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Learning objectives

- define the four components of an information system
- · identify how information systems can assist a start-up
- · understand how to create a web presence for your organization
- · learn how to use information systems to gain a competitive advantage
- · understand how companies identify their information needs and set priorities
- acquire an appreciation of why it is important to manage is risks

Introduction

This chapter explores how Information Systems (IS) can be used by managers to better develop their business idea, launch and sustain their businesses. It will also examine how IS forms the foundation for operations management, customer relationship management and financial and managerial accounting.

While you may be familiar with the term "this is the information age" it can mean different things to different people. In his famous book, *The World is Fla*t, (Friedman 2005) Thomas Friedman explains how IS has changed the way the world works. He calls the World Wide Web a "Global network for collaboration" and gives many examples of how many forms of knowledge work can now be done anywhere in the world, that individuals from different countries can collaborate on projects without having to travel to distant cities to meet each other face-to-face, and that projects can be worked on by contributors from anywhere in the world. Examples of these three possibilities are listed below, in order to give you a better appreciation for what is possible:

• Knowledge work can be done anywhere. Perhaps the most common example of this is software

development. Software engineers in developing economies can develop programs under contract from companies in the developed world at much lower cost. Known as "outsourcing", this is effective because universities in many developing economies such as India, China, Brazil, and Eastern Europe have well-trained programmers who are willing to work for wages above the prevailing wage levels in their home countries, but less than what a trained programmer earns in a developed country.

• Colleagues can collaborate on projects without having to travel great distances. Videoconferencing has reached the point where individuals can meet "face-to-face" over the Internet and have discussions related to a project they are working on together. These products can range from very sophisticated (and expensive) products like Cisco's "Telepresence" conferencing tool (Cisco 2009) to relatively inexpensive (or even free) software tools like Skype (Skype 2009).

The best examples of a large number of individuals collaborating on a common project is the so-called "open" movements: Open source programs like Linux and others we discuss later in this chapter, Open access to research journals, and the Open Educational Resources (OER) initiative which provide free educational resources over the Internet developed by volunteers from all over the world, of which the textbook you are reading from the Global Text Project is a prime example.

IS tools for the start-up organization

Before we begin our discussion of IS tools for a start-up organization, it is important to note that it may not be necessary to use a computer-based information system when you first go into business. You may be able to satisfy your information processing and record-keeping needs with manual systems. However, as the price of computers drop and your business expands, you may find it wise, as many small business owners do, to invest in computer-based information systems. Many people use Information Systems and Information Technology as if they meant the same thing. They are different, and it is important for you to understand the difference between them. As illustrated in Exhibit 41, an Information System is comprised of two sub-systems, a Social sub-system and a Technology sub-system.



Exhibit 41: An information system

The discussion of the four components of information systems as well as Exhibit 41 above has been extracted from another book in the Global Text library (Information Systems 2008).

The technology sub-system

An information system may not need the use of computers to make the accumulation, organization, and reporting of information easier, faster, or more reliable. In your organization early stages, you may find it simple enough to just keep paper records and communicate face-to-face or by telephone rather than use email. However,

modern organizations increasingly rely on information technology as the core of their information systems and part of the reason is that the cost of using computers has decreased as technology improves. We define information technology to include hardware, software and telecommunication equipment that is used to capture, process, store and distribute information.

Hardware is the physical equipment—such as a personal computer, a laptop, a portable computing device, and even a modern cell phone—used to process information. Software is the set of coded instructions (programs) that direct the hardware to perform the required tasks. A typical example is Google Docs—a word processing program designed to instruct a computer to create text documents. Telecommunication systems are the networking equipment enabling users and devices to communicate. An example of a telecommunication system is a telephone network, which allows two callers to interact by voice over a distance.

These three elements—hardware, software and telecommunication systems—comprise the technology component of an information system.

The process sub-system

As discussed in Chapter 7, a process is the set of steps employed to carry out a specific business or organizational activity. In other words, a process maps the set of actions that an individual, a group or an organization must enact in order to complete an activity. Consider the job of a grocery store manager and the process he engages in when restocking an inventory of goods for sale. The store manager must:

- check the inventory of goods for sale and identify the needed items
- call individual suppliers for quotations and possible delivery dates
- compare prices and delivery dates quoted among several suppliers for the same goods
- select one or more suppliers for each of the needed items based on the terms of the agreement (e.g. availability, quality, delivery)
- call these suppliers and place the orders
- · receive the goods upon delivery, checking the accuracy and quality of the shipped items; pay the suppliers

Note that there are multiple viable processes that an organization can design to complete the same activity. In the case of the grocery store, the timing and form of payment can differ dramatically, from cash on delivery to direct transfer of the payment to the supplier's bank account within three months of the purchase. The critical insight here is that the design of the process must fit with the other components of the information system and be adjusted when changes occur. It must also meet the unique needs of the organization. For example, imagine the grocery store manager purchasing a new software program that enables her to get quotations from all of the suppliers in the nearby regions and place orders online. Clearly the preceding process would need to change dramatically, and the store manager would need to be trained in the use of the new software program—in other words, changes would also affect the people component.

People

The people component of an information system encompasses all those individuals who are directly involved with the system. These people include the managers who define the goals of the system, and the users. The critical

insight here is that the individuals involved in the information system come to it with a set of skills, attitudes, interests, biases, and personal traits that need to be taken into account when the organization designs the information system. Very often, an information system fails because the users do not have enough skills, or have a negative attitude toward the system. Therefore, there should be enough training and time for users to get used to the new system.

For example, when implementing an automated payroll system, training on how to enter employees' account information, how to correct wrong entries, and how to deposit the salaries into each account should be provided to the human resources staff. The benefits of the system should be communicated to both the human resources staff and the employees in order to build up positive attitudes towards the new system.

Structure

The structure (or organizational structure) component of information systems refers to the relationship among the individuals in the people component. Thus, it encompasses hierarchical and reporting structures, and reward systems. Many of these issues are discussed in Chapter 5. The structure component plays a critical role in an information system, simply because systems often fail when they are resisted by their intended users. This can happen because individuals feel threatened by the new work system, or because of inherent human resistance to change. When designing a new information system the organization needs to be cognizant of the current and future reward system in order to create incentives to secure its success.

Relationships between the four components

At this point it should be clear how information systems, while enabled by IS, are not synonymous with IS. Each of the four components discussed above can undermine the success of an information system—the best software application will yield little result if users reject it and fail to adopt it. More subtly, the four components of information systems must work together for the systems to perform. Thus, when the organization decides to bring in a new technology to support its operation, the design team must adjust the existing processes or develop new ones. The people involved must be trained to make sure that they can carry out the processes. If the skills of these individuals are such that they can not perform the required tasks or be trained to do so, a different set of individuals need to be brought in to work with the system. Finally, the design team must evaluate whether the organizational structure needs to be modified as well. New positions may need to be created for additional responsibilities, and old jobs may need to be eliminated. The transition from the old way of doing things to the new system needs to be managed, ensuring that appropriate incentives and a reward structure is put in place.

Some practical advice for start-ups

- Do not invest in IS solutions until you can see that they will provide you with real benefits. They will require an investment of valuable time and money that you could perhaps use more effectively in other areas of your business.
- Installing IS systems often takes longer and costs more than originally estimated. You should have someone with IS skills available to help you get past the troubling points.
- Remember that it is usually a mistake to be one of the first to use a new technology. It can be risky, and it is even more important that you have access to personnel with strong IS skills.

At the same time, it can be a mistake to wait too long to gain business benefits from carefully chosen IS applications, particularly if your competition is taking advantage of IS for efficiency, effectiveness, and innovation.

Moving forward with information systems

When you decide it is time to move forward with leveraging your organization with information systems, you will appreciate the effort spent on developing a systems plan. The plan will state the kind of hardware, software, and communications technologies you need, as well as the sectors of your organization which should receive your attention first.

Many small organizations begin operations with manual systems to keep track of their operations. They may have simple lists on paper for customer, vendor, and employee information and keep a set of accounting records on paper as well. This was the way business information was kept by all organizations, large and small, before the advent of computers. When PCs became available, their cost was such that the power of the computer was made available at low cost and so today, most organizations of any size have at least one PC or laptop. You may well start out with keeping records manually, but before too long, you will appreciate how much easier it is to keep records on a computer and how well-designed software applications can provide you with valuable information quickly, in many different ways, whenever you need it.

One issue you will need to address early is your sourcing options, i.e. where will you obtain your hardware, software, and human resources to help you acquire and manage the IS resources you need. In Chapter 8, we discussed the ways that organizations partner with other organizations to perform essential business functions. It is very common for organizations to partner with another company to supply them with the specialized knowledge needed to acquire the right combination of hardware, software, and communications services to meet the needs of the organization. We will discuss these issues later in this chapter when we discuss the ways organizations develop a systems plan. Suffice it to say at this point, that you will have many options:

For example:

- You can hire an IS professional if your needs require a full-time employee to manage your IS processes (and if you can afford it). Organizations that do not need a full-time employee and do not have IS expertise available in-house or even on a part-time basis typically make arrangements for part-time support from an IS consulting firm. Sometimes the consulting firm is a sole proprietorship.
- You can acquire your own hardware (e.g. PCs) or you can buy time on another organization's hardware to run your software applications. In developed economies, there are companies like Google and Amazon that offer so-called "cloud computing" services. They have developed so much expertise in managing server farms (i.e. data centers) that they now sell hardware capacity on-demand to other companies. Similar options are available in other parts of the world.
- As with hardware, you have similar options with software. Up until recently, if you needed a software package to do the accounting for your organization, for example, you had to buy a package and install it on your own computer. Now, many software packages can be accessed with a simple Internet connection and a web browser. The software package resides not on your computer, but on the vendor's computer (or perhaps another computer "in the clouds").

All of the options have their advantages and disadvantages and we discuss them later in this chapter.

While it is certainly possible for you to hire a programmer and have him or her develop the software programs your organizations need, it is rare when a start-up company needs to do this as there are so many software programs available for you to use (and some of them are free). In all likelihood, you will begin to move your organization into the "information age" in one of two ways, either (1) acquiring a suite of commonly-used programs designed for meeting the needs of both individuals and organizations, or (2) acquiring software programs designed specifically to meet most needs of a small organization. Each of these options is discussed below:

Acquiring a suite of commonly-used programs

Perhaps the best-known suite of commonly used programs is Microsoft Office. A basic version of Office, Microsoft Office Standard 2007 includes four programs:

- 1. Microsoft Word, used for preparing documents
- 2. Microsoft Excel, used for preparing spreadsheets (most commonly used for accounting analyses but also useful for basic record-keeping such as customer lists or checkbooks)
- 3. PowerPoint, used for making presentations
- 4. Microsoft Outlook, used for managing email (Microsoft 2009)

There are several other open-source options available as well, typically at no cost to you. Some of these are:

- 1. OpenOffice (OpenOffice.org 2009)
- 2. Google Docs (Google 2009)
- 3. Zoho (Zoho 2009)

In addition to being free, the open source options have the ability to read and write computer file and is format compatible with the more widely used Microsoft products.

When to think about using database management software

As your business grows and you need to keep accurate records on a computer beyond what is reasonable to do with a spreadsheet program, you should consider adding database management software.

Karen Stille placed a good comparison of the features of database and spreadsheet software a website, QCISolutions. In summary, she states that:

"As a general rule of thumb, databases should be used for data storage and spreadsheets should be used to analyze data.

"In a nutshell we use a database if...

- the information is a large amount that would become unmanageable in spreadsheet form and is related to a particular subject.
- you want to maintain records for ongoing use.
- the information is subject to many changes (change of address, pricing changes, etc.).

• you want to generate reports based on the information.

Use a spreadsheet if...

- you want to crunch numbers and perform automatic calculations.
- you want to track a simple list of data.
- you want to easily create charts and graphs of your data.
- you want to create "What-if" scenarios.

"In most cases, using the combination of a database to store your business records and a spreadsheet to analyze selected information works best". (Stille 2009)

Microsoft's widely-used database management software is called ACCESS, and versions of Microsoft Office that use ACCESS are available for purchase. More information is available on the Microsoft site (Microsoft). On the other hand, open source database management software is also available at no cost to you. You may wish to examine one of the following open source packages to see if one of them meets your needs:

- MySQL (MySQL 2009)
- Zoho Creator (Zoho 2009)

One of the prevailing issues with using open source software rather than software you purchase is the level of support you can expect from the software's creator. If you pay for software, you have a right to expect excellent documentation and support. If the software is free, sometimes documentation and support do not meet the same standards. Much of the support you get is from the community of users. As of this writing, the worldwide community for ACCESS is much larger, and there are many books written about it. The open source databases are just as useful, but finding information and support can be a more tedious process. However, according to the Gartner Group, a highly-respected technology research company based in the US, open source database management software is becoming more attractive. In a report released in November 2008, they made the following observations:

"During 2008, since our last note about open-source database management systems (DBMSs), we have seen an increase in the interest and use of open-source DBMS engines in a production environment. As this trend continues to gain speed, the cost benefits of using an open-source DBMS is increasing and the risk of using it is decreasing.

Key findings:

- Lower total cost of ownership (TCO), compared to commercial DBMSs, can be realized for non-missioncritical applications.
- There are large third-party software vendors looking to certify open-source DBMSs as a platform for existing applications, including SAP.
- The major open-source DBMS products are now available for installation as a package, without involving the source code, including tools to help support the DBMS environment.

• If the technical capabilities of the staff are strong, use of an open-source DBMS in mission-critical environments is possible now.

Recommendations:

- Open-source DBMS engines can be used today for non-mission-critical applications with reduced risk over several years ago.
- Only use an open-source DBMS engine supplied by a vendor who controls or participates in the engineering of the DBMS and always purchase subscription support when used in production environments.
- If open source is part of your overall IS strategy, plan for the use of open-source DBMS engines in missioncritical environments in two to five years." (Gartner 2008)
- · Acquiring software programs designed specifically to meet most needs of a small organization
- In the same way that Office Suites are available which can perform many of the basic information systems tasks of a small organization, there are suites of programs available to perform specific functions like accounting, payroll, customer relationship management, inventory control and the like. Recall that we discussed computer-based accounting systems in considerable detail in Chapter 9.
- (Enterprise Resource Planning (ERP) systems are the analogous software solutions for large and mediumsized companies.) Examples of small business "suites" include the following:

Microsoft has a site devoted to software suite solutions for small businesses at:

http://www.microsoft.com/business/peopleready/

NetSuite (<u>www.netsuite.com</u>) NetSuite is in a category of software called "software as a service" (SaaS). In the SaaS model, the software resides on the servers of the software provider rather than on the using the organization's computer. The advantages of this model are that users never have to worry about software and data backups or software updates. These functions are provided at the software company's data centers. Some SaaS models charge users by the month, others charge them at a variable rate, based on the number of transactions per month and/or the size of their databases. The downside for some users with SaaS is that the information is not kept "in-house". Although hosted solutions are considered very secure, some users worry about security and privacy issues. The website, <u>www.2020software.com</u>, compares several small business software suites, and has links to the companies' sites.

There are a number of open source initiatives for small business software you may wish to investigate. One such example is xTuple (<u>http://www.xtuple.org/</u>). A comprehensive list of options is available at SourceForge (<u>www.sourceforge.net</u>). Our previous cautions on the use of open source software products apply here as well.

Creating a Web presence

Having a website is now considered as necessary as a phone or fax number even an email address for corresponding with customers. Since the site will be a reflection of your organization, its product or service, the most important step is to research and plan. For most businesses, a Web site can serve as a resource for information and to promote the organization, its brand, and the value of the product or services being offered. But

many times, businesses as well as individuals create a site for the sake of having one, without taking time to understand what customers and the business expect from a site. When you set down to create your site, consider the following first:

- Decide on a budget.
- Decide on a name (Domain Name or URL). Check <u>http://www.whois.com</u> to see if the name is already taken.
- Register the name (Domain Name or URL). Login to a registrar like <u>http://www.godaddy.com</u> and follow their instructions for registration.
- Decide how the site will be designed and maintained (who will handle this).
- What will be the content of the site?
- Decide on a hosting company for the site. There are hundreds, if not thousands of hosting companies will host your website for as little as USD 3.95 per month. A simple Google search will turn up many candidates for you in your locale. To get an appreciation of the kinds of hosting services that are available from US-based companies, go to http://hostingreview.com.
- Decide whether you will hire someone to build the site for you or if you want to use one of the many template-driven software packages to build it yourself.

Finding out what kinds of information your customers want, and then designing and developing your site to provide up-to-date, ongoing resource materials can help you better position your products or services and serve as a credible "go-to spot". A web site can go from a simple one-page site with your name and mission statement to a site with multiple pages that include on-line sales, newsletters and discussion forums.

Know what your customers want

Remember that your Web site should be a dynamic communication tool. Users today are conditioned to use the Web as a where-to-turn resource, where they expect up-to-date news, information and tips related to your product or services. Users will also use the information provide to compare you with others, specifically your competition. For you, it is also another opportunity where you can promote your services and serve the community. There is nothing gained by having a website that posts dry, out-of-date content. Keep a pulse on what kind of information about your product/services customers are looking for, and how and where they expect to find it. Do not be too quick to list the areas where you feel you are strongest—remember to put yourself in your customer's shoes and ask what they want to ask: "What is in it for me (WIIFM) to visit this website?"

An effective site should:

- Recognize the needs of all who will use your site, vendors, customers and yes even employees, and direct each to the content that will interest them most.
- Be easy to access, read and use with well-thought-out content, useful links, e-mail addresses or phone numbers.
- Provide helpful information on how to keep customers coming back

Make your visitors feel confident about choosing your organization as a provider for the product or services for which they are looking.

Give your customer a positive experience

Knowing what your customer wants to see on your website is only half the challenge. In today's quick to find, instant gratification environment, your customers not only want to find information on your services and product quickly, the want to share it and have a positive customer experience when they do. A positive experience is one that not only gives your customer their needed information but one, that provokes positive feedback from your customer when he or she contacts you via a Web chat or Internet phone. This gives customers an incredible ability to quickly and easily influence others as well as providing instant feedback into your customers buying patterns and feelings about your site and company.

If you can better understand your customer, their needs and objectives you will better understand how to measure and track the "voice of the customer". Why? This will foster a better customer relationship and will provide you with two outcomes: (1) having your customer extend your marketing without additional cost and (2) having customer based testimonies on their experiences that will increase your companies' reputation of the products or services you offer.

Know the basics

Whether you already have a site that is an offshoot of a current business you have done work with, or it is a stand-alone site (brochureware)—or whether you are considering creating a Web site, the information you provide is key. Looking at some of the best known websites, several sites stand out for their information, creativity, usefulness and easy to use. One such site, video how-to site <u>http://www.Howcast.com</u>, is a gem. At one time or another we have all tried to do things without reading the instructions. Howcast.com not only addresses this, but provides video as well.

The key elements of any site are a user-friendly, clean appearance and consistently improving content. As you determine your needs for a website, one of the important goals should be to allow your customers to access your site and avoid the time-consuming process of surfing the Web for similar products or services. They can visit your site and be taken to useful, informative sites.

The have-to's of an effective site:

- An introduction of your products or services: what is it, who uses it and why to buy it
- · Basic information up front: contact information, product or services information, etc.
- · Listing of products or services, grouped together by topic
- News: Post the latest information about how your organization is changing, how your products or services are being accepted or who is buying them. Consider an e-newsletter in PDF form with tips readers can hold onto
- Articles: Post in PDF form product information and marketing material by your marketing or product development team on what is new or what is coming

• A contact mechanism—a way for customers to ask a question, request information, register for warranty of your product or services, get your newsletter or get a referral

The next layer of your site:

- where and how to send a customer information they are seeking
- printable/downloadable forms for transmitting
- product/services tips and tools
- product updates
- upcoming events, such as industry or company seminars, with an agenda and how to register or request information
- · community outreach information that shows how your organization is helping members of the community
- · periodic satisfaction surveys that poll customers

The enhanced, "special customer" layer to your site:

- Password-protected forms
- · password-protected customer sensitive data
- credit card encryption
- personal data (i.e. date of birth, social security number, contact info, etc.)
- · enhanced articles and updates
- special programs and communications

eMarket your website

Register your website with search engines, some registration domain sites may have this available (check their pages and see if they do this) and what it will cost you to have your web site pulled to the front of the list. The more search engines that you register with the more the site will be displayed to those looking for products or services you offer. Note: a number of these sites are fee based, the more times your site comes up in a search the more it may cost you. At a minimum, you should consider registering your web page with both Google and Yahoo (instruction with registering on these search engines can be found on there respective sites). Both of these sites as well as MSN.com are the most commonly used web search engines sites globally.

In this process, when you view your web page, at the bottom you will a see box called Meta Tags (Meta tags are text within the source code of a web page. It provides information to search engines about the content of a specific page or site) This is where you put in key words or phrases that the search engines will pick up on when someone does a search.

Examples:

- Fish Store: Fish, Fresh Water, Fish Food, Guppies, Angel, etc.
- Pet Store: Dog, Cat, Hamster, Dog Food, Cat Food, etc.

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• Computer Store: Computer, Hard Disk, CD, Hard Drive, DVD, etc.

If you are in a business that does not sell on the Internet, you may want to hold off on paying for this option as local people will go to your site from advertising, word of mouth or local Web searches.

As noted earlier, having a web presence is a very important part of a business today. You must make sure to take the time to plan and design your site so that it has the professional look and a certain "panache" or style that will help your business distinguish it from others. A site that not only will encourage visitors to return, but offers the information they are seeking the first time they visit. With careful and thoughtful planning and decision making you can create a small business site that can and will compete with larger companies, enhance your business and increase your margins and profits.

Using information technology competitively Competitive advantage

When you are starting your business, very likely you will just be interested in substituting computer-based information systems for keeping the basic records of your business and preparing the reports you need to be an effective decision-maker. As your business grows, however, you should start to think of the potential benefit of going beyond the basics, as larger companies do, and look for ways to use information systems for competitive advantage. Many people use the term "technology-enabled innovation" to describe this process. Since it is never too early for you to start thinking about such innovation, we will cover the topic now.

Just about all businesses have competitors and customers have choices as to which businesses they decide to patronize. For example, you, as a customer, may have several restaurants to choose from if you want to buy a meal. Each restaurant, therefore, has other restaurants as competitors. A restaurant will try to offer its customers a better meal at a better price so that their business is successful in comparison with the competition. This is what is meant by gaining a competitive advantage. Of course, if a restaurant is the only one in a small town, its owner does not have to worry so much about competition (unless someone else decides to open a restaurant and compete for its customers. Businesses that can gain an advantage over their competitors are the ones who will be successful and, as we saw in Chapter 4, most small businesses that start up are doomed to fail. So, competitive advantage is important.

Porter and competitive advantage

In Chapter 3, you were introduced to the ideas of Professor Michael Porter, whose ideas on how to achieve a competitive advantage, first introduced in the 1980s²⁹ have stood the test of time. Recall that Porter's model consisted of three main categories:

- The Five Forces Model
- Three Generic Strategies
- The Value Chain

²⁹ The information on Michael Porter needs to be cited.

In this section we will discuss how the creative use of information technology and communications technologies (IS) can help organizations gain a competitive advantage. These ideas were first expressed in two separate Harvard Business Review articles³⁰



Use IS to alter the five forces in your favor. The five forces are illustrated Exhibit 42.

Exhibit 42: Porter's Five Forces Model Source

Source:

http://en.wikipedia.org/wiki/Porter_5_forces_analysis

Buyer power can be reduced by using IS in ways that tend to restrict buyers' choices. A good example is the frequent flyer programs that are offered by most commercial airlines around the world. When they enroll in the program, air travelers are awarded "miles" for every flight they take on, for example, British Airways. Their accumulated miles are maintained by a computer system. Travelers can obtain tickets for free flights once as certain number of miles has been accumulated in their account. This encourages travelers to always use the same airline so they can qualify for rewards more quickly. Frequent flyer programs, of course, have to keep track of a lot of information on the activities of thousands of travelers and would not be possible to manage without computer systems. An airline without a frequent flyer program is at a competitive disadvantage to airlines which have them.

Supplier power is high when a business must rely on just a few suppliers. For example, if there is just one store in a town which stocks office supplies, businesses have nowhere else to buy supplies they need and may be forced to pay higher than normal prices. On the other hand, if a local business is connected to the Internet, it can choose from many other suppliers and possibly find cheaper prices, even when the cost of shipping is considered.

The threat of new entrants can be reduced when IS is used to erect "entry barriers". Entry barriers are offerings that a business must make available to its customers if it expects to do business in a certain sector simply because most or all of its competitors offer a certain feature to their customers. An example is ATM machines offered by banks. ATM machines would not be possible without the use of computers and communications networks. If you had to choose between a bank that offered ATM machines and one that did not, which one would you choose? Most likely the one with ATM machines. ATM machines are a barrier to enter the banking sector in a particular locale. 30 Cite McFarlane and Porter/Millar.

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The threat of substitute products can usually be reduced by using IS to bind customers more closely to a business and create what is called "switching costs". This means that the IS systems offered by a business are so appreciated by the customer that customers are reluctant to switch to a substitute product. For example, there are many free open content software products that equally competitive with the costly brands. Zoho, Google Docs, Thinkfree, are examples. One of the reasons many PC users do not switch to them is that they would have to learn how to use a new package. Even though the free packages are easy to learn, there is a switching cost involved that binds users to Microsoft Office: The time it would take to learn even a relatively simple package is enough of an obstacle to many users that they conclude that switching is not worth the effort.

The Intensity of Intra-Industry Competition can often be increased by IS-enabled innovations. For example, the global reach of the Internet means that competitors for many products and services can be located anywhere in the world. For example, tax accounting specialists may now find themselves competing with accounting specialists in low-cost countries. This is becoming a common practice as companies conclude that IS makes it possible for many forms of knowledge work to be performed anywhere in the world.

Use IS to reinforce your basic strategic positioning.



Exhibit 43: Porter's three generic strategies

Porter suggests that a business cannot be all things to all people. It must choose between three generic strategies As illustrated in Exhibit 43, a business can choose to be a cost leader, it can pursue a differentiated strategy for which consumers are willing to pay more, or it can target a segment of the market with either a low-cost or a differentiated strategy. For example, if we consider brands of automobiles, the Tata targets a broad market for low-priced cars, and the Subaru targets a broad differentiated market for low-priced allwheel drive cars. The Mazda Miata targets a segmented market for low-priced sports cars, while Rolls Royce targets a segmented (high-priced) market for sedans.

Source: http://en.wikipedia.org/wiki/Porter_generic_strategies

Information systems can assist a business in implementing one of Porter's three generic strategies by using IS to create operational efficiencies, thus lowering manufacturing costs, for example. Also, IS can create a differentiated model by having a website that permits customers to design a personalized version of an automobile and order it online, much the same way that we can buy personal computers online.



Exhibit 44: Porter's value chain

Source: http://kookyplan.pbwiki/f/ValueChain.ong

As discussed in Chapter 3, the Value Chain is a graphical representation of the processes (or activities) involved in most organizations. Analysts use the value chain framework to look for ways to streamline costly activities or add value to certain activities through the use of IS. As just one example, an organization could use IS to outsource a call center service to a lower cost location or, it could use IS to provide a well-designed website to offer a differentiated experience to customers who need to contact the organization, and embody a personalized call center service for issues that cannot be resolved by the customer just by using website features.

Identify your information systems needs

It is almost always the case that there are insufficient resources for an organization to take advantage of all of its opportunities to use IS to obtain business benefits. Such resources can be in the form of personnel in an internal IS Department or cash to hire outside consultants or both. Because of this, it is important that organizations be sure they are using their resources on IS projects that have the greatest value to the organization. A time-tested way of doing this is to have a process for setting IS development priorities that are consistent with and aligned with organizational priorities. In the literature, this is typically called "strategic alignment". There are three general approaches that organizations take to setting priorities for information systems projects. (Some practitioners say "there is no such thing as an IS project; there are only business projects". Such a perspective emphasizes the importance of obtaining business benefits from an investment in IS). The three general approaches to setting priorities (also known as developing a strategic plan for the IS function) are:

- 1. Have the IS department set priorities
- 2. Have a cross-functional steering committee set priorities
- 3. Conduct a systems planning project

Each of these approaches is discussed in more detail in the following paragraphs.

Have the IS department set priorities

The person in charge of the IS functions, particularly in larger organizations is called the Chief Information Officer or CIO. The CIO is responsible for new system development, systems operations, and maintenance of existing systems. Ideally, the CIO has a solid understanding of the organization's overall strategy and tactics as well as a good understanding of IS issues. A competent CIO should be able, therefore, to do a good job of setting priorities for the IS function. All too often, however, the CIO is more comfortable with technical issues and undertakes projects that are interesting from a technical standpoint, but offer little in the way of business benefits. On the other hand, some CIOs have an insufficient command of technical issues and therefore overlook opportunities to use IS to make their organization more efficient, effective, and innovative. Finding a person with the right blend of business and technical savvy has proven to be difficult, and, thus, CIO has come to be known, in some circles as "Career is Over".

Have a cross-functional steering committee set priorities

Many organizations use a cross-functional steering committee to discuss and agree on overall priorities for the IS function. All major areas of the company are represented, including, for example, accounting, finance, human resources, operations, and sales and marketing. Having all areas involved provides some assurance that the organization's needs and opportunities are addressed in the proper priority sequence. The shortcomings of this approach, in practice, however is that some heads of areas may not be as supportive of IS as they should be, and the process can become complicated when organizational politics intervene.

For example, the organization's best opportunity for obtaining business benefits could lie with a new information system to track how well sales are performing in order to be sure that customer demands will be met But this opportunity may not be understood or appreciated by the sales manager. Without the support from the sales manager, the IS project in his or her area would be unlikely to succeed, so the organization's best opportunity is lost. On the other hand, it could be the case that the operations manager has a strong and persuasive personality, and by force of argument in steering committee meetings is able to convince others that operations projects should get the highest priority.

Develop a formal plan for information systems

Even small companies will benefit from taking a relatively short time to develop a formal plan for the information systems function. In Chapter 1, and elsewhere in this book, we have emphasized the value of having a formal business plan to guide the organization. Many organizations take their business plan down another level and have formal plans for individual departments, such as sales and marketing, operations, and human resources. It is particularly important to have a written plan for the information systems function as top management, must be assured that the benefits of IS are being applied in accordance with the overall goals of the organization. IS professionals call the end result of an IS planning process "strategic alignment", which simply means that the strategic goals of the IS function are aligned with the strategic goals of the organization.

In a very small organization an information systems plan can be developed by one or two individuals. In larger organizations, it is usually developed by a project team, sometimes with the assistance of outside consultants. The important thing is that resources devoted to developing an information systems plan have knowledge of current

and emerging information and communications technologies as well as a solid understanding of the organization's strategic plan. Development of a formal plan usually involves interviewing managers in each organizational unit to obtain their perspectives on issues such as:

- · the overall strategic plan or direction of the organization
- · plans of individual organizational units developed in support of the organization's plan
- · industry trends, competitors' strategies and common practices
- · legal and regulatory record-keeping and reporting requirements
- · current problems and opportunities with operational processes
- · information needs for planning and decision-making

Identifying business entities (e.g. customers, products, employees, etc) and data (i.e. attributes) required to describe each entity.

Once this is done, possible IS projects can be determined by identifying natural groupings of process and data and/or unmet information needs of managers. Possible projects must then be ranked in priority sequence.

Technical issues must be considered next, because there are several applications that the organization eventually uses that often share a common technical platform (e.g. PCs, networked PCs, etc). As we discussed earlier in this chapter, another option is to adopt the "software as a service" (SaaS) approach when it is available and appropriate. Technical issues may cause a reassessment of the priority sequence of possible projects. For example, it may be easier or more logical to install the organization's first application which uses database management software on a smaller project to let personnel get familiar with the software before moving on to a larger, more risky project. More details on current technical concept and issues are available in Global Text's Information Systems Text, Chapter 7, available at http://docs.globaltext.terry.uga.edu:8095/anonymous/webdav/Information%20Systems/Information %20Systems.pdf. You may also like to scan the table of contents of the IS Text for additional readings as it covers many of the topics we discuss here in much greater detail.

Once a plan is agreed, it is implemented. Most organizations find it useful to update the plan yearly at least as business and technical issues can change quickly.

What is IS risk management?

The IS risk is the business risk associated with the use, ownership, operation, involvement, influence, and adoption of information/technology solutions (Application, Hardware, Network and People) within an organization. IS risk consists of IS-related events that could potentially impact the business. It is also the management of uncertainty within the functions of IS so as to provide the organization with assurance that:

- · the possibility of a threat occurring is reduced or minimized
- the impact, direct and consequential, is reduced or minimized

To provide this assurance, threats must be identified and their impact on the organization evaluated so that appropriate control measures can be taken to reduce the possibility or frequency of a threat occurring and to reduce or minimize the impact on the business.

Information is a key business resource which, in order to be of value, must be correct, relevant and applicable to the business process and delivered in a timely, consistent and usable manner; it must be complete and accurate and provided through via the best use of resources (planned or unplanned), and if sensitive it must have its confidentiality preserved. Information is the result of the combined application of data, application systems, technology, facilities, and people. IS Risk Management ensures that the threats to these resources are identified and controlled so that the requirements for information are met.

Project management risks

Despite the fact that sound system design and installation methodologies have been well known for decades, the IT profession is still plagued by troubled or failed projects, colloquially called "an Ox in the ditch". Studies like the Chaos Reports published by the Standish Group over the years have documented the extent of IT project successes and failures. For example, the latest publicly available report, "CHAOS Summary 2009" states:

"This year's results show a marked decrease in project success rates, with 32 per cent of all projects succeeding which are delivered on time, on budget, with required features and functions" says Jim Johnson, chairman of The Standish Group, "Forty-four per cent were challenged which are late, over budget, and/or with less than the required features and functions and 24 per cent failed which are cancelled prior to completion or delivered and never used."

"These numbers represent a downtick in the success rates from the previous study, as well as a significant increase in the number of failures", says Jim Crear, Standish Group CIO, "They are low point in the last five study periods. This year's results represent the highest failure rate in over a decade" (Standish 2009). Businesses have to be aware of figures like these before you give the go-ahead for an IT project. Failed IT projects can be disastrous to an organization, even forcing them to go out of business.

Some of the reasons IT projects fail are:

- An inadequate understanding of what functions and features (i.e. requirements) the organization needs in the new system. It would be like trying to build a building before its design has been completed.
- Poor project planning, task identification, and task estimation. Usually this means that essential tasks have been overlooked or under-estimated meaning the project's time and cost estimates are too optimistic.
- Lack of proper skills on the project team. This would be like assigning carpentry tasks to an electrician. Some IT professionals think they can do anything and this is almost always not true.
- Failure to address problems and/or project champion. Just about every IT project has problems. If they are not dealt with on a timely basis they do not go away by themselves, they just get worse. It is helpful in addressing problems if a highly-placed executive is a "champion" of the project and can step in and get problems solved if the project team is struggling.
- Inadequate testing. All too often, a new system is put into operation before it has been adequately tested to be sure it handles all conditions it is likely to encounter. A system failure after conversion can cause normal business processes (like accepting customer orders, for example) to fail.

- No fall-back plan. Before converting to a new system, the project team should have a tested fall-back plan they can revert to in order to keep business processes working while the new system is adjusted.
- Executive champions should be aware that IT project risks are all too often known to the IT professionals but are not always shared with others. Therefore, you should always ask that a formal project risk assessment be done at the beginning of a project and that plans are in place to keep risks at a minimum.

Security risks

The biggest challenge companies face in tackling IS security risks is the growing sophistication of hackers and other cyber-criminals. Organizations must now contend with a range of hi-tech attacks orchestrated by wellorganized, financially-motivated criminals. While large organizations often have independent IS security staffs, it is likely that your start-up can focus on just a couple of basic items, such as:

- Identifying the value of information stored on your computer(s) and making sure that access to such information is restricted to employees who need to use for legitimate business purposes. For example, your customer database and customer profitability analyses should be protected as you would not want such information to fall into the hands of a competitor as the result of actions taken by a disloyal employee.
- Computers sometimes break down ("crash"). This is why it is important to have a procedure of backing up critical files on a daily basis, and have written, tested procedures to recover needed information from backup files quickly. Organizations have gone out of business as a result of failed computer systems that were not properly backed-up.

If you have a website, you will need to be sure that it is adequately protected from both internal and external threats. We discuss Internet risks in the next section.

Internet risks

Companies considering a website or Internet-based services need to be aware of the various risks and regulations that may apply to these services. Over the past few decades, the Internet has become critical to businesses, both as a tool for communicating with other businesses and employees as well as a means for reaching customers. Each day of the week and every month, there are new Internet threats. These threats range from attacks on networks to the simple passing of offensive materials sent or received via the Internet. The risks and particular regulations that apply may vary depending on the types of services offered. For example, institutions offering informational websites need to be aware of the various consumer compliance regulations that may apply to the products and services advertised online. Information needs to be accurate and complete to avoid potential liability. Security of the website is also an important consideration. Companies and some individuals traditionally have relied on physical security such as locks and safes to protect their vital business information now face a more insidious virtual threat from cyber-criminals who use the Internet to carry out their attacks without ever setting foot in an establishment or someone's home. More often than not, these crimes are conducted from outside the United States. Security measures should protect the site from defacement and malicious code.

It is clear that no single risk management strategy can completely eliminate the risks associated with Internet use and access. There is no one special technology that can make an enterprise completely secure. No matter how much money companies spend on cyber-security, they may not be able to prevent disruptions caused by organized

attackers. Some businesses whose products or services directly or indirectly impact the economy or the health, welfare or safety of the public have begun to use cyber risk insurance programs as a means of transferring risk and providing for business continuity.

Summary of IS risk management

Managing IS risk is a daily decision making process aimed at reducing the amount of losses and threats to a company. It is a pro-active approach to reducing exposure to data/information loss and ensuring the integrity of the applications used day-to-day. An IS security plan should include at minimum a description of the various security processes for specified applications, procedural and technical requirements, and the organizational structure to support the security processes. A risk assessment should be performed first. Identifying risks provides guidance on where to focus the security requirements. Security requirements and controls should reflect the business value of the information assets involved and the consequence from failure of security. Security mechanisms should be "cost beneficial", i.e. not exceed the costs of risk. It should also include expectations for risk within the overall IS security plan.

Chapter summary

Many people use information systems and information technology as if they meant the same. They are different, and it is important for you to understand the difference between them. As we illustrated in Exhibit 41, an Information System is comprised of two sub-systems, a social subsystem and a technical subsystem. The social subsystem has two parts: people and organizational structure. The technical subsystem also has two parts: technology and business processes. The reason it is important to understand this is that all four parts of an Information system must work effectively if the system is to meet the needs for which it was designed and installed.

Information systems can be very powerful tools to help you run your organization. On the other hand, in a startup, be sure you need the support of information systems before you invest in them. It may be that you can handle your operations manually for a time and avoid the cost and time investing in a computer-based IS requires.

If you do decide to move forward with computer-based information systems it is wise to develop a plan first, and make sure you are proceeding in an orderly manner. There are three general approaches to developing an IS plan. You will also find that you have many options available for hardware and software, and the options can vary widely in initial purchase price and the kind of support provided by the vendor. If you see value in having a website there are some generally-accepted principles you should follow to make your website effective.

Many organizations have found ways to use IS for competitive advantage. Michael Porter's frameworks, the five forces model, the three generic strategies, and value chain have proven to be useful tools in coming up with ideas for innovative information systems.

Finally, when an organization has valuable information stored in computers, it is exposed to risks from errors and from various internal and external threats. It is important for managers to evaluate the risks and come up with cost-effective measures to be sure the organization is adequately protected from loss or damage to valuable information.

Discussion questions

- > Describe the four components of an information system. Why is it important to consider each of them when designing and installing an information system?
- > Under what circumstances might it be wise for a start-up entrepreneur to postpone investing in computer-based information systems for the organization?
- > What are the major options you have for obtaining hardware, software and support from IS professionals?
- > Define a "software suite". What are the advantages of using a software suite instead of a number of stand-alone software applications?
- > When should you consider using database management software instead of a spreadsheet?
- Discuss the advantages and disadvantages of open source software applications for a start-up organization
- > What are the objectives of a Website? Who benefits the most from your organization's web presence?
- > When having a web presence what is the single most important objective? What is the greatest risk to a website?
- > Give at least three examples of organizations that have used IS in innovative ways to gain competitive advantage. For each example, which of Porter's framework elements does it illustrate?
- > What are the three general approaches for setting an organization's IS priorities? What are the advantages and disadvantages of each?
- > Why is important for start-up entrepreneurs to pay attention to IS risk management?
- How do managers decide how much attention and resources they should devote to IS risk management?

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