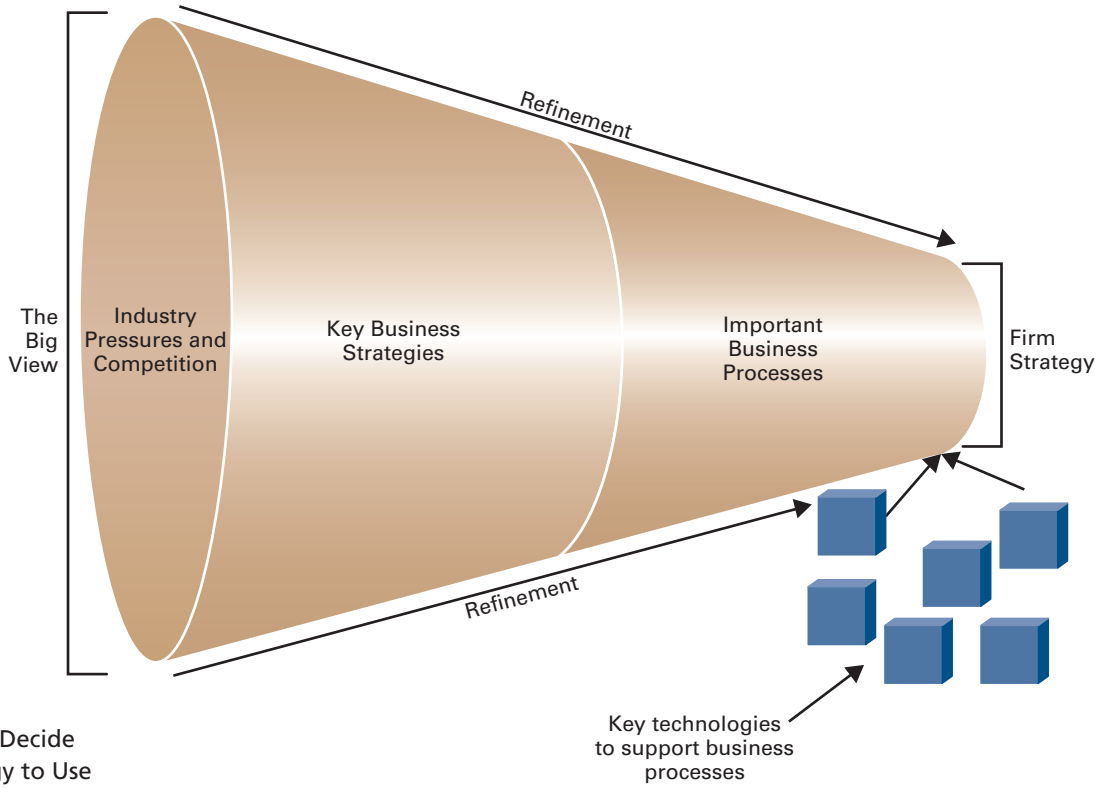


Figure 1.1

How Businesses Decide What Technology to Use

LO1

Management Information Systems

Just like finance, accounting, marketing, and many others, management information systems is a business function vitally important to the success of your organization. Formally, we define management information systems as follows:

- ***Management Information Systems (MIS)*** deals with the planning for, and development, management, and use of information technology tools to help people perform all tasks related to information processing and management.

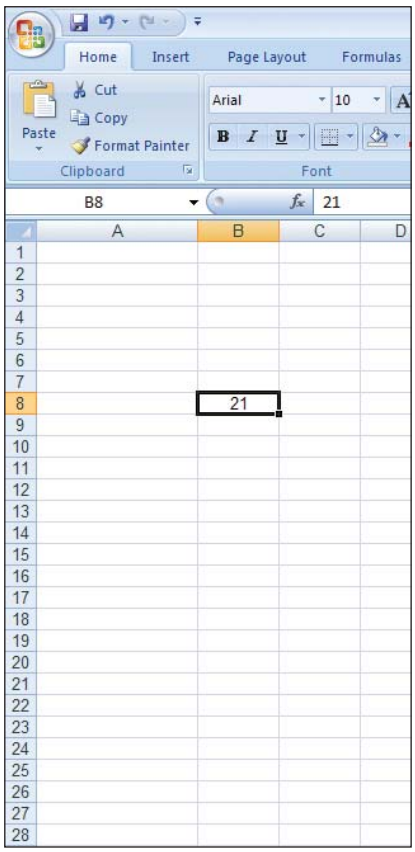
So, MIS deals with the coordination and use of three very important organizational resources—information, people, and information technology. Stated another way, *people* use *information technology* to work with *information*. To do so, they are involved in MIS. Ideally, of course, people use technology to support the goals and objectives of the organization as driven by competitive pressures and determined by appropriate business strategies. MIS helps them to do this.

INFORMATION AS A KEY RESOURCE

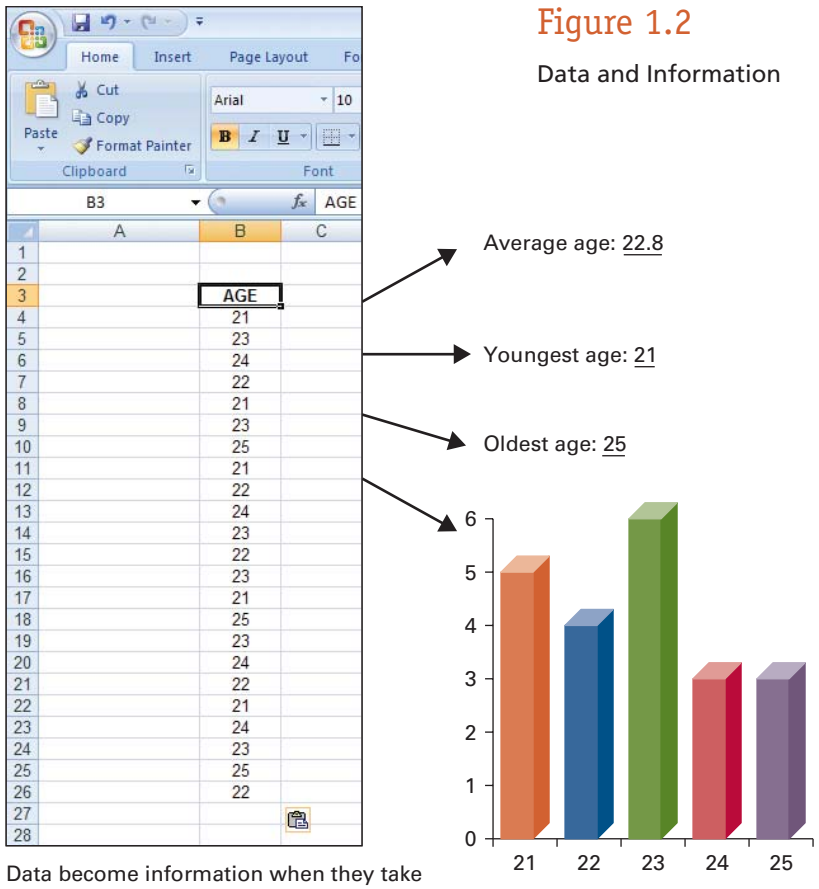
As stated above, we are in the information age, a time when knowledge is power. But what *are* information and knowledge? Let's first define *data, information,* and *business intelligence* and give an example to understand them better. Finally, we'll discuss the elusive term *knowledge.*

- ***Data*** are raw facts that describe a particular phenomenon such as the current temperature, the price of a movie rental, or your age. (Actually, the term *data* is plural; *datum* is singular.)
- ***Information*** is data that have a particular meaning within a specific context. The current temperature becomes information if you're deciding what to wear; in deciding what to wear, the data describing the price of a movie rental are not pertinent information.
- ***Business intelligence (BI)*** *is* collective information—about your customers, your competitors, your business partners, your competitive environment, and your own internal operations—that gives you the ability to make effective, important, and often strategic business decisions.

Consider Figure 1.2. In the left image is a single Excel cell containing the number 21; let's assume that's your age. That is a piece of data—some sort of fact that describes the amount of time you have been alive. Now let's create a list of customers for a business that contains the age of each customer (the right portion of Figure 1.2). This is potential *information* since your business can use it. Notice that you can create an average, find the ages of the youngest and oldest customers, and build a frequency distribution of customers by age.



In an Excel cell, you can store a single piece of data. Here, the cell contains the number 21, which we're assuming to be your age.



Data become information when they take on meaning. Here, information is a list of ages of all customers, which starts to provide insight into your customers.

Figure 1.2

Data and Information

Now, look at Figure 1.3. There you'll see an Excel workbook containing many pieces of information for each customer. This is *business intelligence* (often referred to simply as BI). What does this mean? Take a careful look at some of the columns of information. For each customer, we know the preferred salesperson. We can also see the number of coupons each customer has used. Now we can start to derive more meaningful information—business intelligence. We can compare how men and women use coupons. We can derive the customer average age by preferred salesperson.

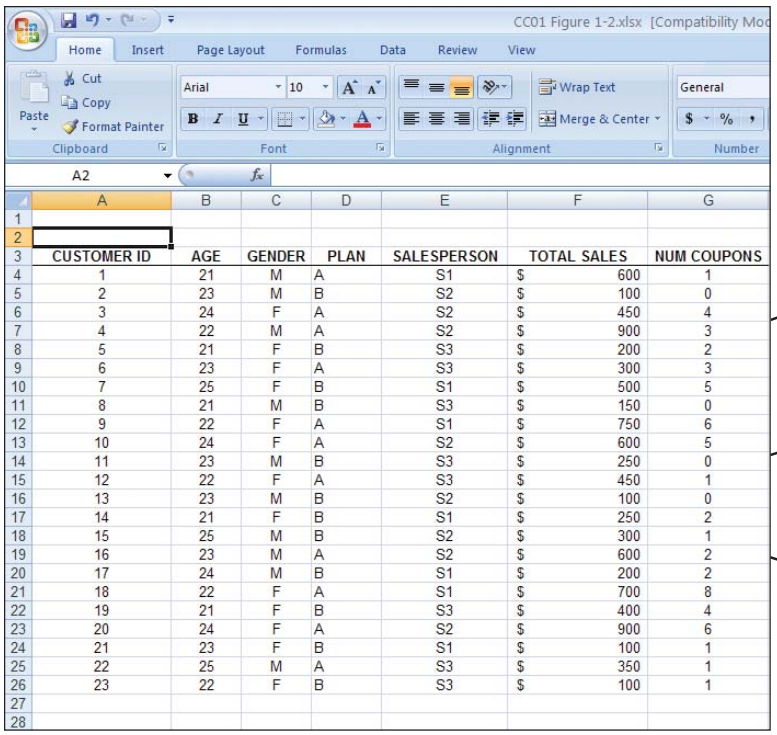
Notice how data, information, and business intelligence all build on each other. Information is a more complete picture of multiple data points; in our example, an age was a single piece of data while information was the collective ages of all customers. Business intelligence extends that information to include gender behaviour, the use of coupons, preferred salespersons, and total purchases. And *knowledge* builds upon all of those. You acquire knowledge in a business or field through practice over time using information and intelligence. You will understand better what we mean by knowledge as we go along.

Knowledge is a broad term that can describe many things; (1) it can provide contextual explanation for business intelligence; (2) it can point toward actions to take to affect business intelligence; (3) it can include intellectual assets such as patents and trademarks; and (4) it includes organizational know-how for things such as best practices.

Consider our example in Figures 1.2 and 1.3. Knowledge can provide context by explaining the reason that more women than men use coupons is that the majority of coupons are placed in women's magazines. You would derive this sort of knowledge by having the business intelligence in Figure 1.3 and at the same time having access to the marketing strategies. Given the business intelligence in the figure, the knowledge

Figure 1.3

Business Intelligence



	A	B	C	D	E	F	G
1							
2							
3	CUSTOMER ID	AGE	GENDER	PLAN	SALESPERSON	TOTAL SALES	NUM COUPONS
4	1	21	M	A	S1	$ 600	1
5	2	23	M	B	S2	$ 100	0
6	3	24	F	A	S2	$ 450	4
7	4	22	M	A	S2	$ 900	3
8	5	21	F	B	S3	$ 200	2
9	6	23	F	A	S3	$ 300	3
10	7	25	F	B	S1	$ 500	5
11	8	21	M	B	S3	$ 150	0
12	9	22	F	A	S1	$ 750	6
13	10	24	F	A	S2	$ 600	5
14	11	23	M	B	S3	$ 250	0
15	12	22	F	A	S3	$ 450	1
16	13	23	M	B	S2	$ 100	0
17	14	21	F	B	S1	$ 250	2
18	15	25	M	B	S2	$ 300	1
19	16	23	M	A	S2	$ 600	2
20	17	24	M	B	S1	$ 200	2
21	18	22	F	A	S1	$ 700	8
22	19	21	F	B	S3	$ 400	4
23	20	24	F	A	S2	$ 900	6
24	21	23	F	B	S1	$ 100	1
25	22	25	M	A	S3	$ 350	1
26	23	22	F	B	S3	$ 100	1
27							
28							

Total sales for all customers on Plan B: $2,650

Average age of customer preferring salesperson S3: 22.3

Average coupons women use: 3.7
Average coupons men use: 1.0

When you start to combine multiple sets of information, you can generate a considerable amount of business intelligence. Business intelligence helps you make effective strategic business decisions.

of individuals in the organization would help them make use of it. Knowledge would address what marketing strategy, for instance, should be undertaken to get more customers on Plan B to increase total purchases.

The *quality* of intelligence and knowledge is obviously critical. We'll talk next about the quality of these assets. Then we'll discuss other characteristics of information. (In the following discussion, we'll be using the term *information* generically to refer to all intellectual assets—data, information, business intelligence, and knowledge because the term *information* is also used by business people and academics alike in this way.)

DEFINING INFORMATION QUALITY Information exhibits high quality only if it is pertinent, relevant, and useful to you. Unfortunately, in today's information age, information is not exactly at a premium; you are bombarded daily with information, much of which is not really important to you in any way. Below are some information attributes that help define its quality:

- **Timeliness**—First, do you have access to information *when you need it?* If you're preparing to make a stock trade, for example, you need access to the price of the stock right now. Second, does the information describe the time period or periods you're considering? A snapshot of sales today may be what is relevant. Or for some important decisions, you really need other information as well—sales yesterday, sales for the week, today's sales compared to the same day last week, today's sales compared to the same day last year, and so on.
- **Location**—Information is of no value to you if you can't access it. Ideally, your location or the information's location should not matter. IT can definitely create information quality through technologies that support telecommuting, workplace virtualization, mobile e-commerce, and so on, so you can access information at or from any location.
- **Form**—First, is the information in a form that is most useful to or usable by you—audio, text, video, animation, graphical, or other? Depending on the situation, the quality of information is defined by its form and your ability to make use of it. Second, is the information free of errors? Think of information as you would a physical product. If you have a defective product, it lacks quality in that you cannot use it. Information is the same. This is the concept of ***garbage-in garbage-out (GIGO)***. If the information coming into your decision-making process is in bad form (i.e., garbage-in), you'll more than likely make a poor decision (i.e., garbage-out).
- **Validity**—Validity is closely related to the second aspect of form above. Validity addresses the credibility of information. Information is all over the Internet, but does it come from a credible source? Much of the information on the Internet has not gone through any sort of quality control or verification process before being published, so its validity is subject to legitimate question.

CONSIDERING INFORMATION FROM AN ORGANIZATIONAL PERSPECTIVE Organizations must treat information as any other resource or asset. It must be organized, managed, and disseminated effectively for the information to exhibit quality. Within an organization, information flows in four basic directions (see Figure 1.4 on the next page):

1. **Upward.** Upward information flows describe the current state of the organization based on its daily transactions. When a sale occurs, for example, that information originates at the lowest level of the organization and is passed upward through the various levels. Along the way, the information takes on a finer level of *granularity*. ***Information granularity*** refers to the extent of detail within the information. At lower organizational levels, information exhibits fine granularity

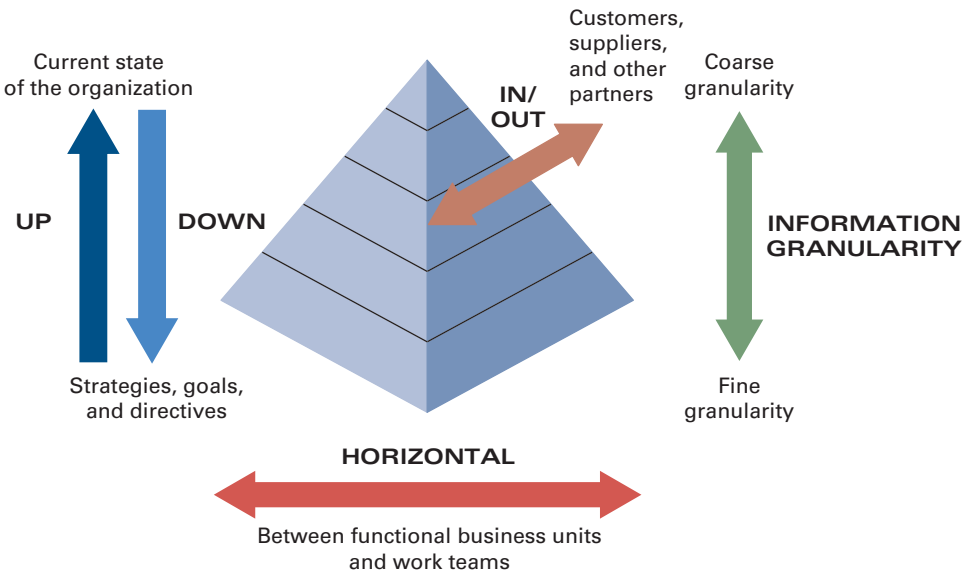


Figure 1.4

An Organization, Its Information Flows, and Information Granularity

because people need to work with information in great detail. At the upper organizational levels, information becomes coarser because it is summarized or aggregated in some way. That is, strategic managers need sales by year, for example, as opposed to knowing the detail of every single transaction.

2. **Downward.** Strategies, goals, and directives that originate at a higher level are passed to lower levels in downward information flows. The upper level of an organization develops strategies; the middle levels of an organization convert those strategies into tactics; and the lower levels of an organization deal with the operational details.
3. **Horizontal.** Information flows horizontally between functional business units and work teams. The goal here is to eliminate the old dilemma of "the right hand not knowing what the left hand is doing." All units of your organization need to inform other units of their processes and be informed by the other units regarding their processes. In general, everyone in a company needs to know everything relevant in a business sense (personal and sensitive data not included).
4. **Outward/inward.** Information is communicated from and to customers, suppliers, distributors, and other partners for the purpose of doing business. These flows of information are really what electronic commerce is all about. Today, no organization is an island, and outward/inward flows can yield a competitive advantage.

Another organizational perspective on information concerns what information describes. Information is internal or external, objective or subjective, and various combinations of these.

- ***Internal information*** describes specific operational aspects of an organization.
- ***External information*** describes the environment surrounding the organization.
- ***Objective information*** quantifiably describes something that is known.
- ***Subjective information*** attempts to describe something that is unknown.

Consider a bank that faces the decision about what interest rate to offer on a daily interest savings account. That bank will use internal information (how many customers have such accounts), external information (what rate other banks are offering), objective information (what is today's prime interest rate), and subjective information (what

PERSPECTIVES

OVERCOMING LANGUAGE BARRIERS ON THE INTERNET

The Internet is certainly a disruptive innovation (an innovation that unexpectedly displaces an established technology—in this case the telephone and other synchronous communications technologies[5]) that has eliminated geographical and location barriers. With almost one-sixth of the world's population having access to the Internet, "location, location, location" in the physical world is becoming less and less and less important.

However, we now have new issues to deal with, notably a language barrier. What happens if you connect to a site that offers information in a language you don't understand? How can you send an e-mail to someone who doesn't speak English? One solution is language translation software, and one company leading the way in the development of language translation software is SYSTRAN. General Motors of Canada uses the English–French translation capability of SYSTRAN to produce literature within the Canadian market.

SYSTRAN offers a suite of software tools that enables you to translate about 3,700 words per minute for e-mail, Web page, and pdf content, as well as display Asian fonts. Most of SYSTRAN's software products are also available as plug-ins for Microsoft Outlook, Word, Excel, and PowerPoint.

Is it perfect? Not according to SYSTRAN's disclaimer. It states specifics about what its products will do, then encourages you to carefully review any translation before making it a part of your business communications.

Indeed, when Kentucky Fried Chicken wanted to translate its slogan "Finger-lickin good" into Chinese, it came out as "Eat your fingers off." Product names are another example. When General Motors tried to sell the Chevy Nova in South America, people didn't buy it because *No va* means "it won't go" in Spanish. (Neither of those two companies were using language translation software provided by SYSTRAN.)

Experiment with this. Connect to SYSTRAN's Web site at www.systransoft.com. Type in a phrase and choose the language into which you would like it translated.[6]

the prime interest rate is expected to be in the future). Actually, the rate other banks are offering is not only external information (it describes the environment surrounding the organization) but also objective information (it is quantifiably known). Information usually has more than one aspect to it.

PEOPLE AS A KEY RESOURCE IN MIS

The single most important resource in any organization is its people. People set goals, carry out tasks, make decisions, serve customers, and, in the case of IT specialists, provide a stable and reliable technology environment so the organization can run smoothly and gain a competitive advantage in the marketplace. So, this discussion is all about *you*.

In business, your most valuable asset is *not* technology but rather your *mind*. IT is simply a set of tools that help you work with and process information. It's really a mind support tool set. Technology such as spreadsheet software can help you quickly create a high-quality and revealing graph. But it can't tell you whether you should build a bar or a pie graph, and it can't help you determine whether you should show sales by territory or sales by salesperson. Those are *your* tasks, and that's why your business curriculum includes classes in human resource management, accounting, finance, marketing, and perhaps production and operations management.

Nonetheless, technology is an important set of tools for you. Technology can help you be more efficient and can help you dissect and better understand problems and opportunities. So, it's as important for you to learn how to use your technology tool set as it is important that you understand the information to which you're applying your technology tools.

TECHNOLOGY LITERACY A ***technology-literate knowledge*** worker knows how and when to apply technology. The "how" aspect includes knowing which technology to purchase, how to exploit the many benefits of application software, and what technology infrastructure is required to get businesses connected to each other, just to name a few. From your personal perspective, we've provided ELMs in this text to help you become a technology-literate knowledge worker.

We encourage you to read all the ELMs, especially ELM D (Careers in Business). That module covers career opportunities in a variety of business disciplines including finance, marketing, accounting, management, and many others. Reading ELM D (Careers in Business) will help prepare you for whatever career you choose. You'll find a discussion there of key technologies for each business discipline that will help you succeed in your career.

A technology-literate knowledge worker also knows "when" to apply technology. Unfortunately, in many cases, people and organizations blindly decide to use technology in a desperate effort to solve a business problem. Technology is not a panacea. You can't simply apply technology to any given process and expect that process instantly to become more efficient and effective. Look at it this way—if you apply technology to a process that doesn't work correctly, then you'll only be doing things wrong millions of times faster. There are cases when technology is not the solution. Being a technology-literate knowledge worker will help you determine when and when not to apply technology.

INFORMATION LITERACY An ***information-literate knowledge worker***

- Can define what information is needed
- Knows how and where to obtain information
- Understands the information once it is received (i.e., can transform the information into business intelligence)
- Can act appropriately based on the information to help the organization achieve the greatest advantage.

Consider a real-life example of an information-literate knowledge worker. Several years ago, a manager of a retail store received some interesting information: diaper sales on Friday evenings accounted for a larger than expected percentage of total sales of that item for the week. Most people learning this would have immediately jumped to a strategy that ensured diapers were always well stocked on Friday evenings, or to run a special on diapers Friday evenings to increase sales even further; but not our information-literate knowledge worker. She first looked at the information and decided that she needed more information in order to create business intelligence. She simply needed to know more before she could act.

She decided the business intelligence she needed was *why* diaper sales spiked on Friday evenings and *who* was buying the diapers. That intelligence was not stored within the computer system, so she stationed an employee in the diaper aisle on Friday evening to record any information pertinent to the situation (i.e., she knew how and where to obtain the information). The store manager learned that young businessmen purchased the most diapers on Friday evenings—obviously stocking up for the weekend on their way home from work. The manager's response was to stock premium domestic and imported beer near the diapers. Since then, Friday evening has been a big sales time not only for diapers but also for premium beer.

There are a couple of important lessons you can learn from this story. First, as we've stated, technology is not a panacea. Although a computer system generated the initial report detailing the sales of diapers on Friday evenings, our retail store manager did not make any further use of technology to design and implement her innovative and highly

effective solution. Second, this story can help you distinguish between information and business intelligence. In this case, the information was the sales of diapers on Friday evening. The business intelligence, however, included

- *Who* was making diaper purchases on Friday evening
- *Why* those people were purchasing diapers on Friday evening
- *What* complementary product(s) those people might also want or need. (This last point might also illustrate the manager's special *knowledge*.)

As a good rule of thumb, when you receive information and need to make a decision based on it, ask yourself questions that start with *who*, *what*, *when*, *why*, *where*, and *how*. Answers to those questions will help you create business intelligence and make better decisions.

YOUR ETHICAL RESPONSIBILITIES Your roles as a technology-literate and information-literate knowledge worker extend far beyond using technology and business intelligence to gain a competitive advantage in the marketplace for your organization. You must also consider your social responsibilities: This is where ethics become important. ***Ethics*** are the principles and standards that guide our behaviour toward other people. Your ethics have consequences for you just as laws do. But ethics are different from laws. Laws either clearly require or prohibit an action. Ethics are more subjective, more a matter of personal or cultural interpretation. Thus, ethical decision making can be complex. A decision or an action in some cases might have—or be expected to have—an outcome that is actually right or wrong according to different people's ethics. Consider the following examples of actions:

1. Copying software you purchase, making copies for your friends, and *charging them* for the copies
2. Making an extra backup of your software just in case both the copy you are using and the primary backup fail for some reason
3. Giving out the phone numbers of your friends and family, without their permission, to a telecom provider of some sort of calling plan so you can receive a discount.

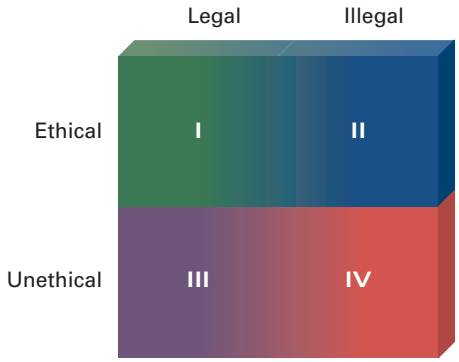
Each of these examples is either ethically (according to you or some people) or legally (according to the government) incorrect or both. In the second example, you might be ethically okay in making an extra backup copy (because you didn't share it with anyone), but according to some software licenses you're prohibited by law from making more than one backup copy. What do you think about the first and third examples? Illegal? Unethical? Both?

To help you better understand the relationship between ethical acts and legal acts, consider Figure 1.5. The graph is composed of four quadrants, and the complexity of ethical decisions about behaviour is suggested by quadrant III (legal but unethical). Do any of the three examples above fall in quadrant III? Perhaps you can think of some other actions that although legal might still be unethical (how about gossiping?). You always want your actions to remain in quadrant I. If all your actions fall into that quadrant, you'll always be acting both legally and ethically and thus in a socially responsible way. Clearly, technology has further increased the complexity of ethics in our society because of the speed and casual ease with which people can access, distribute, and use information.

Being socially and ethically responsible in the information age involves not only the actions you initiate yourself but also what you do to protect

Figure 1.5

Acting Ethically and Legally[7]



PERSPECTIVES

E-LEARNING: NOT JUST FOR SCHOOL

To become effective in your use of information, you can use technology to learn—not only about what information means, but also basically how to perform your work responsibilities better. Brink's Home Security, the largest international security network with over 200 branches in Canada and the United States, recently implemented an e-learning management system to help (1) train its 2,600 employees, (2) increase customer retention, (3) improve profits, and (4) reduce employee turnover.

Many of Brink's field personnel work nights and weekends, installing home security systems. For them, instructor-led classes in a central location (Brink's operates in more than 52 countries) simply didn't work.

The new e-learning management system helps managers develop customized on-line training modules and allows field personnel to access those modules 24 hours per day, seven days per week. The system even provides skills assessment and other forms of evaluation.

The total investment in the system for Brink's was US$300,000. Brink's expects to save US$500,000 in the first three years as a result of replacing instructor-led classes with the e-learning modules. Brink's has already noticed that its better-trained field personnel have improved profit margins and increased customer retention.[8]

yourself and your organization against the actions of others—that is, protecting yourself and your organization against cyber crimes. There are many types of cyber crimes—such as promulgating viruses or worms, committing identity theft, and engaging in Web defacing—performed by a variety of hackers such as black-hat hackers and cyberterrorists, and it is your responsibility to guard against them. It might even be considered an ethical lapse not to do so. We cannot stress enough how important it is for you to protect yourself and your organization's assets in cyberspace. We'll talk more about these issues in Chapter 8 (Protecting People and Information) and ELM C (Computer Crime and Digital Forensics).

INFORMATION TECHNOLOGY AS A KEY RESOURCE IN MIS

The third key resource for management information systems (MIS) is ***information technology (IT)***, any computer-based tool that people use to work with information and support the information and information-processing needs of an organization. IT includes a cell phone or PDA that you use to obtain stock quotes, your home computer that you use to write term papers, large networks that businesses use to connect to one another, and the Internet, which almost one in every six people in the world currently has access to.

KEY TECHNOLOGY CATEGORIES One simple—yet effective—way to categorize technology is as either *hardware* or *software* (see Figure 1.6). ***Hardware*** is the physical devices that make up a computer. ***Software*** is the set of instructions that your hardware executes to carry out a specific task for you. So, your PDA is the actual hardware; and it contains software that you use to maintain your calendar, update your address book, check your e-mail, watch videos, obtain stock market quotes, and so on.

All hardware technology falls into one of the following six basic categories:

1. An ***input device*** is a tool you use to enter information and commands. Input devices include such tools as keyboard, mouse, touch screen, game controller, and bar code reader.

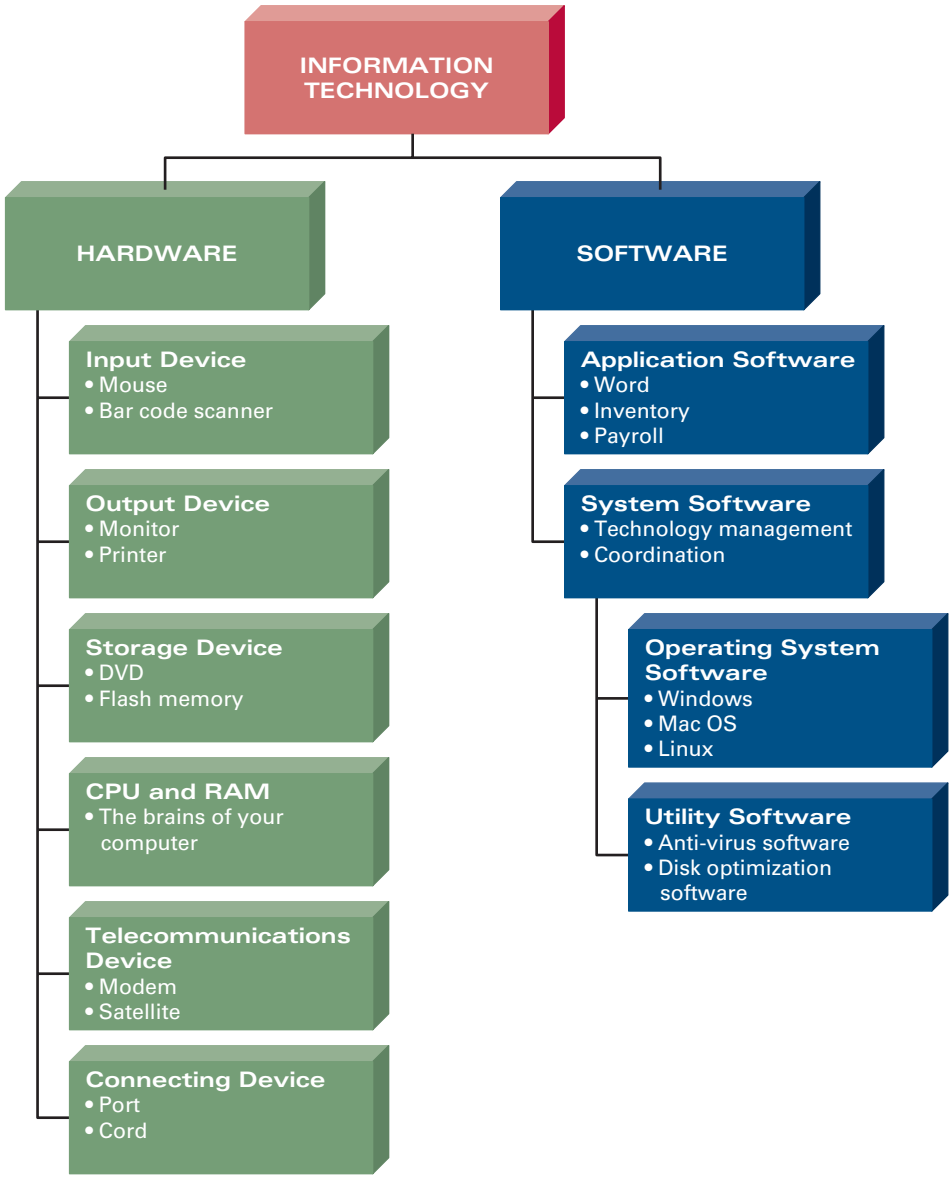


Figure 1.6

Information Technology Hardware and Software

2. An ***output device*** is a tool you use to see, hear, or otherwise recognize the results of your information-processing requests. Output devices include such tools as printer, monitor, and speakers.
3. A ***storage device*** is a tool you use to store information for use at a later time. Storage devices include such tools as USB keys, flash memory cards, and DVDs.
4. The ***central processing unit (CPU)*** is the hardware that interprets and executes the system and application software instructions and coordinates the operation of all the hardware. ***RAM***, or ***random access memory***, is a temporary holding area for the information you're working with as well as the system and application software instructions that the CPU currently needs.
5. A ***telecommunications device*** is a tool you use to send information to and receive it from another person or computer in a network. If you connect to the Internet using a modem, the modem is a telecommunications device.

6. *Connecting devices* include such things as a USB port into which you connect a printer, connector cables to connect your printer to the USB port, and internal connecting devices on the motherboard.

There are two main types of software: *application* and *system*. ***Application software*** is the software that enables you to solve specific problems and perform specific tasks. Microsoft Word, for example, can help you write term papers. From an organizational point of view, payroll software, collaborative software, and inventory management software are all examples of application software.

System software handles tasks specific to technology management and coordinates the interaction of all technology devices. System software includes network operating system software, drivers for your printer and scanner, operating system software such as Windows Vista and Mac OS, and utility software such as anti-virus software, uninstaller software, and file security software.

If this is your first exposure to technology hardware and software, we suggest you explore ELM A (Computer Hardware and Software).

As we have seen, MIS really is all about three key organizational resources—the people involved, the information they need, and the information technology that helps them. MIS is about getting the right technology and the right information into the hands of the right people at the right time. To meet the technology and information needs of your organization, you must understand the industry in which you operate, build the appropriate business strategies, and then identify the important business processes that support the strategies. Finally, you select the right technologies.

LO2

Porter's Five Forces Model: Assessing the State of the Competition

Businesses should never "throw technology" at a problem, or use technology just for the sake of technology. On the contrary, businesses engage in discussion and strategic decision making to determine how technology can best support their efforts, which are quite different for each business. As you learn about the field of management information systems and the use of information technology, your foremost question should be: How do businesses decide which technologies to use and when? As we stated earlier, organizations determine which technology to use and when to use it by following a process such as

1. Assess the state of competition and industry pressures affecting your organization.
2. Determine business strategies critical to success in meeting those competitive and industry pressures.
3. Identify important business processes that support your chosen business strategies.
4. Align technology tools with the important business processes.

In this section we'll examine the first step—understanding the competitive forces within an industry. We'll do so by exploring the use of Porter's Five Forces Model. In the remaining two sections of the chapter, we'll cover several useful models for developing business strategy, the second step above, and then finally we'll cover value chain analysis as a tool for identifying important business processes. Throughout the entire book, we'll introduce you to technology and discuss its importance for supporting business processes.

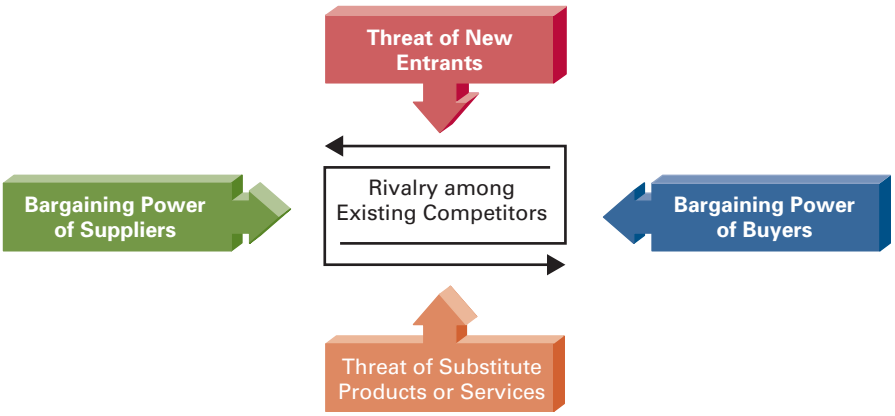


Figure 1.7
Michael Porter's Five Forces Model

Michael Porter's framework—called the Five Forces Model—has long been accepted as a useful tool for business people to use when thinking about business strategy and the impact of IT.[9] The ***Five Forces Model*** helps business people understand the relative attractiveness of an industry and the industry's competitive pressures in terms of the following five forces (see Figure 1.7):

1. Buyer power
2. Supplier power
3. Threat of substitute products or services
4. Threat of new entrants
5. Rivalry among existing competitors.

BUYER POWER

Buyer power in the Five Forces Model is high when buyers have many choices from which to buy, and low when their choices are few. Providers of products and services in a particular industry wish to reduce buyer power. They create a competitive advantage by making it more attractive for customers to buy from them than from their competition. Below are a few of the many companies using IT–enabled processes to reduce buyer power.

- zip.ca—Canada's largest online DVD rental service allows you to set up your movie list. After you watch a movie and return it, zip.ca will send you the next movie on your list.
- Air Canada—Enrol in the Aeroplan program. As you travel on Air Canada (or its many partners such as German airline Lufthansa), you accumulate miles for free air travel, upgrades, and hotel stays. Programs like this one, which reward customers based on the amount of business they do with a particular organization, are called ***loyalty programs***.
- Apple iTunes—Create an iTunes account and buy and download whatever music you want. Then, you can organize and manage your music, move it to your iPod, and burn CDs.
- Dell—Completely customize your computer purchase. It will be delivered to your doorstep within a few business days.

What's interesting about each of these examples (as well as all the others you can think of) is that the competitors in those industries have responded by creating similar programs. This simply means that no competitive advantage is ever permanent. A ***competitive***

advantage is providing a product or service in a way that customers value more than what the competition is able to do. zip.ca was the first to offer movie rentals within Canada (in partnership with Rogers Video) using the Internet as the primary platform. Therefore, it had ***first-mover advantage***, a significant impact on gaining market share by being the first to market with a competitive advantage. However, others soon followed with similar offerings, thus nullifying that competitive advantage. Every major airline has a loyalty program similar to that of Air Canada. There are many places on the Internet where you can buy and download music. And almost every major computer vendor allows you to customize your computer purchase. The lesson learned here—and for all strategies that result in a competitive advantage—is that a competitive advantage is only temporary and your organization must constantly innovate to find new competitive advantages.

SUPPLIER POWER

Supplier power in the Five Forces Model is high when buyers have few choices from which to buy, and low when their choices are many. Supplier power is the opposite of buyer power: As a supplier organization in an industry, you want buyer power to be low and your supplier power to be high.

In a typical supply chain (see Figure 1.8), your organization will probably be both a supplier (to customer organizations) and a buyer, or customer (of other supplier organizations). As a customer of other supplier organizations, you want to increase your buyer power. As a supplier to other organizations, you want to increase your supplier power, thus reducing your customer's buyer power.

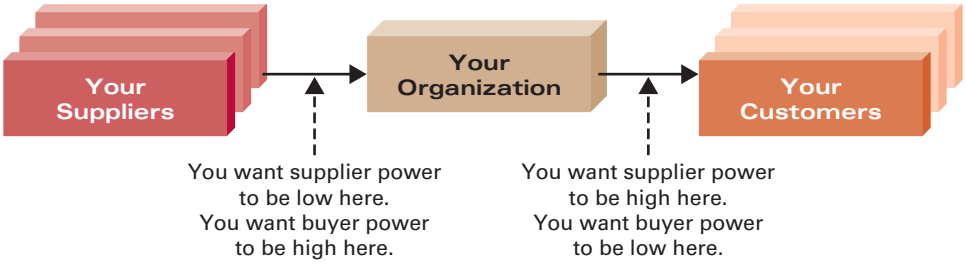
In the quest for increasing supplier power, organizations use many tools at their disposal, not just IT. Companies obtain patents and trademarks to minimize the extent to which products and services can be duplicated and offered by other organizations. The De Beers Group for many years has fought fiercely to tightly control the supply and distribution of diamonds. OPEC (the Organization of the Petroleum Exporting Countries) has organized 13 oil-producing nations to better control the distribution of the world's most popular energy resource (reportedly to ensure the stabilization of oil prices).

THREAT OF SUBSTITUTE PRODUCTS OR SERVICES

The ***threat of substitute products or services*** in the Five Forces Model is high when there are many alternatives to a product or service, and low when there are few alternatives from which to choose. Ideally, your organization would like to be a supplier organization in a market in which there are few substitutes for the products and services you offer. Of course, that's seldom possible in any market today, but you can still create a competitive advantage by increasing *switching costs*. ***Switching costs*** are costs that make customers reluctant to switch to another product or service supplier. A switching cost does not necessarily have to be an actual monetary cost.

Figure 1.8

Evaluating Buyer and Supplier Power for Your Organization



As you buy products at amazon.ca over time, for example, Amazon develops a unique profile of your shopping and purchasing habits through such techniques as collaborative filtering. When you visit Amazon, products are offered to you that have been tailored to your profile. This is possible only through the use of sophisticated technologies. If you choose to do your shopping elsewhere, there is a switching cost of sorts because the new site you visit will not have a profile of you or a record of your past purchases. (This is an effective variant of a loyalty program.) So Amazon has reduced the threat of substitute products and services, in a market in which there are many substitutes, by tailoring offerings to you, by creating a "cost" to you to switch to another online retailer.

Switching costs can of course be real monetary costs, too. You've probably been introduced to a switching cost when you signed up for the services of a cell phone provider. All the options and plans sound really great. But there is a serious switching cost in that most cell phone providers require you to sign a long-term contract (as long as two or three years) in order to receive a free phone or unlimited night and weekend calling minutes. The very successful substitute to this has been prepaid cards and, more recently, disposable cell phones that contain a certain number of minutes for your use.

THREAT OF NEW ENTRANTS

The ***threat of new entrants*** in the Five Forces Model is high when it is easy for new competitors to enter a market, and low when there are significant entry barriers to entering a market. An ***entry barrier*** is a product or service feature that customers have come to expect from organizations in a particular industry and that must be offered by an entering organization to compete and survive. Such barriers are erected, and overcome, and then new ones are created again. This is that vicious business cycle of build a competitive advantage, enjoy first-mover advantage, and then watch your competition develop similar initiatives— thereby nullifying your competitive advantage.

For example, if you're thinking of starting a bank, you must offer your customers an array of IT–enabled services, including ATM use, on-line bill paying and account monitoring, and the like. These are significant IT–based entry barriers to entering the banking market because you must offer them for free (or a very small fee). If you consider our previous example of cell phone providers, a significant entry barrier in the past had to do with your phone number. Previously, if you wanted to change cell phone providers, you couldn't take your telephone number with you (i.e., you had to get a new cell phone number). This created a significant entry barrier because new cell phone providers entering the industry were mainly limited to obtaining new customers who did not currently have a cell phone. But that has all changed with *LNP*, *Local Number Portability*, your ability to take your cell phone number with you to a new provider.

RIVALRY AMONG EXISTING COMPETITORS

The ***rivalry among existing competitors*** in the Five Forces Model is high when competition is fierce in a market, and low when competition is more complacent. Simply put, competition is more intense in some industries than in others, although the overall trend is toward increased competition in just about every industry. Rarely can you identify an industry that exhibits complacent competition. (One example might be mortician and burial services. Because of the nature of the services offered, you don't see mortician and burial service organizations actively advertising on TV, offering reduced rates, and so on.)

The retail grocery industry in Canada is intensely competitive. While Loblaw, Metro, and Safeway compete in many different ways, essentially they try to beat or match the competition on price. For example, most have loyalty programs that give shoppers special discounts and privileges. In this way, stores gather valuable business intelligence on customer buying habits that help the chains craft pricing, advertising, and coupon strategies.

PERSPECTIVES

COMPARING THE E-COMMERCE ACTIVITIES OF DIFFERENT GOVERNMENTS—A NEW KIND OF COMPETITION

Most people don't think that the government has any competitors but it does in many ways. Think about Income Security programs (Old Age Security and Canada Pension Plan), Canada's health insurance plans, and other types of programs that compete with for-profit companies offering retirement programs, health care insurance, prescription medication policies, and so on. Governments even compete with each other, after a fashion, to see who's doing the best job of serving their citizenry.

For example, according to a report presented by the United Nations, the U.S. government ranks first overall in the aggregated categories of number of computers per 100 citizens, number of Internet hosts per 1,000 citizens, percentage of population on-line, number of telephone lines per 100 citizens, and an information access index (the ease with which government information can be found.) That's pretty impressive.

However, according to a second report released by Accenture, the government of Canada ranked first in overall citizen satisfaction with the provision of e-government services. Categories in that report included e-government customer relationship management activities, maturity level of delivering services electronically, number of multichannel service delivery options, and extent to which the government shares information with its citizens. So, while the United States has the best infrastructure in place for e-government activities, Canada seems to be the best at determining what its citizens want and need. By the way, the United States ranked third in the Accenture study.

E-government is a major force and player on the Internet. According to Nielsen Net Ratings, the U.S. government ranked sixth among the most popularly visited sites, behind Microsoft, Time Warner (AOL), Yahoo!, Google, and eBay but ahead of Lycos, Walt Disney, RealNetworks, Amazon, and Ask.[10, 11, 12]

Since margins are quite low in the grocery retail market, grocers build efficiencies into their supply chains, connecting with their suppliers in IT–enabled information partnerships. Communicating with suppliers over telecommunications networks rather than using paper-based systems makes the procurement process much faster, cheaper, and more accurate. That equates to lower prices for customers—and increased rivalry among existing competitors.

As you can see, Porter's Five Forces Model is extremely useful in helping you better understand the positioning of your organization within its industry and in helping you better understand the competitive forces affecting your organization. With this knowledge in mind, your organization's second task is to develop specific business strategies to remain competitive and profitable.

LO3

Porter's Three Generic Strategies: Building Business Strategy

The development of business strategies is a vast and wide discipline. There are literally hundreds of methods and approaches to the development of business strategy. There are even more books on the subject. (One such book with a particularly innovative approach is *Blue Ocean Strategy* by Kim and Mauborgne. Be sure to put it on your wish list of business books to read.) Here, we'll focus on Michael Porter's three generic strategies and two other approaches.

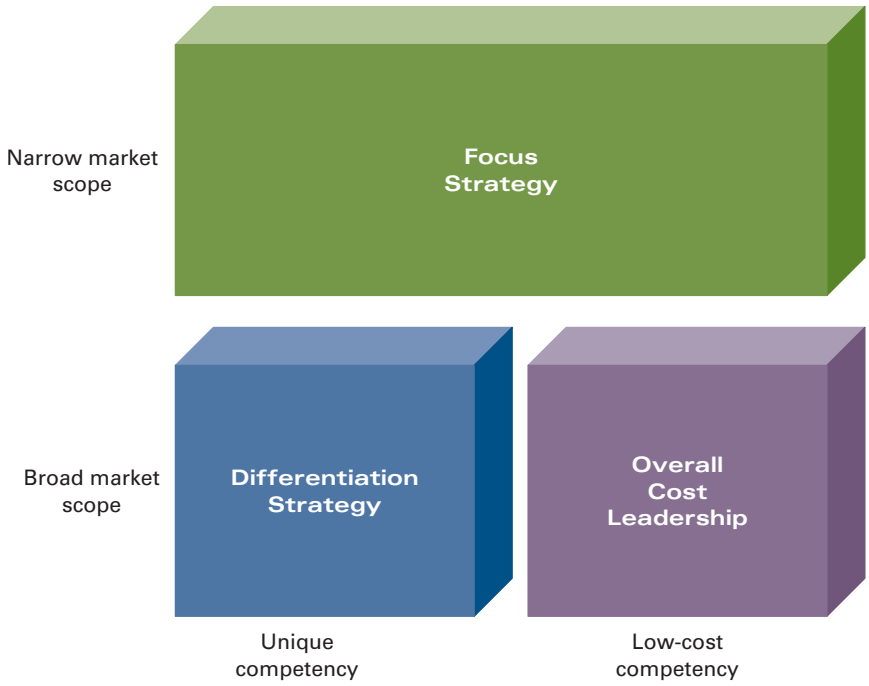


Figure 1.9

Michael Porter's Three Generic Strategies

Michael Porter identified three approaches or strategies to beating the competition in any industry (see Figure 1.9). They are

1. Overall cost leadership
2. Differentiation
3. Focus

OVERALL COST LEADERSHIP

Overall cost leadership is defined by Porter as offering the same or better quality product or service at a price that is lower than any competitor is able to offer. Examples of organizations focusing on overall cost leadership are numerous and change almost daily, with the most well-known example being Walmart. Walmart's slogans of "Always Low Prices, Always" and "We Sell for Less, Every Day" accurately describe the strategy of overall cost leadership. For everything from women's lingerie to car batteries, Walmart's focus is on offering the same products as the competition but at a lower price. Walmart relies on an IT–enabled tight supply chain management system to squeeze out every penny possible from the procurement, distribution, and warehousing of its products. The company uses sophisticated business intelligence systems to predict what customers will want and when.

Dell works in a similar fashion. Its sell-source-ship model of customizing computer purchases revolutionized the industry. Automobile makers Hyundai and Kia similarly attempt to sell reliable low-cost vehicles to a wide audience, in contrast to Hummer and Mercedes-Benz, which have no overall cost leadership strategy. The large grocery retail chains we identified earlier such as Loblaw, Safeway, and Metro essentially compete on price, often offering loss leaders just to get customers in the store. A ***loss leader*** is a product sold at or below cost to entice customers into a store in the hope that they will also buy more profitable products. Loss leaders are often placed in the back of the store so customers will have to walk by products with higher profit margins.

IT can be a particularly effective tool if your organization chooses an overall cost leadership strategy. IT can tighten supply chain systems, help you capture and assimilate customer information to better understand buying patterns in an effort to better predict product inventory and shelf placement, and make it easy (efficient) for customers to order your products through Web-enabled e-commerce systems.

DIFFERENTIATION

Differentiation is defined by Porter as offering a product or service that is perceived as being "unique" in the marketplace. GM's Chevrolet Motor Division is trying to be just that with its Volt, a totally electric concept vehicle that GM promises to bring to production by 2010. GM and Chevrolet are positioning themselves as the ultimate green vehicle manufacturer—thus different from all others. Another example could unfold in the recent purchase of Canada's venerable Hudson's Bay Company by the owners of the upscale US chains Fortunoff and Lord & Taylor. While plans are preliminary, news as of the July 2008 purchase was that NRDC (the new owners of HBC) planned to embed Fortunoff and Lord & Taylor stores within existing HBC outlets, creating a wholly different shopping experience. Clearly there is a niche in this area between the moderately upscale HBC and the next step up in retail in Canada (Harry Rosen and Holt Renfrew, for example).[13]

Apple Computer also focuses on differentiation as a business strategy. Apple computers not only look different, but also have a different screen interface and focus more on non-textual information processing such as photos, music, and videos than do any of the competition.

Both Audi and Michelin have successfully created a differentiation strategy based on safety. To be sure, differentiation is not about being different based on lower price—that's the strategy of overall cost leadership—but the two are interrelated. While many people are willing to pay extra for grocery products at an upscale food market, they are not willing to pay too much extra. Organizations focusing on differentiation must still be concerned about price in relation to the competition.

FOCUS

Focus as a strategy is usually defined as focusing on offering products and services (1) to a particular market segment or buyer group, (2) within a segment of a product line, and/or (3) to a specific geographic market. Focus is the opposite of attempting to be "all things to all people." Many restaurants focus on only a certain type of food—Mediterranean, Mexican, Chinese, and so forth. Stores such as Bulk Barn, Canada's largest bulk food retailer, focus on allowing customers to buy non-packaged perishable items in any quantity. Many doctors focus on only a particular type of medical help—oncology, paediatrics, and so on; similarly, many law offices focus on a particular legal venue—worker's compensation, living trusts, patents and trademarks.

As with the other generic strategies defined by Porter, focus cannot be practised in isolation. If your organization chooses a particular buyer group on which to focus, you can bet that other competitors will do so as well, so you'll also have to compete on price (overall cost leadership) and/or differentiation, too.

TWO INTERESTING AND COMPLEMENTARY STRATEGY FRAMEWORKS

Besides Porter's three generic strategies, there are numerous other strategy frameworks. Most people tend to use more than one as each provides another perspective from which

to make decisions regarding the best business strategy given the competitive pressures of the industry. Here, we'll briefly look at two other frameworks; you'll easily see they are both different from and similar to Porter's three generic strategies (and each other).

TOP LINE VERSUS BOTTOM LINE A typical income statement for a business has two main parts: (1) revenues and (2) expenses (see Figure 1.10). Revenues are monies your organization receives from selling its products and services while expenses are the costs it incurs providing those products and services. From a strategy point of view, you can focus on the "top line" (revenues) or the "bottom line" (expenses).

When focusing on the top line, your strategy is to *increase revenues*, which can be achieved any number of ways—reaching new customer segments, offering new products, cross-selling related services, offering complementary products, just to name a few. Conversely, when focusing on the bottom line, your strategy is to *minimize your expenses* in making your products or providing your services, which can be achieved in a number of ways as well—optimizing manufacturing processes, decreasing transportation costs, reducing the costs of human capital, minimizing errors in a process, again to name just a few. A bottom-line strategy is similar to Porter's strategy of overall cost leadership. And a top-line strategy is analogous to either or both differentiation and focus as defined by Porter. You will never focus solely on one to the neglect of the other; rather, you will focus on some combination of the two, since they are means to the same end (greater profitability).

From an IT point of view, you must form a business strategy that addresses the role of IT in affecting both the top line and bottom line, though not necessarily equally. For example, you could use technology to implement a ***customer self-service system*** on the Web. A customer self-service system is an extension of a transaction processing system that places technology in the hands of an organization's customers and allows them to process their own transactions. (A ***transaction processing system*** or ***TPS*** is a system that processes transactions within an organization.) On-line banking and ATMs are examples of self-service systems. With these, bank customers have the ability to do their banking from anywhere at any time.

In the United States, on-line banking and ATMs have allowed banks to reduce the costs associated with the delivery of many types of services. Thus, they support a bottom-line strategy. Financial institutions also use these IT–enabled systems to attract new customers.

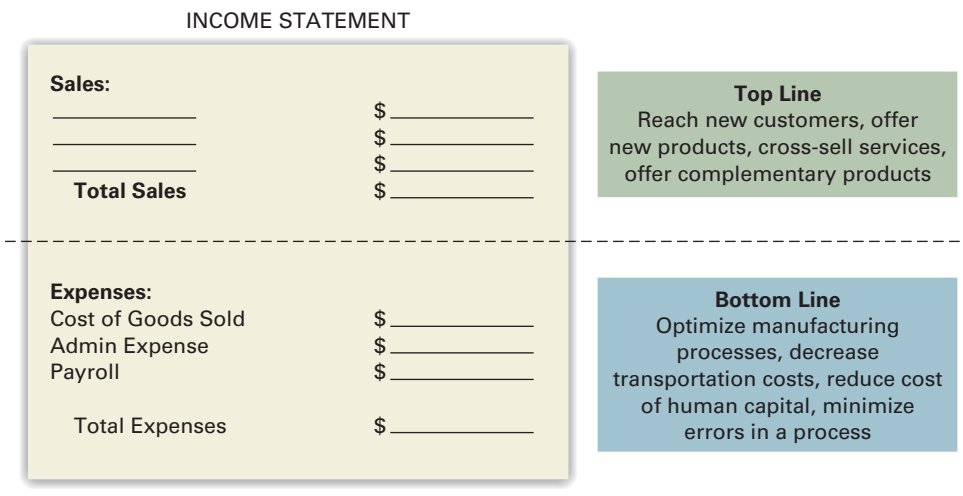


Figure 1.10

Business Strategy: Top Line versus Bottom Line

PERSPECTIVES

CREATING SYNERGY AMONG TOP LINE AND BOTTOM LINE

Top-line and bottom-line initiatives are different means to the same end: increased net profit. Top-line initiatives achieve that end by focusing on increasing revenue while bottom-line initiatives achieve that end by focusing on decreasing costs. What you really hope to find is a technology-supported initiative that will allow you to do both—simultaneously increase revenues and decrease costs. That's what Ottawa's Lee Valley Tools, among many other leading retailers, was able to do. Lee Valley Tools is a manufacturing and multi-channel retail company specializing in woodworking and gardening tools and equipment, as well as woodworking hardware and gifts. Its research, development, and manufacturing arm, Veritas Tools, has developed, patented, and currently manufactures innovative tools, including numerous wood planes, marking gauges, and other measuring tools, as well as router tables and sharpening systems. A Lee Valley subsidiary, Canica Design, invents, patents, and manufactures highly advanced medical instruments including scalpels and an innovative wound-closure system.

Using integrated order management software such as that provided by CommercialWare, Lee Valley Tools and others are able to cut error rates in manual data entry and verification as well as simultaneously increase sales performance.[14]

Oddly, U.S. citizens and institutions have lagged considerably behind Canada and other industrialized countries in their use of automated payment systems (such as Interac). Though processing costs are considerably lower vis-à-vis the paper system of cheques, the United States has been slow to adopt the technology.[15] Many financial institutions now also offer various products such as stamps for sale through ATMs. Again, this is an example of using IT to focus on the top line, increasing revenues, by selling new products.

As you learn about various technologies in this book, ask yourself

1. How can I apply these technologies in a business environment to help my organization implement a top-line strategy (i.e., increase revenues)?
2. How can I apply these technologies in a business environment to help my organization implement a bottom-line strategy (i.e., minimize expenses)?

RUN-GROW-TRANSFORM FRAMEWORK A helpful conceptual framework for viewing the bigger organizational picture and determining the use of IT in it is the ***run-grow-transform (RGT) framework***, an approach in which you allocate in terms of percentages how you will spend your IT dollars on various types of business strategies. For example, if you're interested only in "business-as-usual" but cheaper and faster than the competition, you would focus a great percentage of your IT dollars on a "run" strategy. If you wanted to transform your business in some way, you would allocate a certain percentage of your IT dollars to a "transformation" strategy. The following are the aspects of the RGT framework:

- *Run*—optimize the execution of activities and processes already in place. Seek organizational growth through offering products and services faster and cheaper than the competition.
- *Grow*—increase market reach and product and service offerings; expand market share; and so on. Seek organizational growth by taking market share from the competition (i.e., get a bigger piece of the pie).

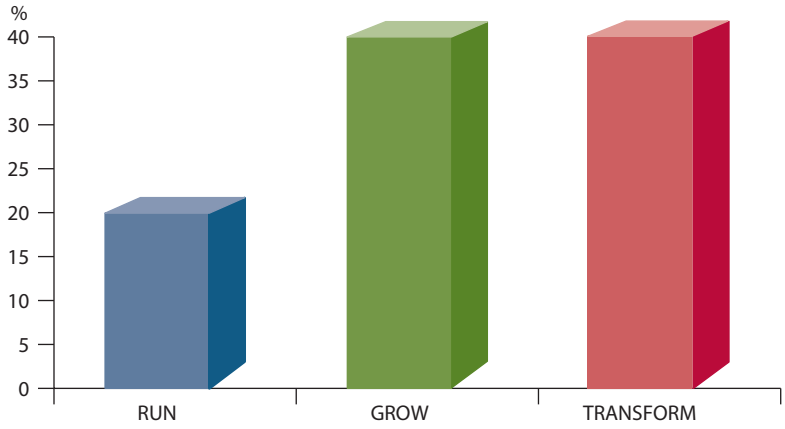
- *Transform*—innovate business processes and/or products and services in a completely new way, move into seemingly different markets, and so on. Seek organizational growth through new and different means.

As you can see, the RGT framework is similar in many ways to both Porter's three generic strategies and a top-line versus bottom-line approach as follows:

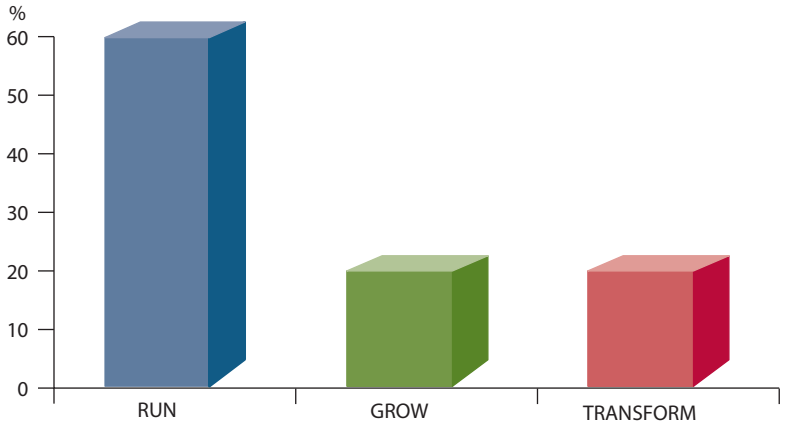
- Run = overall cost leadership = bottom line
- Grow = focus and differentiation = top line
- Transform = (new) differentiation = top line (when the focus is innovation)

The application of the RGT framework is often best considered with an eye to the maturity of the organization and the maturity of the industry (see Figure 1.11). A new venture start-up, for example, will often focus more of its efforts on the grow aspect, while a mature organization—with a well-defined and successful line of products and services—in a mature industry will often focus more of its efforts on the run aspect. In the latter instance, the organization may already be a market leader and want to ensure and sustain its competitive advantage through price and cost optimization.

Regardless of maturity, however, all organizations must focus on the *transformation* aspect. In the business world, as is often said, if you're standing still, you're falling



A new venture start-up focusing less on running the organization and more on growing and transforming the organization.



A mature organization within a mature industry focusing mainly on efficiently running the organization.

Figure 1.11

Illustrations of the Run-Grow-Transform (RGT) Framework

behind. It's a simple fact—your competition is always trying to do something better than you are. Therefore, your organization must constantly seek to evolve and, in most cases, to transform itself. Many times, your organization can take a proactive approach to using technology to transform itself. Below are just a few of the many examples of organizations that have focused on transformation.

- ePost—In 1999, Canada Post launched The Electronic Post Office™ service, ePost, the world's first universally available e-billing solution. While the value of being able to receive, view, pay, and store bills online is a major driver of Electronic Bill Presentment and Payment (EBPP) services, Canada Post envisions a time when all types of critical and sensitive documents will be securely delivered online.
- eBay—The world's most popular online auction site, eBay acquired PayPal a few years ago and began offering payment services to its buyers and sellers. In 2003, it began offering its own MasterCard credit card (a great example of transformation), with its "Anything Points" program offering eBay members the ability to buy products and pay for seller services with points accumulated from using a credit card.
- General Motors (GM)—Many people believe that GM's core competency is the production of automobiles. While that may be true, a major portion of its revenue comes from the financing of automobiles (and other big-ticket items such as homes). Its financing business segment (GMAC) is now more profitable than the actual manufacturing and selling of automobiles. GM doesn't want you to pay cash for a car—it wants you to finance the purchase through GMAC.

Like these examples, your organization too must constantly seek to transform itself. The highly competitive business environment necessitates this focus on evolving toward ever greater competitive advantage. IT can help.

LO4

Identifying Important Business Processes: Value Chain Analysis

Thus far, you've learned how to (1) understand your organization within the context of its industry and competitive pressures and (2) define your organization's major strategy for effectively competing using three approaches—Porter's three generic strategies, top line versus bottom line, and the run-grow-transform framework. Now, your organization is at a point "where the rubber meets the road" with respect to how technology will be used in a positive way to affect various processes in support of your strategy. A helpful tool is *value chain analysis*. ***Value chain analysis*** is a systematic approach to assessing and improving the value of business processes within your organization to further increase its competitive strengths.

A ***value chain*** is the chain or series of business processes, each of which adds value to your organization's products or services for customers. A ***business process*** is a standardized set of activities that accomplishes a specific task; for instance, processing a customer order, delivering the customer order, service after the sale, and so on. Overall, value chain analysis helps your organization identify valuable business processes.

Figure 1.12 depicts the typical components of a value chain. The chain of ***primary value processes*** along the bottom half takes in the raw materials and makes, delivers, markets, and sells, and services your organization's products or services.

- *Inbound logistics*—receiving and warehousing raw materials and distributing those raw materials to manufacturing as needed.

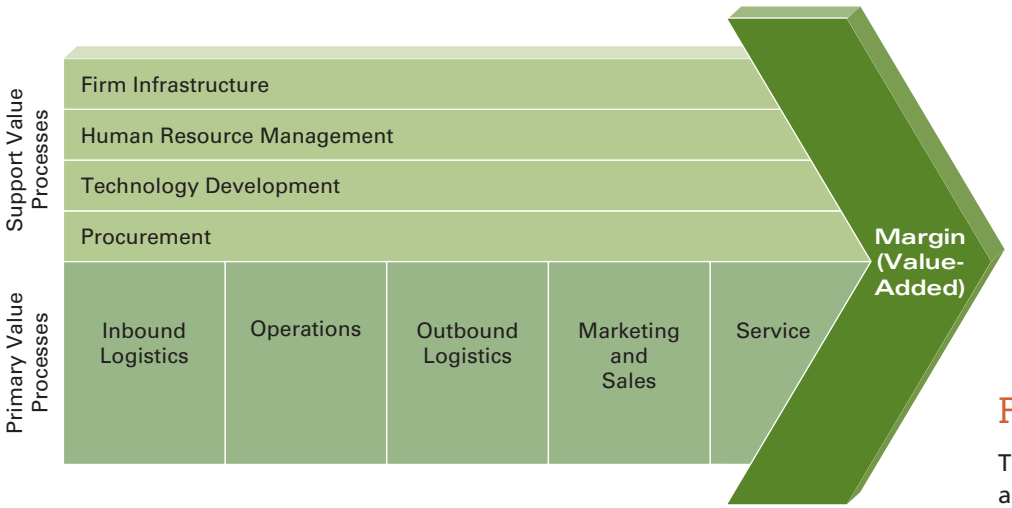


Figure 1.12
The Components of a Value Chain

- *Operations*—processing raw materials into finished products and services.
- *Outbound logistics*—warehousing and distributing finished products and services.
- *Marketing and sales*—identifying customer needs and generating sales.
- *Service*—supporting customers after the sale of products and services.

Support value processes along the top half of the chain—firm infrastructure (culture, structure, control systems, accounting, legal, and so on), human resource management, technology development, and procurement (purchasing of raw materials)—support the primary value processes. Your organization requires these support value processes to ensure the smooth operation of the primary value processes.

Your organization's margin or profit depends on how well you perform both the primary value processes and support value processes. That is, the amount that your customers are willing to pay (defining the value your customers place on your products and services) must exceed the cost of the processes in the value chain. This concept is similar to top-line and bottom-line strategies in that your success (profit) depends on the revenue from customers (top line) exceeding the costs of your operations (bottom line).

You may never have heard of the Robert Talbott Company of Carmel Valley, California, but if you know what a necktie is, you can get the gist of the analysis that follows.[16] Talbott is a premier necktie manufacturer in the United States. Talbott traditionally shunned the use of technology; for example, all of its tie orders were written on paper forms. That used to work fine, because Talbott always ensured value-added by utilizing high-quality workmanship, unique designs, and fine fabrics. However, in today's fast-changing consumer market, customers want constantly updated styles and more of them. Talbott now creates four neckwear lines for Nordstrom each year with up to 300 designs per line.

How might a value chain analysis help Talbott in its operations? It could do so by identifying both value-added and value-reducing processes within its value chain. Let's look at the identification of value-added processes first.

IDENTIFYING PROCESSES THAT ADD VALUE

Talbott should first construct a survey instrument for its customers and ask which of the processes (both primary and support) within the value chain add the most value. This type of survey is often in a format in which a customer must assign a total of 100 points

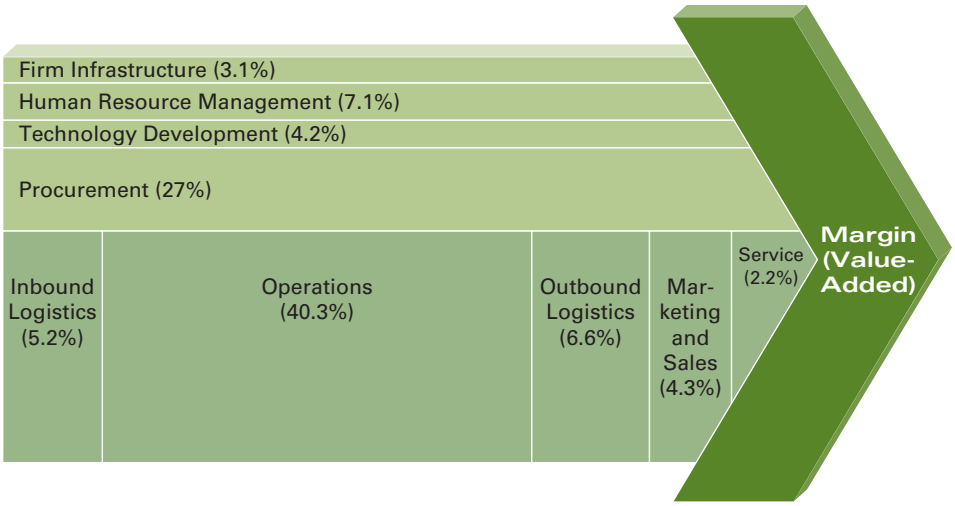


Figure 1.13

The Value-Added View of a Necktie Manufacturer

across all the processes. Then, by summing all the responses and creating a percentage of total for each process, Talbott can determine which processes add the most value. Figure 1.13 depicts one possible customer survey result. Notice how the processes in the figure are sized to depict the value that customers attribute to each process. The largest value-added source is the high-quality manufacturing process (operations). Still, a close second is the purchasing procurement process that provides access to high-quality silks and other fabrics. As these processes are the ones that are most visible to customers, they will quickly add even more value when supported by IT. Therefore, Talbott has created a computer-aided design system to reduce the time it takes to create and manufacture new ties. It could also further strengthen its quality-control systems to ensure that the procurement of raw materials results in the highest quality of silks and other fabrics.

IDENTIFYING PROCESSES THAT REDUCE VALUE

After identifying value-added processes, it's important to identify those processes that reduce value for the customers. To do this, Talbott creates a second part to its survey instrument. In this part, Talbott asks customers to assign 100 points across all processes according to which processes reduce value. Then, by once again summing all the responses and creating a percentage of total for each process, Talbott can determine which processes reduce value the most.

Talbott identified the marketing and sales process as the process that reduced value the most, as shown in Figure 1.14. It found that sales were lost because salespeople were promising neckties that were out of stock. Customers were beginning to lose faith in Talbott's ability to deliver high-quality ties. They saw this process failure as one that reduced Talbott's value to them as customers.

To correct its marketing and sales process deficiencies, Talbott implemented a new IT system to get timely product information to the sales force. Using laptop computers, the sales force now carries product line information on the road with them. They place orders over their computers from their hotel rooms and receive inventory updates at the same time. As a result, neckties that customers want are on the shelves on a timely basis and customers have new faith in an old friend who now adds more value than ever.

Evaluating value chains is particularly effective because it forces your organization to gather and analyze quantifiable information from your customers. It eliminates much of

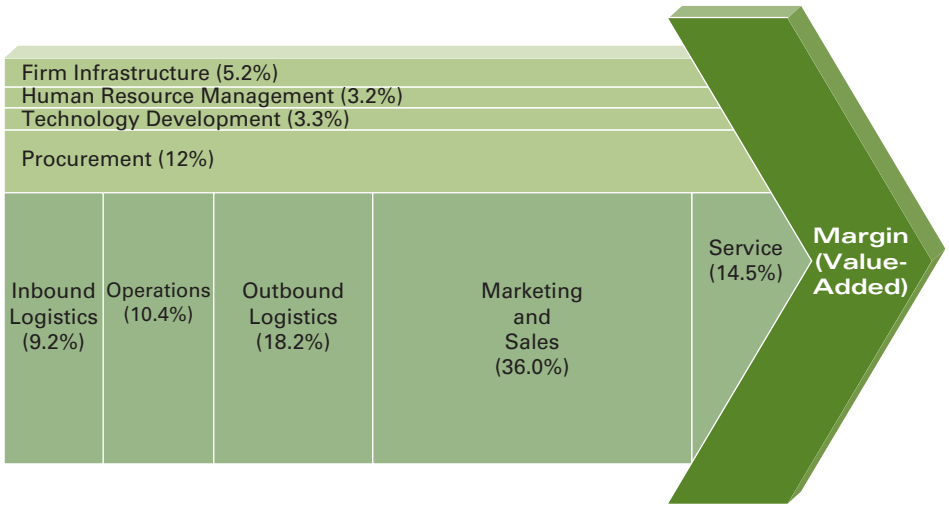


Figure 1.14

The Value-Reduced View of a Necktie Manufacturer

the "flying by the seat of your pants" in making decisions. And as you begin to quantify important information, you can build a better return-on-investment case for the acquisition, development, and use of IT to further add value to your processes and reduce ineffectiveness.

To briefly summarize our main points in this chapter, MIS is all about people using technology to work with information as they support the organization in its quest for a competitive advantage. You can't blindly apply technology; you must carefully select technology within the context of the competitive pressures of your industry, the business strategies that you choose, and the important business processes you identify.

Introduction to Enterprise Systems

LO5

To manage today's complex global business environments, organizations rely on enterprise systems (ES). The aim of an ES is to ensure that information can be shared across all functional levels and management hierarchies. ES help eliminate the problem of information fragmentation caused by multiple information systems in an organization.

Most businesses are moving away from home-grown solutions to ES. ES are incredibly complex, general-purpose software packages with capabilities to support a wide variety of companies and industries. As a result, they must be configured to support the organizational structures and business processes of the particular company to efficiently and effectively manage a firm's business processes. Unless a company uses it to become more efficient and effective in delivering goods and services to its customers, the ES will be only a drain on company resources.

Major solutions provided by ES include

- enterprise resource planning (ERP).
- customer relationship management (CRM).
- supply chain management (SCM).

These types of systems will be discussed throughout the text. The major business solutions comprise components (for example, sales & distribution, materials management, accounts payable, human resources, production, project system, marketing resource management, sales planning & forecasting, supplier network, and business warehouse)

that allow organizations to select only those they require to meet their business requirements. It is important to note that all components are dependent on the financial and control components, making these the fundamental core of ES. All of the business solutions and selected components sit on top of one or more databases; it is the ES that controls and manages the database. Sometimes the ES and database are purchased from different vendors.

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Summary: LEARNING OUTCOMES *REVISITED*

LO1 **Define management information systems (MIS) and describe the three important organizational resources within it.** ***Management Information Systems (MIS)*** deal with the planning for, development, management, and use of information technology tools to help people perform all tasks related to information processing and management. People, as an organizational resource within MIS, are the most important of the three. To be successful in their use of technology, people must be both ***information-literate*** and ***technology-literate***. Information in various forms goes by many names such as ***data***, ***business intelligence***, and ***knowledge***. All are intellectual assets but exhibit subtle differences. ***Information*** is data that has meaning within a specific context. ***Information technology (IT)*** is any computer-based tool that people use to work with information and support the information and information-processing needs of an organization.

LO2 **Describe how to use Porter's Five Forces Model to evaluate the relative attractiveness of and competitive pressures in an industry.** Porter's ***Five Forces Model*** focuses on industry analysis according to five forces: (1) ***buyer power***—high when buyers have many choices and low when choices are few; (2) ***supplier power***—high when buyers have few choices and high when choices are many; (3) ***threat of substitute products and services***—high when many alternative are available and low when alternatives are few; (4) ***threat of new entrants***—high when it is easy to get into a market and low when it is difficult to get into a market; and (5) ***rivalry among existing competitors***—high when competition is fierce and low when competition is more complacent.

LO3 **Compare and contrast Porter's three generic strategies; top line versus bottom line; and the run-grow-transform framework as approaches to the development of business strategy.** Porter's *three generic strategies* are (1) ***overall cost leadership***—the same or better quality products at a price less than that of the competition; (2) ***differentiation***—a product or service that is perceived as being "unique;" and (3) ***focus***—products or services for a particular buyer group, within a segment of a product line, and/or a specific geographic market. A *top-line* strategy focuses on increasing revenues by increasing market share, cross-selling complementary products, etc. A *bottom-line* strategy focuses on decreasing costs by optimizing processes, reducing errors, etc. Finally, the ***RGT framework*** requires that you allocate in terms of percentages how you will spend your IT dollars among running the organization, growing the organization, and transforming the organization.

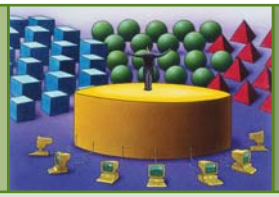
LO4 **Describe the role of value chain analysis in identifying value-added and value-reducing processes.** ***Value chain analysis*** is a systematic approach to assessing and improving the value of business processes within your organization to further increase its competitive strengths. Value chain analysis allows you to gather customer data and quantifiably assess the extent to which different processes add value and reduce value, thus identifying those processes that would benefit from IT support.

LO5 **List three major types of enterprise systems (ES) and describe how they can create value for an organization.** We consider ES an umbrella, comprising several major system types in use

within organizations of all kinds. These include enterprise resource planning (ERP), customer relationship management (CRM), and supply chain management (SCM) systems. Each provides an incredibly rich, complex, and powerful toolset, which must first be configured and tuned to match the business process of the individual organization. Without such individual fine-tuning and optimization, ES provide nothing more than a drain on organizational resources.

CLOSING CASE STUDY 1

Exploring Your Space at MySpace.com



While being interviewed by *The Hollywood Reporter* concerning MySpace, Rupert Murdoch stated, "In a sense, we say we've got 30 million portals." In early 2008, MySpace.com had more than 110 million active monthly users around the world. According to comScore, it ranked third in page views among all domains.[17]

Social networking sites are an interesting phenomenon on the Web. In a sense, eBay (www.ebay.ca) is a social networking site that supports the gathering of consumer buyers and sellers. Epinions.com (www.epinions.com) is a social networking site enabling consumers to share product reviews. Wikipedia (www.wikipedia.org) is a social networking site focusing on the development of free open-source information and content.

In MySpace.ca, you create and maintain your own "portal," a sort of personal Web site. In that portal, you create a personal page about yourself, sharing just about any information you care to. You can include photos, create a blog about a topic of interest, and establish relationships with other people in chat rooms.

Beyond just personal social networking, MySpace is becoming the space for many types of businesses. Most notably, musicians and bands are using MySpace to post and sell music. Over 660,000 musicians and bands maintain user profiles on MySpace. And those musicians aren't just limited to fledgling "wannabes." Madonna pursued an aggressive campaign at MySpace for her album *Confessions on a Dance Floor.* Madonna even posted her own confessions on MySpace, describing how she loves to go through people's bags while they're not looking (and other questionable acts). Other MySpace users can watch Madonna's videos, and even copy and paste them into their own profile sections.

Television shows and movies are also jumping into MySpace. TV shows like *Family Guy, The Man Show*, and *Kitchen Confidential* have a MySpace presence. Popular movies like *Walk the Line* and *Saw II* have their own space.

Book publishers spend extensive time reading and reviewing self-print books written on MySpace. Many people have found MySpace to be an excellent venue for self-publishing a book, getting people to read it, and getting publishers to take a look at their manuscripts. Many book publishers have profiles on MySpace and encourage authors to submit books and manuscripts there.

Of course, there is also a dark side to MySpace. Recently, a man created a MySpace portal and used it to attract underage girls for the purpose to committing sexual acts with them. He was caught but not before making contact with several potential victims.[18, 19]

Finally, with the introduction of legislation in Canada that prohibits the distribution of copyrighted material (Bill C-61 in June 2008), sites such as MySpace and YouTube also become targets for those monitoring copyright infractions. Whether this will have a chilling effect on Web 2.0 sharing is yet to be seen.

Questions

1. Visit MySpace (www.myspace.com). What process do you go through to create your own personal portal? Do you have to pay a fee? What information do you have to provide MySpace to create a personal portal?
2. Search for a "friend" on MySpace. How do you do this? What are the search criteria you can use?
3. Peruse the various blogs on MySpace. What seem to be the dominant blog topics? Did you find any blogs that are of questionable social value (according to your own ethics)? If so, what were the topics?

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4. Search for your favourite garage band or perhaps a popular well-known band. What content were you able to find? Could you view a music video? If so, could you view the entire video or just a segment of it?
5. In your opinion, why have social networking sites grown in popularity? Do you have a MySpace profile? If so, why did you create it?
6. According to one account, MySpace is designed to be "unedited and democratic." But as you read above, MySpace has been used by pedophiles to attract young children. Should MySpace be completely uncontrolled and unedited? Does MySpace have a societal obligation to censor questionable content? In your view, what does "questionable content" mean?
7. Will Canada's Bill C-61 put a damper on the "democratization" of digital media? Review the legislation on-line (search for it) and decide whether you side with the government (balances the rights of copyright holders and consumers) or with the bill's critics (who state that it will lead to a police state). This is heady and controversial stuff. How do you feel about such legislation? Does it make Canada a groundbreaker or a laggard in terms of the digital revolution? Will it deter you from downloading and sharing copyrighted media? Why or why not? What would you do if you were caught breaking the law in this way?

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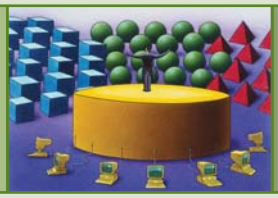
CLOSING CASE STUDY 2

Is the World Dumping Data on You?



It goes by many terms—information overload, analysis paralysis, data dumping, and so on. You know what we're talking about. It is indeed great to live in the information age with a plethora of digital technologies at your fingertips giving you access almost instantly to massive amounts of information. But is all of that information really useful? Do you find yourself spending hours on end searching through that vast amount of information to find exactly what you need? Are search engines really good at helping you quickly locate the precise information you need?

Those are very important questions in the business world. Time is money, and time spent looking for the right information is wasted time and therefore an increased cost, resulting in a decrease in profits. An Accenture study of 1,009 managers at U.S. and U.K. companies with annual revenues exceeding $500 million in revenues revealed the following startling facts:

- IT managers spend 30 percent of their time trying to find information relevant to their jobs.
- 42 percent say they are bombarded by too much information.
- 44 percent complain that other departments don't share data.
- 39 percent can't figure out which information is current.
- 38 percent often receive duplicate data.
- 21 percent don't understand the value of the information once they receive it.
- 84 percent say they store information on hard drives or e-mail, and don't share data that might be relevant to others.
- Only 16 percent state that they use collaborative tools—essential tools for sharing information.[20]

Information is a critical and valuable resource to any organization. It can easily be shared and used by many people, unlike other resources such as money. Knowing the right information about your competitors, your own internal operations, and your customers can yield a significant competitive advantage in the marketplace.

From a personal point of view, having the right information is essential as well. It will help you pick the right classes to take and when. It can make you more efficient and effective in writing term papers. It can help you with your taxes, plan your retirement, and determine which car best fits within your budget and meets your needs.[21]

Questions

1. Critically evaluate the bulleted list of information-related items in this case study. How is each contradictory to the notion of being an information-literate knowledge worker?
2. Consider again Figure 1.1 on page 6 and the steps we presented in the chapter for determining which technologies are most appropriate in an organization. Why is this process so important? During *each* of the four steps in that decision process, what information should be derived and used in the next step?
3. Again, considering the four steps in determining which technologies are most appropriate in an organization, for the information you identified as crucial to be derived during each step in Question 2, which of that information is internal, external, objective, or subjective information? Which information is some combination of internal, external, objective, or subjective?
4. Is it ethical for people in an organization to withhold information and not share it with other employees? If so, under what circumstances would it be acceptable not to share certain types of information with other employees? What can organizations do to encourage their employees to share information?
5. What about your personal life at your school? How easy is it to find the following information on your school's Web site?
   - The course description for the classes you are currently taking.
   - A list of classes you need to take to complete your degree.
   - The requirements you must meet to qualify for various types of government-supported loan programs.
   - The process you go through to apply for graduation.
6. Overall, how would you rate your school's Web site in terms of providing the information you need? How would you rate your school's Web site in terms of allowing you to process your own transactions, such as signing up for a class, scheduling time with an adviser, and so on?

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Key Terms and Concepts

Short-Answer Questions

1. What is the relationship between management information systems (MIS) and information technology (IT)?
2. What four steps should an organization follow in determining which technologies to use?
3. What are some relationships among data, information, business intelligence (BI), and knowledge?
4. How does the granularity of information change as it moves from lower to upper organizational levels?
5. What is the difference between a technology-literate knowledge worker and an information-literate knowledge worker?
6. How do ethics differ from laws?
7. What role does the Five Forces Model play in decision making?
8. Why are competitive advantages never permanent?
9. What are the three generic strategies according to Michael Porter?
10. How are Porter's three generic strategies, a top-line versus bottom-line approach, and the RGT framework similar?
11. Why is value chain analysis so useful to companies?

Assignments and Exercises

1. **USING PORTER TO EVALUATE THE MOVIE RENTAL INDUSTRY** One hotly contested and highly competitive industry is the movie rental business. You can rent videos from local video rental stores, you can order pay-per-view from the comfort of your own home, and you can rent videos from the Web at such sites as zip.ca. Using Porter's Five Forces Model, evaluate the relative attractiveness of entering the movie rental business. Is buyer power low or high? Is supplier power low or high? Which substitute products and services are perceived as threats? Can new entrants easily enter the market? What are the barriers to entry? What is the level of rivalry among existing competitors? What is your overall view of the movie rental industry? Is it a good or bad industry to enter?
2. **REVIEWING THE 100 BEST COMPANIES TO WORK FOR** Each year *Fortune* devotes an issue to the top 100 best companies to work for. Find the most recent issue of *Fortune* that does this. First, develop a numerical summary that describes the 100 companies in terms of their respective industries. Which industries are the most dominant? Pick one of the more dominant industries (preferably one in which you would like to work) and choose a specific highlighted company. Prepare a short class presentation on why that company is among the 100 best to work for.
3. **YOUR SCHOOL'S VALUE CHAIN** Develop a value chain for your school. You don't have to gather information to construct the value chain, but you do have to determine which processes are support value processes and which processes are primary value processes. Draw your value chain according to Figure 1.12 on page 27. Finally, list the three most important processes to you as a student and provide a short explanation of why they are the most important to you.
4. **BUSINESS STRATEGY FOR ENTERING THE CELL PHONE SERVICE INDUSTRY** Assume that you run a start-up and have decided to enter the cell phone service industry. Which of the three generic strategies would you choose as your primary business strategy—overall cost leadership, differentiation, or focus? Explain your choice by elaborating on the product and service features you would offer to lure customers from the competition.
5. **RESEARCHING YOUR CAREER AND INFORMATION TECHNOLOGY** To position yourself in the best possible way to succeed in the business world, you need to start researching your career right now. Here, we would like you to focus on the IT skills your career requires. First, consider what career you want to have. Second, visit monster.ca (www.monster.ca) and search for jobs that relate to your career. Read through several of the job postings and determine what IT skills you need to acquire.

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Discussion Questions

1. The three key resources in management information systems (MIS) are information, information technology, and people. Which of these three resources is the most important? Why? The least important? Why?
2. We often say that hardware is the *physical* interface to a technology system while software is the *intellectual* interface. How is your hardware your physical interface to your computer? How is your software your intellectual interface to your computer? Do you see technology progressing to the point that we may no longer distinguish between hardware and software and thus no longer perceive differing physical and intellectual interfaces?
3. In a group of three to four students, consider eBay in the context of Porter's Five Forces Model. How does eBay reduce the threat of new entrants? If necessary, you may want to explore eBay's site (www.ebay.ca) and determine the role of buyer and seller ratings, its integration with PayPal, and how it helps buyers and sellers resolve disputes.
4. In this chapter, we discussed the use of loyalty programs in the travel industry as a mechanism for reducing buyer power. What is another industry that also uses loyalty programs to reduce buyer power? How does that industry use loyalty programs to do so?
5. As an information-literate knowledge worker for a local distributor of imported foods and spices, you've been asked to prepare a customer mailing list that will be sold to international cuisine restaurants in your area. If you do so, will you be acting ethically? Suppose you don't consider the proposal ethical. What will you do if your boss threatens to fire you if you don't prepare the list? Do you believe you would have any legal recourse if you didn't prepare the list and were subsequently fired?

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