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DEPARTMENT OF INFORMATION TECHNOLOGY

COURSE CODE: BIT3304

COURSE TITLE: MANAGEMENT OF INFORMATION SYSTEMS

Instructional manual for BBIT – Distance Learning

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COURSE OUTLINE

BIT 2207: MANAGEMENT OF INFORMATION SYSTEMS

Purpose of the course

By the end of the course unit, the learner will be able to:

- Completely apply management concepts learnt to areas of information systems.
- Manage the information systems of a business organization

MANAGEMENT OF INFORMATION SYSTEMS - TOPICS - DETAILS

I. Information, Systems, and Information Systems concepts

A. Definition of a system., Information System, importance of information systems

B. System components.

C. Definition of data and information.

D. Importance of information systems for business and management

II. Information Technology infrastructure

A. Definition and Levels of I.T. Infrastructure

B. Infrastructure components: hardware platforms, software

C. Hardware platform trends

D. Managing information resources

III. Information Systems in the Enterprise

A. Types of management information systems by level and function, operational level knowledge level, management level, strategic level.

B. Information systems and decision making; Transaction processing, Management information systems, Decision support and (DSS), Executive Support Systems (ESS)

IV. **I.S Management and Strategy**

A. Application of management of information systems in business organizations

B. Strategic advantages of information technology

V. IT Economic benefits:

A. Evaluating IT benefits

B. Evaluating IT cost

C. Evaluating IT performance

VI. Planning for Information Technology and Systems

A. IT planning, the evolution of IT Planning

VII. Managing information systems resource; control and security.

A. System Vulnerability and abuse

B. Business value of security and control

C. Security and control framework

D. Technology and tools for control

VIII. Redesigning the Organization with Information Systems

A. Systems and planned organizational change

B. Business process reengineering

C. Systems development approaches

IX. Impact of IT

A. Effects, ethical issues,

B. Impact on organizations,

C. Impact on individual at work,

D. Social ethical impact and the internet.

<u>Main course text</u>

Laudon K, Laudon J, Management Information Systems, Managing the digital firm (Ninth Edition)

Assessment: Examination - 70%: Coursework - 30%

Module compiler: John Kamau

CHAPTER ONE

INFORMATION, SYSTEMS, AND INFORMATION SYSTEMS CONCEPTS

Learning Objectives

By the end of this chapter the learner shall be able to;

i. Explain why information systems are so important today for business and management.
ii. Evaluate the role of information systems in today's competitive business environment.
iii. Define an information system from both a technical and business perspective.

1.1 Definition of a system

A system can be broadly defined as an integrated set of elements that accomplish a defined objective. People from different engineering disciplines have different perspectives of what a "system" is. For example, software engineers often refer to an integrated set of computer programs as a "system." Electrical engineers might refer to complex integrated circuits or an integrated set of electrical units as a "system." As can be seen, "system" depends on one's perspective, and the "integrated set of elements that accomplish a defined objective" is an appropriate definition.

An information system is a set of interrelated components that collect (or retrieve), process, store and distribute information to support decision making and control in an organization.

Information systems contain information about significant people, places and things within the organization or in the environment surrounding it.

Information is data that has been shaped into a form that is meaningful and useful to human beings.

Data, are streams of raw facts representing events occurring in organizations or the physical environment before they have been organized and arranged into a form that people can understand and use. E.g. supermarket checkout data

Three activities in an information system produce the information that organizations need to make decisions, control operations, analyze problems, and create new products or services. These activities are input, processing, and output.

Input captures or collects raw data from within the organization or from its external environment.

Processing converts this raw information into a more meaningful form.

Output transfers the processed information to the people who will use it for the activities for which it will be used.

Information systems also require feedback, which is output that is returned to appropriate members of the organization to help them evaluate or correct the input stage

1.2 Why information systems

We are in the midst of a swiftly moving river of technology and business innovations that is transforming the global business landscape. An entirely new Internet business culture is emerging with profound implications for the conduct of business. You can see this every day by observing how businesspeople work using high-speed Internet connections for e-mail and information gathering, portable computers connected to wireless networks, cellular telephones connected to the Internet, and hybrid handheld devices delivering phone, Internet, and computing power to an increasingly mobile and global workforce.

The emerging Internet business culture is a set of expectations that we all share. We have all come to expect online services for purchasing goods and services, we expect our business colleagues to be available by e-mail and cell phone, and we expect to be able to communicate with our vendors, customers, and employees any time of day or night over the Internet. We even expect our business partners around the world to be “fully connected.” Internet culture is global.

1.3 Why information systems matter

While many managers are familiar with the reasons why managing their typical resources such as equipment and people are important, it is worthwhile to take a moment to examine four reasons why managing information systems and technology are just as important.

Capital Management

As the text states, "Investment in information technology has doubled as a percentage of total business investment since 1980, and now accounts for more than one-third of all capital invested in the United States…" That's a lot of money that businesses are spending on a relatively new component of many organizations. The business world has come a long way very rapidly in the last twenty years in terms of the amount of dollars spent on technology. Unfortunately, many companies haven't made the same advances in learning how to properly manage all these new corporate assets.

Foundation of Doing Business

Take a look around you and see if you can find a business that does not depend on information technology in one form or another. The local restaurant probably manages their lunch-time crowds using hand-held devices that allow the waiter or waitress to communicate menu orders directly to the kitchen. The rental car company uses information technology to track not only customer orders but may also use global positioning systems that relay the exact position of every car wherever it is. Your local drycleaners may also use information technology to keep track of all their chemical processes to ensure regulatory compliance. In short, there are very few businesses and organizations that do not currently use some form of information technology.

Productivity

Simply put, effectively managing your organization's information technology and resources will increase the productivity and effectiveness of your company. With the right technology workers can increase the amount of work they are able to accomplish in less time than ever before.

1.4 Strategic Opportunity and Advantage

Businesses and organizations simply can't stick their heads in the sand and ignore all of the improvements and inventions that are available nowadays. If they choose to do so, chances are their competition won't. It's not just the improvements in current processes that are available but the opportunities for new products or services that businesses can take advantage of with information technology.

How Much Does IT Matter?

For many years computer technology was relegated to the back rooms or basements of a corporation. Only the "techies" worried about it, and they were often the only ones who really knew how it all worked. Now computers are all over the organization — there's one on every desk and, more times than not, in every pocket or purse. It's not enough for you to know how to pound a keyboard or click a mouse. It's not even enough for you to know how to surf the Web or send e-mail. Every employee, including you, must know how to take advantage of information systems to improve your organization and to leverage the available information into a competitive advantage for your company.

1.5 Why IT Now? Digital Convergence and the Changing Business Environment

The Internet and Technology Convergence

Even though the Internet as a whole has existed since 1969, the World Wide Web didn't exist until around 1993-1994. That's fewer than 10 years ago. Now you can't pick up a magazine or a newspaper, turn on the television or radio, even drive by a billboard, without some kind of reference to "dot-com." Businesses are rushing to the Internet in an effort to keep up with the competition or to create whole new businesses. Now organizations struggle with such issues as how to design and develop a Web site or how to determine a fair e-mail policy for employees. **Electronic market** systems are allowing businesses to take advantage of technology to create new methods of buying and selling. For a while it seemed as though the middleman was going out of business because of the new direct connections between customers and merchants. While

this is true in some industries, new opportunities are springing up for the middleman in other areas. We'll look at this issue in more detail later.

Transformation of the Business Enterprise

You can't help but know about all the job cuts occurring in our country. It seems like every week we hear about thousands and thousands of people losing their jobs. Back in the 1980s most of the job losses were in the blue-collar sector. In the 1990s it seems many of the cuts were made in the white-collar, management jobs. Why? Think about it. Technology, to a large extent, has driven organizations to change the way they operate and that includes the way they manage. We're going to take an in-depth look at how organizations work and how they've been transformed by technology.

Globalization

Next time you purchase a product, any product, look at the fine print and see where it's made. It could be China, or the Philippines, or a South American company, or even in the United States. You can disagree with the fact that many manufacturing jobs are being moved from the U.S. to foreign countries. But look at the vast number of jobs that are being created in this country. Maybe they aren't the traditional factory jobs we're used to. In fact, many of our new jobs are in the information industry. Many of them service whole new markets that didn't exist just a few years ago. There was no position called "Webmaster" in 1991. That's because the Web didn't exist. But now, that particular job category is one of the fastest growing in the U.S. and overseas. The global economy Laudon & Laudon talk about is being made possible by technology, and that's why it's so important that you understand how to use information systems technology instead of just computer technology. There's a big difference between the two, and we'll talk about it more.

Rise of the Information Economy

In a knowledge- and information-based economy, knowledge and information are key ingredients in creating wealth. Think back to the early 1900s when the horse and buggy were the

main form of transportation. Along came a guy named Ford who built a whole new industry around the automobile. Many jobs, such as horse groomers, horse shoers, and buggy manufacturers, were lost forever. Now think about all the new jobs that were created — not just in the factories, but all the other businesses associated with the car. The people in the horse and buggy industry adapted, retrained for the new jobs, and the whole country changed. The same thing is happening now with the information industry. Many of the new jobs that are being created have better working conditions, better pay, and more advantages than the old jobs had. You just have to be equipped to take advantage of the situation. You have to take advantage of retraining opportunities. You have to gain the skills necessary for the transformation of the industries that have been a mainstay of this country. It's not that hard — it just takes a lot of hard work.

Chapter Review Questions

1. List and explain four reasons why information systems are so important for business today
2. Describe five technology and business trends that have enhanced the role of information systems in today's competitive business environment.
3. What are some of the new roles information systems are playing in organizations?

4. Discuss the changes in the business environment brought about by technology in the last five years.

Suggested Further Reading

Laudon K, Laudon J, Management Information Systems, Managing the digital firm (Ninth Edition) page 3-30.

CHAPTER TWO

IT Infrastructure and Platforms

Learning Objectives

At the end of the chapter the learner shall be able to;

i. Define IT infrastructure and describe the components and levels of IT infrastructure.
ii. Identify and describe the stages of IT infrastructure evolution.
iii. Identify and describe the technology drivers of IT infrastructure evolution.
iv. Assess contemporary computer hardware platform trends.
v. Assess contemporary software platform trends.
vi. Evaluate the challenges of managing IT infrastructure and management solutions.

2.1 Defining I.T. Infrastructure

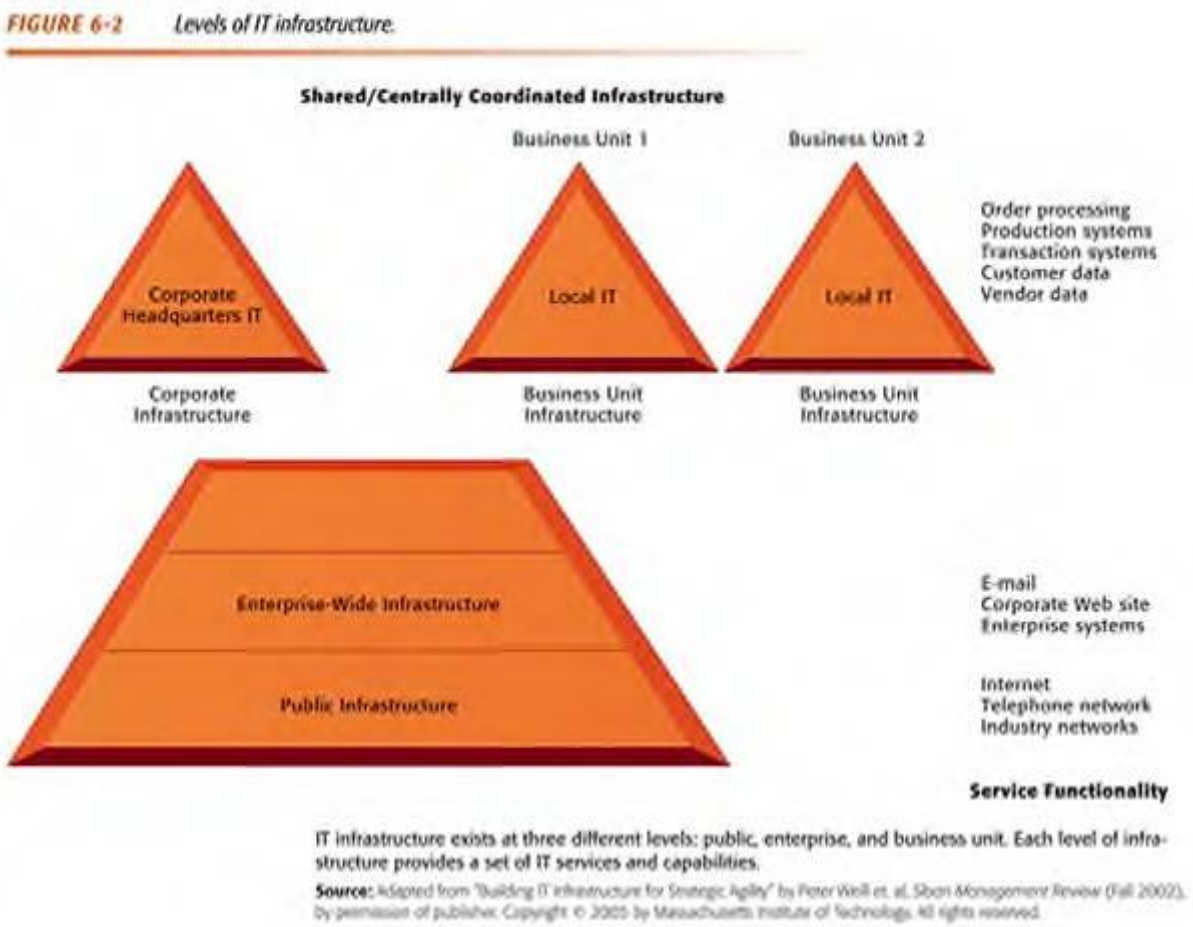
Information technology infrastructure is a set of firmware services budgeted by management and comprising both human and technical capabilities. These services include;

- Computing platforms used to provide computing services that connect employees, customers and suppliers into a coherent digital environment, including large mainframes, desktop and laptop computers, and personal digital assistants (PDA) and internet appliances.
- Telecommunications services that provide data, voice, and video connectivity to employees, customers, and suppliers.
- Data management services that store and manage corporate data and provide capabilities for analyzing the data.
- Physical facilities management services that develop and manage the physical installations required for computing, telecommunications, and data management services.

- IT management services that plan and develop the infrastructure, coordinate with the business units for IT services, manage accounting for the IT expenditure, and provide project management services.
- IT standards services that provide the firm and its business units with policies that determine which information technology will be used, when, and how.
- IT education services that provide training in system use to employees and offer managers training in how to plan for and manage IT investments.
- IT research and development services that provide the firm with research on potential future IT projects and investments that could help the firm differentiate itself in the marketplace.

2.2 Levels of IT Infrastructure

A typical firm's IT infrastructure can be divided into three major levels: public, enterprise and business unit. Each level has its own unique hardware, software, and service components. The public-level includes the Internet, public telephone networks on which businesses are increasingly reliant, industry-operated networks, cable systems, satellite systems, and cellular telephone networks. The enterprise level may include email, Web sites, intranets, extranets, and enterprise applications. Business units concentrate on those infrastructure components that service the four functional areas of a typical business: sales & marketing, production & manufacturing, finance, and human resources. Figure 6-2 will help you distinguish between the three levels.



2.3 Evolution of IT Infrastructure: 1950-2005

Reviewing the evolution of corporate IT infrastructure can offer some insight into where we may be headed.

- **Electronic accounting machine (1930-1950):** dominated by machines that began to replace humans in the accounting department. Because almost all of the computing was done in the accounting and finance functional area, future IT departments tended to be under the purview of the Chief Financial Officer.
- **General-purpose mainframe and minicomputer era (1959 – present):** the mainframe era began with highly centralized computing with networks of terminals concentrated in the computing department. While early models contained proprietary software and data,

today's mainframes are able to process a wide variety of software and data. It's interesting to note that IBM began this era and remains the single largest supplier of mainframe computing. While the experts and pundits predicted the death of the mainframe in the mid 1980s, the mainframe has evolved and remains a strong, viable component in many IT infrastructures because of its ability to process huge amounts of data and transmissions.

- **Personal computer era (1981 to present):** it's interesting to note that the advances developed for personal computer in the home has given rise to much of the advances in corporate computing in the last 25 years. As the home user became more comfortable with using computers, and more applications were developed for personal computers, more employees demanded increased use of computers in the workplace. While the **Wintel** standard has dominated this era, open-source software is starting to put a big dent into that stronghold.
- **Client/server era (1983 to present):** as the desktop and laptop personal computers became more powerful and cheaper, businesses began using them to replace mini-computers and some mainframe computers by networking them together. Think of an octopus, with the body representing the server and the tentacles representing the clients. At the heart of every network is a **server**. It can be a mainframe, midrange, minicomputer, workstation, or a souped-up personal computer. It's where some of the data, applications software, and other instructions are stored that network users need in order to communicate with and process transactions on the network. The **client** computer is the node on the network that users need to access and process transactions and data through the network. Rather than one server trying to do it all, each server is assigned a specific task on an **application server**. Dividing tasks among multiple servers allows faster, more efficient responses that cost a business less to process than would a mainframe or one computer trying to do it all. Large companies use a **multitiered client/server architecture** that has several different levels of servers.
- **Enterprise Internet computing era (1992 to present):** Perhaps no other era has seen the explosive growth in functionality and popularity as this era. The problems created by proprietary, closed systems are being solved by the standards and open-source software

created in this era. The promise of truly integrated hardware, software, and services is coming true with the technological advances in the last fifteen years. On the other hand, the promises of delivering critical business information painlessly and seamlessly across all organizational levels are made all the more difficult to match because of the ever-changing landscape of technology products and services.

Technology Drivers of Infrastructure Evolution

Moore's Law: The power of microprocessors doubles every 18 months

The law of mass digital storage: The amount of digital information is roughly doubling every year. The cost of storing digital information is falling at an exponential rate

Metcalfe's Law and Network economics: The value or power of a network grows exponentially as a function of the number of network members.

Declining communications costs and the Internet: Rapid decline in the costs of communication and the exponential growth in the size of the internet

Standards and network effects: There are agreements among manufacturers and widespread consumer acceptance of technology standards.

2.4 Infrastructure Components

What if you bought a car that did not include tires, a steering wheel, a radio, or a heater? After purchasing this vehicle, you had to shop around for the missing parts. When you entered a store, you are confronted with eight different steering wheels, six different radios, and nine different heaters. You quickly realize how incompatible the parts are with varying brands of vehicles and wished that the manufacturers simply put all the parts together for you. Once assembled, you drive to the gas station only to realize that your car can't use that brand of gasoline. How frustrating.

In part, that is what has happened to computers and peripherals over the years. In the early days of personal computers, the printer you had your eye on may not have worked with your brand of

computers. You had to buy a scanner built specifically for your computer. You couldn't connect to the Internet unless you had the correct modem for your Internet Service Provider. If you wanted to share photos with your friends, each of you had to have four different software programs, each of which would process the others' photos. Now expand these examples to a corporate enterprise system. The evolution we are now experiencing is aiming to fix these problems and make computing ubiquitous anytime, anywhere. Let's look at the seven major components of systems necessary to see us through to this goal.

Computer Hardware Platforms

The microprocessor is the heart of any computing device no matter how small or large. Two companies produce most microprocessing chips: Intel and Advanced Micro Devices (AMD). The most popular and widely known is Intel. (However, when you're shopping for a new computer you should consider the AMD processor. It's as good as the Intel chip and tends to be a little cheaper. Benchmark tests of the AMD chip against the Intel Celeron chip proved that the AMD chip was superior in performance.)

Since the network is becoming so commonplace and the heart of computing, network service providers must have the server backbone in place to meet the increased demand. **Blade servers** are meeting the needs of service providers cheaper and easier than traditional big-box servers. IBM offers mainframe computers that can also provide the network processing although they are more expensive and require Unix software.

Operating System Platforms

Operating systems tell computers what to do, when to do it, and how. Operations such as logging on, file management, and network connectivity are controlled by the operating system. By far the most prolific operating system is Microsoft Windows in various versions. Windows is also the operating system used by some non-traditional computing devices such as hand-held PDAs and cell phones.

Unix and **Linux** are often associated with large networks that require less application overhead and faster processing. Linux **open-source software** is becoming the operating system of choice for organizations looking to save money. Businesses and governments across the globe are adopting the Linux platform as a way to reduce IT spending and license costs.

Enterprise Software Applications

Integrating applications into seamless processes across the organization is the goal of enterprise software applications. Customer relationship management and supply chain management systems are the two most popular applications in this category. We explore them more extensively in later chapters. Why are these applications becoming popular?

> "In the back office, business processes that have historically been optimized for internal efficiency can now add the dimension of superior customer service, personalized to each customer, leveraging the skills of trained agents in the call center. With better information from the customer, back office processes are improved. And in the long run, agents can gradually decrease the flow of paper into the back office, in favor of more efficient communication channels such as e-mail and the web. (TechWorld.com, copied March 21, 2005)

Data Management and Storage

Businesses and organizations are gathering more and more data on customers, employees, and even the business itself. Managing and storing the data so that they are easily accessible and provide meaningful information to the organization is becoming a science in and of itself. **Storage area networks (SANs)** provide a cohesive, economical way to consolidate data from across any and all systems within the business. Online users want instant access to data and SANs help companies provide it.

Networking/Telecommunications Platforms

As we continue the march towards convergence of all things digital, networking and telecommunications platforms will merge into one. Rather than having one platform for networking computer devices and a separate platform for telecommunications, we'll see one company providing a combination of telephone services, cell phone connectivity, computers and peripheral devices, handheld PDAs, and wireless services all rolled into one. Many telecommunications companies are now merging with Internet service providers to offer a complete package of digital services.

Internet Platforms

The Internet and its technology standards continue to expand the services businesses are able to provide their employees, customers, suppliers, and business partners. Intranets and extranets built on Internet technologies give businesses an easy and inexpensive method of providing services that were cost prohibitive a few years ago.

Rather than purchase all of the hardware necessary to support Web sites, intranets, and extranets, many small and medium-sized companies use **Web hosting services** instead. It's cheaper and easier to have these service-providers take care of hardware, software, and security issues while the business concentrates on its core processes.

Consulting and System Integration Services

Systems used in many medium and large-sized companies and organizations are so complex that most businesses simply can't manage by themselves. Integration services provided by the likes of IBM and Hewlett-Packard are necessary to simply keep up with changes. In many ways it makes more business sense for a company such as Frito-Lay to concentrate on its core processes of making snack food and let IBM take care of the technology issues.

2.5 Management Challenges

The challenges of creating and managing a good IT infrastructure include:

- Making wise infrastructure investments
- Coordinating infrastructure components
- Dealing with **scalability** and technology change
- Management and governance

To be sure, it's extremely hard to figure out ahead of time how much computing capacity a company will need. It's like gazing into a crystal ball and trying to discern the future. Managers need to design **scalability** into their systems so that they don't under- or over-build their systems. The idea is to initially build the system for what the company thinks they need, but to design it in such a way that increasing capacity is a fairly easy thing to do. If the system is more successful than originally thought, or as the number of users increases, capacity can be increased without having to start over from scratch.

Solution Guidelines

Does your company spend too little on IT infrastructure thereby foregoing opportunities for new or improved products and services? Or does your company spend too much on IT infrastructure thereby wasting precious resources that could be utilized elsewhere? By answering the following questions, your company could align its IT spending with its needs.

- Inventory the market demand for your firm's services
- Analyze your firm's five-year business strategy
- Examine your firm's IT strategy, infrastructure, and cost for the next five years
- Determine where your firm is on the bell curve between old technologies and brand new ones
- Benchmark your service levels against your competitors
- Benchmark your IT expenditures against your competitors

Chapter Review Questions

1. Define I.T. infrastructure from both a technology and a services perspective. Which services does I.T. infrastructure comprise?
2. Name and describe the different levels of I.T Infrastructure
3. What are the Moore's Law and the law of Mass Digital Storage? What aspects of infrastructure change do they help explain?
4. List each of the era in the I.T. Infrastructure evolution and describe their distinguishing characteristics

Suggested Further Reading

1. Laudon K, Laudon J, Management Information Systems, Managing the digital firm (Ninth Edition) page 185-223.

CHAPTER THREE

INFORMATION SYSTEMS IN THE ENTERPRISE

Learning Objectives

By the end of this chapter the learner shall be able to;

i. Evaluate the role played by the major types of systems in a business and their relationship to each other.
ii. Describe the information systems supporting the major business functions: sales and marketing, manufacturing and production, finance and accounting, and human resources.
iii. Analyze the relationship between organizations, information systems, and business processes.
iv. Explain how enterprise applications promote business process integration and improve organizational performance.

3.1 Levels of Management

Information systems serve the following three levels of management

1. **Top Level of Management**

It consists of board of directors, chief executive or managing director. The top management is the ultimate source of authority and it manages goals and policies for an enterprise. It devotes more time on planning and coordinating functions.

The role of the top management can be summarized as follows –

a. Top management lays down the objectives and broad policies of the enterprise.
b. It issues necessary instructions for preparation of department budgets, procedures, schedules etc.

c. It prepares strategic plans & policies for the enterprise.
d. It appoints the executive for middle level i.e. departmental managers.
e. It controls & coordinates the activities of all the departments.
f. It is also responsible for maintaining a contact with the outside world.
g. It provides guidance and direction.
h. The top management is also responsible towards the shareholders for the performance of the enterprise.

2. Middle Level of Management/Managers

The branch managers and departmental managers constitute middle level. They are responsible to the top management for the functioning of their department. They devote more time to organizational and directional functions. In small organization, there is only one layer of middle level of management but in big enterprises, there may be senior and junior middle level management. Their role can be emphasized as –

a. They execute the plans of the organization in accordance with the policies and directives of the top management.
b. They make plans for the sub-units of the organization.
c. They participate in employment & training of lower level management.
d. They interpret and explain policies from top level management to lower level.
e. They are responsible for coordinating the activities within the division or department.
f. It also sends important reports and other important data to top level management.
g. They evaluate performance of junior managers.
h. They are also responsible for inspiring lower level managers towards better performance.

3. Lower Level of Management/Operational

Lower level is also known as supervisory / operative level of management. It consists of supervisors, foreman, section officers, superintendent etc. According to *R.C. Davis,* "Supervisory management refers to those executives whose work has to be largely with

personal oversight and direction of operative employees". In other words, they are concerned with direction and controlling function of management. Their activities include –

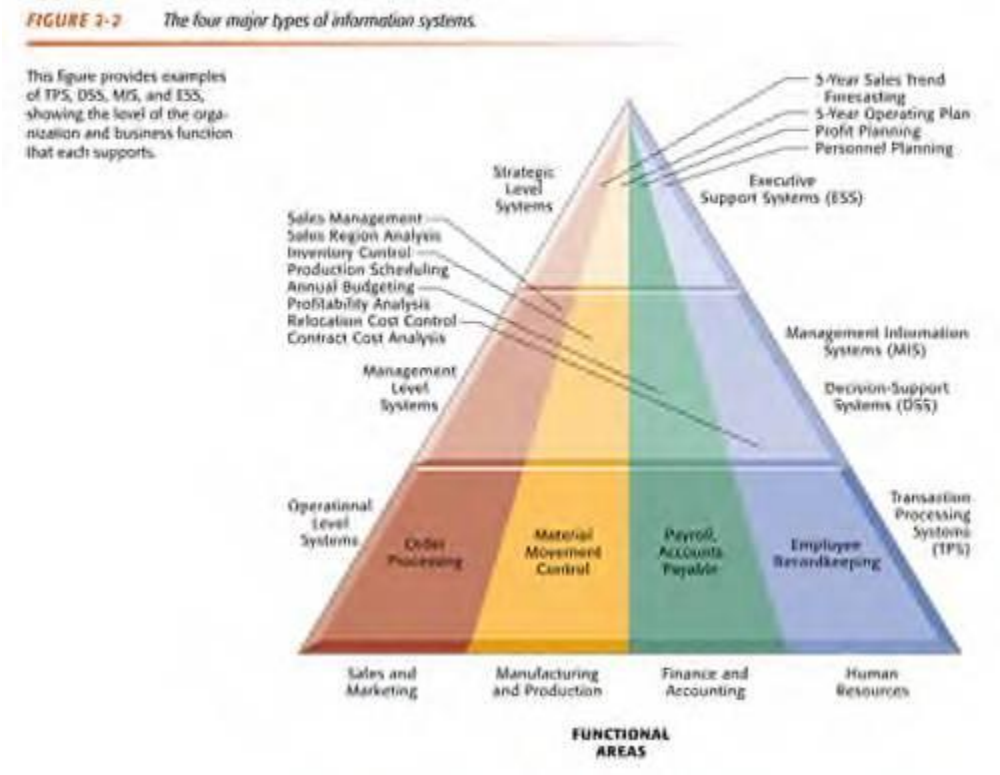
a. Assigning of jobs and tasks to various workers.
b. They guide and instruct workers for day to day activities.
c. They are responsible for the quality as well as quantity of production.
d. They are also entrusted with the responsibility of maintaining good relation in the organization.
e. They communicate workers problems, suggestions, and recommendatory appeals etc to the higher level and higher level goals and objectives to the workers.
f. They help to solve the grievances of the workers.
g. They supervise & guide the sub-ordinates.
h. They are responsible for providing training to the workers.
i. They arrange necessary materials, machines, tools etc for getting the things done.
j. They prepare periodical reports about the performance of the workers.
k. They ensure discipline in the enterprise.
l. They motivate workers.
m. They are the image builders of the enterprise because they are in direct contact with the workers.

3.2 Different Kinds of systems

Because there are different interests, specialties, and levels in an organization, there are different kinds of systems. No single system can provide all the information an organization needs.

Different Kinds of Systems

Three main categories of information systems serve different organizational levels: Operational-level systems, management-level systems, and strategic-level systems.



Operational-level systems support operational managers by keeping track of the elementary activities and transactions of the organization, such as sales, receipts, cash deposits, payroll, credit decisions, and the flow of materials in a factory. The principal purpose of systems at this level is to answer routine questions and to track the flow of transactions through the organization. How many parts are in inventory? What happened to Mr. Williams's payment? To answer these kinds of questions, information generally must be easily available, current, and accurate. Examples of operational-level systems include a system to record bank deposits from automatic teller machines or one that tracks the number of hours worked each day by employees on a factory floor.

Management-level systems serve the monitoring, controlling, decision-making, and administrative activities of middle managers. The principal question addressed by such systems is this: Are things working well? Management-level systems typically provide periodic reports rather than instant information on operations. An example is a relocation control system that

reports on the total moving, house-hunting, and home financing costs for employees in all company divisions, noting wherever actual costs exceed budgets.

Some management-level systems support non-routine decision making. They tend to focus on less-structured decisions for which information requirements are not always clear. These systems often answer “what-if” questions: What would be the impact on production schedules if we were to double sales in the month of December? What would happen to our return on investment if a factory schedule were delayed for six months? Answers to these questions frequently require new data from outside the organization, as well as data from inside that cannot be easily drawn from existing operational-level systems.

Strategic-level systems help senior management tackle and address strategic issues and long—term trends, both in the firm and in the external environment. Their principal concern is matching changes in the external environment with existing organizational capability, what will employment levels be in five years? What are the long-term industry cost trends, and where does our firm fit in? What products should we be making in five years?

Information systems also serve the major business functions, such as sales and marketing, manufacturing and production, finance and accounting, and human resources. A typical organization has operational-, management-, and strategic—level systems for each functional area. For example, the sales function generally has a sales system on the operational level to record daily sales figures and to process orders. A management—level system tracks monthly sales figures by sales territory and reports on territories where sales exceed or fall below anticipated levels. A system to forecast sales trends over a five-year period serves the strategic level. We first describe the specific categories of systems serving each organizational level and their value to the organization. Then we show how organizations use these systems for each major business function.

3.3 Four major types of systems

Organizations and individuals use different types of systems for different purposes. Here are some of the main types of information systems and their uses.

Components of information systems: people, equipment, procedures, data.

The main ones you need to know are TPS, MIS & DSS, and EIS.

Transaction processing system (TPS):

A TPS collects and stores information about transactions, and controls some aspects of transactions. A transaction is an event of interest to the organization. e.g. a sale at a store.

A TPS is a basic business system. It:

- is often tied to other systems such as the inventory system which tracks stock supplies and triggers reordering when stocks get low;
- serves the most elementary day-to-day activities of an organisation;
- supports the operational level of the business;
- supplies data for higher-level management decisions (e.g. MIS, EIS);
- is often critical to survival of the organisation;
- mostly for predefined, structured tasks;
- can have strategic consequences (eg airline reservation system);

- usually has high volumes of input and output;
- provides data which is summarised into information by systems used by higher levels of management;
- need to be fault-tolerant.

On-line transaction processing: A transaction processing mode in which transactions entered on-line are immediately processed by the CPU.

Decision support system (DSS):

Helps strategic management staff (often senior managers) make decisions by providing information, models, or analysis tools. For support of semistructured and unstructured decisions (structured decisions can be automated). Used for analytical work, rather than general office support.

They are flexible, adaptable and quick. The user controls inputs and outputs. They support the decision process and often are sophisticated modeling tools so managers can make simulations and predictions.

Their inputs are aggregate data, and they produce projections. An example job for a DSS would be a 5 year operating plan.

Management information system (MIS) :

Condenses and converts TPS data into information for monitoring performance and managing an organisation.

Transactions recorded in a TPS are analyzed and reported by an MIS.

They have large quantities of input data and they produce summary reports as output. Used by middle managers. An example is an annual budgeting system.

Executive information system (EIS):

Also known as an Executive Support System (ESS), it provides executives information in a readily accessible, interactive format. They are a form of MIS intended for top-level executive use. An EIS/ESS usually allows summary over the entire organisation and also allows drilling down to specific levels of detail. They also use data produced by the ground-level TPS so the executives can gain an overview of the entire organization.

Used by top level (strategic) management. They are designed to the individual. They let the CEO of an organization tie in to all levels of the organization. They are very expensive to run and require extensive staff support to operate.

Others

Office automation system (OAS) :

OAS provides individuals effective ways to process personal and organizational data, perform calculations, and create documents. e.g. word processing, spreadsheets, file managers, personal calendars, presentation packages

They are used for increasing personal productivity and reducing "paper warfare". OAS software tools are often integrated (e.g. Word processor can import a graph from a spreadsheet) and designed for easy operation.

OAS Subspecies:

Communication systems: helps people work together by sharing information in many different forms
Teleconferencing (including audio conferencing, computer conferencing, videoconferencing), electronic mail, voice mail, fax

Groupware system: helps teams work together by providing access to team data, structuring communication, and making it easier to schedule meetings. For sharing information, controlling work flows, communication/integration of work

TABLE 2-1 Characteristics of Information Processing Systems

Type of System	Information Inputs	Processing	Information Outputs	Users
ESS	Aggregate data; external, internal	Graphics; simulations; interactive	Projections; responses to queries	Senior managers
DSS	Low-volume data or massive databases optimized for data analysis; analytic models and data analysis tools	Interactive; simulations; analysis	Special reports; decision analyses; responses to queries	Professionals; staff managers
MIS	Summary transaction data; high-volume data; simple models	Routine reports; simple models; low-level analysis	Summary and exception reports	Middle managers
TPS	Transactions; events	Sorting; listing; merging; updating	Detailed reports; lists; summaries	Operations personnel; supervisors

Relationship of systems to one another

TPS are typically a major source of data for other systems, whereas ESS are primarily a recipient of data from lower—level systems. The other types of systems may exchange data with each other as well. Data may also be exchanged among systems serving different functional areas. For example, an order captured by a sales system may be transmitted to a manufacturing system as a transaction for producing or delivering the product specified in the order or to a MIS for financial reporting. It is definitely advantageous to integrate these systems so that information can flow easily between different parts of the organization and provide management with an enterprise-wide view of how the organization is performing as a whole. But integration costs money, and integrating many different systems is extremely time consuming and complex. This is a major challenge for large organizations, which are typically saddled with hundreds, even thousands of different applications serving different levels and business functions. Each organization must weigh its needs for integrating systems against the difficulties of mounting a large-scale systems integration effort.

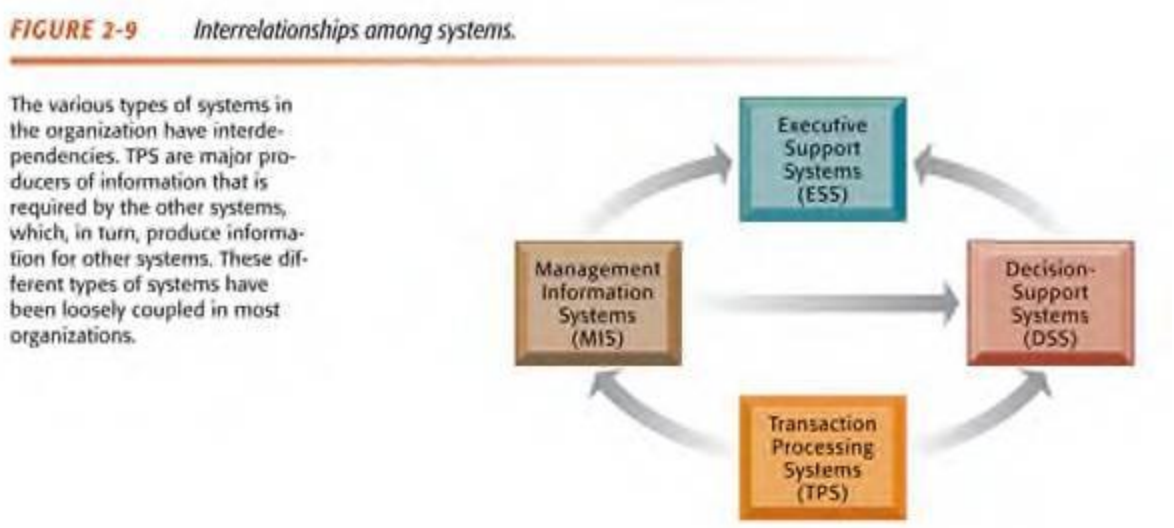


Figure 2.9 Interrelationships among systems.

3.4 Management Opportunities, Challenges, and Solutions

None of these enterprise systems are without their opportunities and challenges.

Briefly, the opportunities are:

- Higher levels of productivity, earnings, and share prices
- Enhanced decision-making at all levels of the organization
- Information when and where necessary

The challenges are:

- Integrating the system throughout the organization and yet serving specific needs
- Training managers and employees
- Managing the costs of information
- Managing user demands on the system

The solutions are:

- Determine specific information requirements and which of the requirements are being met by current systems
- Pay attention to the training needs of managers and employees — allocate the necessary funds to ensure training needs are adequately met
- Ensure each division is charged for all the information services they use and make the division managers responsible for managing the resource the same as they must manage all their other resources

Chapter Review Questions

1. How can a transaction processing system help an organization's strategic-level planning?
2. Which of the four major types of information systems do you think is the most valuable to an organization? Explain your choice.
3. Discuss the benefits and challenges of enterprise systems and explain why a firm would want to build one.

Laudon K, Laudon J, Management Information Systems, Managing the digital firm (Ninth Edition) page 40-65.

CHAPTER FOUR

I.S Management and Strategy

Learning Objectives

By the end of this chapter the learner shall be able to;

1. Identify and describe important features of organizations that managers need to know about in order to build and use information systems successfully.
2. Evaluate the impact of information systems on organizations.
3. Assess how information systems support the activities of managers in organizations.
4. Analyze how information systems support various business strategies for competitive advantage.
5. Assess the challenges posed by strategic information systems and management solutions.

4.1 What Is an Organization?

An organization is a stable, formal social structure that takes resources from the environment and processes them to produce outputs. This technical definition focuses on three elements of an organization. Capital and labor are primary production factors provided by the environment. The organization (the firm) transforms these inputs into products " and services in a production function. The products and services are consumed by environments in as shown in the diagram

next.

FIGURE 1-6 *Functions of an information system.*

An information system contains information about an organization and its surrounding environment. Three basic activities—input, processing, and output—produce the information organizations need. Feedback is output returned to appropriate people or activities in the organization to evaluate and refine the input. Environmental actors such as customers, suppliers, competitors, stockholders, and regulatory agencies interact with the organization and its information systems.

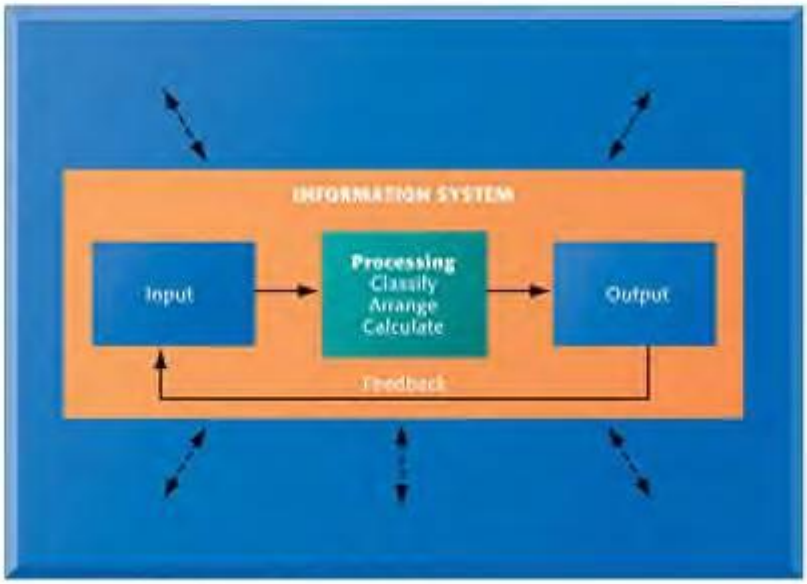


FIGURE 3-2 *The technical microeconomic definition of the organization.*

In the microeconomic definition of organizations, capital and labor (the primary production factors provided by the environment) are transformed by the firm through the production process into products and services (outputs to the environment). The products and services are consumed by the environment, which supplies additional capital and labor as inputs in the feedback loop.

An organization is more stable than an informal group (such as a group of friends that meets every Friday for lunch) in terms of longevity and routineness. Organizations are formal legal entities with internal rules and procedures, which must abide by laws. Organizations are also social structures because they are a collection of social elements, much as a machine has a structure a particular arrangement of valves, cams, shafts, and other parts.

This definition of organizations is powerful and simple, but it is not very descriptive or even predictive of real-world organizations. A more realistic behavioral definition of an, organization

is that it is a collection of rights, privileges, obligations, and responsibilities that is delicately balanced over a period of time through conflict and conflict resolution. In this behavioral view of the firm, people who work in organizations develop customary ways of working; they gain attachments to existing relationships; and they make arrangements with subordinates and superiors about how work will be done, the amount of work that will be done, and under what conditions work will be done.

4.2 Common Features of Organizations

The class you're enrolled in is an organization of sorts, isn't it? Think about it — look at the table describing the characteristics of an organization:

TABLE 3-1 *Structural Characteristics of All Organizations*

Clear division of labor
Hierarchy
Explicit rules and procedures
Impartial judgments
Technical qualifications for positions
Maximum organizational efficiency

These characteristics describe organizations that are called **bureaucracies**. Most of us think of them as slow, cumbersome, and unprogressive. That isn't necessarily so. Many organizations have bureaucratic characteristics and operate very well.

4.3 Strategic advantages of Information Technology

The Role of It In Strategic Management

Strategic Management

Is the way an organization maps the strategy of its future operations. The term strategic points to the long-term nature of this mapping exercise and to the large magnitude of advantage the exercise is expected to give an organization. Information Technology contributes to strategic management in many ways (see Kemerer, 1997 and Callon 1996). Consider these eight.

1. Innovative applications

IT creates innovative applications that provide direct strategic advantage to organizations. For example, Federal Express was the first company in its industry to use IT tracking the location of every package in its system. Next, FedEx was the first company to make this database accessible to its customers over the internet. Ted Ex has gone on to provide e-fulfilment solutions based on IT and is even writing software for this purpose (Bhise et al. 2000)

2. Competitive Weapons

Information systems themselves have long been recognized as a competitive weapon dvcs and learnmouth, 1984 and Callon, 1996). Amazon, com's one-click shopping system is considered so significant and important to the company's reputation for superior customer service that it has patented the system. Michael Dell, founder of Dell Computer puts it bluntly: The internet is like a weapon sitting on the table, ready to be picked up by either you or your competitor" (Dell 1999)

3. Changes in processes

IT supports changes in business processes that translate to strategic advantage (Davenport, 1993) For example, Berri is Australia's largest manufacturer and distributor of fruit price products. The principal goal of its enterprise resource planning system implementation was 'to turn its branch-based business into a national organization with a single set of unified business processes" in order to achieve millions of dollars in cost-savings(J.D. Edwards, 2002a) other

ways in which IT can change business processes include better control over remote stores or offices by providing speedy communication tools, streamlined product design time with computer-aided engineering tools and better decision-making processes by providing managers with timely information reports.

4. Links with Business Partners.

IT links a company with its business partners effectively and efficiently. For example, Rosenbluth's Global Distribution Networks allows it to connect agents, customers and travel service providers around the globe, an innovation that allowed it to broaden its marketing range (Glemons and Hann, 1999) Other examples, of inter organizational strategic information systems are presented later in this chapter.

5. Cost reduction

IT enables companies to reduce costs. For example, a Booz Allen & Hamilton study found that : a traditional bank transaction costs $1.07 whereas the same transaction over the Web costs about 1 cent; a traditional airline ticket costs $8 to process, an e-ticket costs $1 *(lbm.coml.partnerworld/pwhome.nsf/vAssetLookuplad2.pd/sfile/ad2.pdf).* In the customer service area, a customer call handled by a live agent costs $33, but an intelligent agent can handle the same request for less than $2(Schwartz, 2000)

6. Relationships with suppliers and customers

IT can be used to lock in suppliers and customers, or to build in switching costs (making it more difficult for suppliers or customers to switch to competitors) For example, Master Builders sells chemical additives that improve the performance characteristics of concrete. The company offers customers MasterTrac, a tank monitoring system that automatically notifies Master Builders when additive inventories fall below an agreed-on level. Master Builders then resupplies the tanks on a just-in-time basis. The customer benefits from an assured supply of product, less capital tied up in inventory and reduced inventory management time and processing. Master Builders benefits because company competitors face a more difficult task to convince concrete companies to switch to them (Vandenbosch and Dawar 2002)

7. New products

A firm can leverage its investment in IT to create new products that are in demand in the marketplace. Federal express's package-tracking software is one example. In Australia, IGI Explosives no longer views its business model as just selling explosives; it now also writes contracts for broken rocks. IGI engineers developed computer models that specify drilling procedures and explosives use for different types of rockfaces to produce rock in the sizes that the customer needs. According to Vandenbosch and Dawar (2002), "The redefinition of IGI's role not only generated much higher margins for the business" It also gave IGI a much more defensible competitive position"381.

8. Competitive Intelligence

IT provides competitive (business) intelligence by collecting and analyzing information about products, markets, competitors and environmental changes (see Guimaraes and Armstrong, 1997). For example, if a company knows something important before its competitors, or it can make the correct interpretation of information before it's competitors, then it can act first. Gaining strategic advantage through *first-mover advantage* (the competitive advantage gained by being first to offer a competitive intelligence is such an important aspect of gaining advantage, we look at it in some detail next.

4.4 Management Opportunities, Challenges, and Solutions

Opportunities

- Lower transaction and agency costs
- Harness information technologies to develop unique products, services, and processes
- Create new strategic competitive advantages

Management Challenges

Using information systems to beat the competition and increase the value of a product is not easy. It requires changing processes and methods that probably have been in the organization

since time began. The responsibility for successfully developing and then using an integrated information system will usually fall to the managers throughout the organization.

Managers simply cannot rest on their laurels with today's fast paced, fast changing technological advances. Technology changes much faster than organizations can adapt. As soon as employees and managers become comfortable with a particular system, it's almost time to make some more changes.

Solution Guidelines

Performing a Strategic Systems Analysis

Completing a strategic systems analysis is one of the first steps managers should take to help determine how they can use information systems to gain a competitive advantage. Ask yourself these questions about your own firm:

1. What is the structure of the industry in which your firm is located?
2. What are the business, firm, and industry value chains for your firm?

Chapter Review Questions

1. What features do organizations have in common?
2. What is the role of I.T. in strategic management?
3. Describe the management challenges posed by the role of information systems and suggest some solutions.

Laudon K, Laudon J, Management Information Systems, Managing the digital firm (Ninth Edition) page 71-103.

CHAPTER FIVE

Understanding the Business Value of Systems and Managing Change

Learning Objectives

By the end of this chapter the learner shall be able to;

i. Evaluate models for understanding the business value of information systems.
ii. Analyze the principal causes of information system failure.
iii. Assess the change management requirements for building successful systems.
iv. Select appropriate strategies to manage the system implementation process.
v. Identify the challenges posed by implementing new systems and management solutions.

5.1 Understanding the Business Value of Information Systems

Just as you can analyze the benefit of purchasing a new piece of equipment for your business, you can analyze the impact of an information system. Think about it: you tell the boss you need a new storage system for all the widgets you are producing. The boss will ask you to complete some type of analysis to see how the bottom line will be affected. The same is true for a new information system. Just how will it benefit the business overall? What benefits will your customers gain from the new system?

However, you can't reduce everything to dollars and cents. Sometimes the benefits of the new system will be measured in other ways, but you can employ several different methods to evaluate a new information system, just as you would a new storage system.

5.2 Traditional Capital Budgeting Models

Capital budgeting models are one of several techniques used to measure the value of investing in long term capital investment projects. The process of analyzing and selecting various proposals for capital expenditures is called capital budgeting. Firms invest in capital projects to expand

production to meet anticipated demand or to modernize production equipment to reduce costs. Firms also invest in capital projects for many noneconomic reasons, such as installing pollution control equipment, converting to a human resources database to meet some government regulations, or satisfying nonmarket public demands. Information systems are considered long—term capital investment projects.

Six capital budgeting models are used to evaluate capital projects:

The payback method

The accounting rate of return on investment (ROI)

The net present value

The cost-benefit ratio

The profitability index

The internal rate of return (IRR) i

Capital budgeting methods rely on measures of cash flows into and out of the firm.

Capital projects generate cash flows into and out of the firm. The investment cost is an immediate cash outflow caused by the purchase of the capital equipment. In subsequent years, the investment may cause additional cash outflows that will be balanced by cash inflows resulting from the investment. Cash inflows take the form of increased sales of more products (for reasons such as new products, higher quality, or increasing market share) or reduced costs in production and operations. The difference between cash outflows and cash inflows is used for calculating the financial worth of an investment. Once the cash flows have been established, several alternative methods are available for comparing different projects and deciding about the investment.

Financial models assume that all relevant alternatives have been examined, that all costs and benefits are known, and that these costs and benefits can be expressed in a common metric, specifically, money. Tangible benefits can be quantified and assigned a monetary value.

Intangible benefits, such as more efficient customer service or enhanced employee goodwill, cannot be immediately quantified but may lead to quantifiable gains in the long run.

TABLE 15-1 *Costs and Benefits of Information Systems*

COSTS
Hardware
Telecommunications
Software
Services
Personnel
TANGIBLE BENEFITS (COST SAVINGS)
Increased productivity
Lower operational costs
Reduced workforce
Lower computer expenses
Lower outside vendor costs
Lower clerical and professional costs
Reduced rate of growth in expenses
Reduced facility costs
INTANGIBLE BENEFITS
Improved asset utilization
Improved resource control
Improved organizational planning
Increased organizational flexibility
More timely information
More information
Increased organizational learning
Legal requirements attained
Enhanced employee goodwill
Increased job satisfaction
Improved decision making
Improved operations
Higher client satisfaction
Better corporate image

5.3 Financial Models

The payback method

This method is quite simple. It is a measure of time required to payback the initial investment of a project. The payback period is computed as follows;

$$\frac{\text{Original investment}}{\text{Annual Net cash inflow}} = \text{Number of years to pay}$$

The accounting Rate of return on investment (ROI)

Organisations make capital investments to earn a satisfactory rate of return. The ROI calculates the rate of return from investment by adjusting the cash inflows produced by the investment for depreciation. It gives an approximation of the accounting income earned by the project. To find the ROI, first calculate the average net benefit as follows

$$\frac{(\text{Total benefits - Total cost - Depreciation})}{\text{Useful life}} = \text{Net Benefit}$$

This net benefit is divided by the total initial investment to arrive at ROI as follows

$$\frac{\text{Net Benefit}}{\text{Total initial investment}} = \text{ROI}$$

Net Present Value

Evaluating a capital project requires that the cost of an investment (a cash outflow usually in year 0) be compared with the net cash inflows that occur many years later. But these two kinds of cash flows are not directly comparable because of the time value of money. Money you have been promised to receive three, four, and five years from now is not worth as much as money received today. Money received in the future has to be discounted by some appropriate

percentage rate usually the prevailing interest rate, or sometimes the cost of capital. Present value is the value in current dollars of a payment or streams of payments to be received in the future. It can be calculated by using the following formula:

$$\text{Payment} \times \frac{1 - (1 + \text{interest})^{-n}}{\text{Interest}} = \text{Present Value}$$

The net resent value is the amount of money an investment is worth, taking into account its cost, earnings, and the time value of money. The formula for net present value is this: I

Present value of expected cash flows — Initial investment cost = Net present value

Cost benefit Ratio

The cost benefit ration is the ratio of benefits to costs. It sis calculated as follws;

$$\frac{\text{Total benefits}}{\text{Total Costs}} = \text{Cost - Benefit Ratio}$$

Profitability Index

One limitation of net present value is that it provides no measure of profitability. Neither does it provide a way to rank order different possible investments. One simple solution is provided by the profitability index. The profitability index is calculated by dividing the present value of the total cash inflow from an investment by the initial cost of the investment. The result can be used to compare the profitability of alternative investments.

$$\frac{\text{Present Value of Inflows}}{\text{Investment}} = \text{Profitability index}$$

5.4 Causes of Implementation Success and Failure

Understanding the causes of failure can help prevent some projects from being doomed from the start. Understanding that success is sometimes more a function of luck than skill can also help you.

FIGURE 15-5 *Information systems success or failure factors.*

The implementation outcome can be largely determined by the role of users, the degree of management support, the level of risk and complexity of the implementation project, and the quality of management of the implementation process. Evidence of the information system's success or failure can be found in the areas of design, cost, operations, and data.

User Involvement and Influence

Make users feel they own the new system instead of it being an enemy or something they should fear. That's why we stress user involvement through the entire development process. The new system shouldn't be a surprise on Monday morning! Familiarity doesn't always breed contempt; it should breed acceptance when it comes to new information systems.

Management Support and Commitment

If managers don't like the new system or fear it, then how in the world can you expect the workers to accept it? The best way to get managers to like, support, and fund the new system is to communicate with them every step of the way. Make sure they know what's going on. After all, managers are people too, and they have the same fears as anyone else.

Level of Complexity and Risk

The more complex, the more risk. That's pretty easy to understand, but harder to manage. Risks associated with the project should be clearly outlined and discussed. The three major risks are project size, project structure, and experience with technology.

Management of the Implementation Process

The development of a new system must be carefully managed and orchestrated, and the way a project is orchestrated is likely to be the most important factor affecting its outcome. Things to be managed are; user training, budget, funds etc.

5.5 Change Management Challenges

The text gives the startling fact that 70 percent of all business process reengineering projects fail to deliver promised benefits. It doesn't have to be that way. One abiding theme in most of the failures and successes is people. If the changes required by and in people were managed properly, then the success rate increases. Conversely, if the people were poorly managed or, just as likely not managed at all, then the project was a failure. The leading threats of BPR projects are:

- dealing with fear and anxiety throughout the organization
- overcoming resistance by key managers
- changing job functions, career paths, and recruitment practices
- training

Controlling Risk Factors

There is risk in everything you do. The smallest project has risk. Understanding and managing risk, especially when it comes to people, will help you succeed.

1. *Managing Technical Complexity*: You can use special tools to help you manage the implementation of a new information system (**internal integration tools**). If nothing

else, these special tools will help you communicate with everyone on the implementation team and in the organization as a whole. Use your organization's intranet as much as possible to communicate and inform.

2. *Formal Planning and Control Tools*: Automated management tools such as PERT or Gantt charts (**formal planning and control tools**) can also help you manage a complex project. They are extremely beneficial for scheduling events and tracking the hundreds of details involved.
3. *Increasing User Involvement and Overcoming User Resistance*: We simply can't say it enough! Get them involved and keep them involved. Use the **external integration tools** to keep people involved and informed. Guard against destructive, although innocent, sabotage of the system (counterimplementation). Remember, people will weigh their own needs against those of the organization. You have to make sure the two agree as much as possible.

5.6 Management Opportunities, Challenges, and Solutions

It pays to do your homework upfront when developing new systems for the digital firm. The entire organization will live or die for years to come based on the decisions made early on.

Opportunities

All is not doom-and-gloom when you build a new system. New systems can in fact create new opportunities previously not available. System builders, managers, and employees must understand all the pitfalls, plan accordingly, and try to prevent the same problems others have faced before them.

Management Challenges

The challenges presented by new systems and the changes they bring are:

- **Determining system benefits and costs:** using the capital budgeting models presented in this chapter can help managers determine the quantifiable costs of new systems. Managers must understand however, that these models are not absolute and the intangible factors of new systems must be considered.
- **Dealing with the complexity of large-scale systems projects:** the bigger the project, the more change it brings to the organization. That sounds simple enough but many companies overlook just how difficult it is to implement large-scale information systems.

Solution Guidelines

In addition to the models presented in this chapter, here are a few more suggestions for managing the implementation of information systems:

- Fully document the firm's applications and IT infrastructure and conduct periodic reviews of the firm's IT portfolio
- Ensure that information systems investments are closely aligned with the firm's business objectives.
- Project risks and returns should be clearly identified
- Continually measure the business value of new systems and weed out underperforming projects
- For large-scale projects, managers should assume an enterprise-wide focus, solve problems and meet challenges as they arise rather than simple meeting formal project milestones
- Emphasize learning as well as planning and adapt to unforeseen uncertainties and chaos
- Establish a separate office to manage subprojects and coordinate the entire project effort with other ongoing projects
- Coordinate the project with ongoing changes in the firm's business strategy, information technology infrastructure, and business processes

Chapter Review Questions

1. Why should you consider the intangible benefits of a new system when they are difficult to factor into a capital budgeting model?
2. What are some of the causes of implementation success and failure? Which one(s) do you think are the most important?
3. What kinds of problems provide evidence of information systems failure?
4. Why do builders of new I.S. need to address change management?

Laudon K, Laudon J, Management Information Systems, Managing the digital firm (Ninth Edition) page 534-567.

CHAPTER SIX

Planning for Information Technology and Systems

Learning Outcomes

By the end of this chapter the learner shall be able to;

1. Explain the stages of the Information Technology Planning.
2. Explain Nolan's Stages of IS Growth
3. Explain the issues in IT planning

Information Technology Planning is a discipline within the **Information Technology** domain and is concerned with making the planning process for information technology investments and decision-making a quicker, more flexible, and more thoroughly aligned process. According to Architecture & Governance Magazine, (Strategic) IT planning has become an overarching discipline within the **Strategic Planning** domain in which **enterprise architecture** is now one of several capabilities.

6.1 Issues in IT Planning

Aligning the IT plan

Design IT architecture

Allocation IT resources

Completion on time and within budget

6.2 A four-stage model of IT planning

Table 12.1 IT Planning Stages

Major IT Planning Activity	*Description*
Strategic IT planning	Establishing the relationship between the overall organizational plan and the IT plan.
Information requirements analysis	Identifying broad, organizational information requirements to establish a strategic information architecture that can be used to direct specific application development projects.
Resource allocation	Allocating both IT application development resources and operational resources.
Project planning	Developing a plan that expresses schedules and resource requirements for specific information systems projects.

Strategic IT Planning

Information technology involves setting out the plans and the underlying principles of those plans within that organization. Among the elements of the plan that provide guidance toward plan achievement, such plans typically incorporate information on goals and objectives as well as on tracking the realization of those goals through specifications for performance measures.
In order to understand IT planning we will look at a model suggested by Nolan.

Nolan's Stages of IS Growth

Nolan's model concerns the general approach to IT in business. The model proposes that evolution of IT in organizations begins slowly in Stage I, the "initiation" stage.This stage is marked by "hands off" user awareness and an emphasis on functional applications to reduce costs. Stage I is followed by further growth of IT in the "contagion" stage. In this stage there is a proliferation of applications as well as the potential for more problems to arise. During Stage III a need for "control" arises. Centralized controls are put in place and a shift occurs from management of computers to management of data resources. Next, in Stage IV, "integration" of diverse technological solutions evolves. Management of data allows development without

increasing IT expenditures in Stage V. Finally, in Stage VI, "maturity",high control is exercised by using all the information from the previous stages.

Stage I – Initiation

In this stage, information technology is first introduced into the organization. According to Nolan's article in 1973, computers were introduced into companies for two reasons. The first reason deals with the company reaching a size where the administrative processes cannot be accomplished without computers. Also, the success of the business justifies large investment in specialized equipment. The second reason deals with computational needs. Nolan defined the critical size of the company as the most prevalent reason for computer acquisition. Due to the unfamiliarity of personnel with the technology, users tend to take a "hands off" approach to new technology. This introductory software is simple to use and cheap to implement, which provides substantial monetary savings to the company. During this stage, the IT department receives little attention from management and work in a "carefree" atmosphere.

Stage I Key points:

- User awareness is characterized as being "hands off".
- IT personnel are "specialized for technological learning".
- IT planning and control is not extensive.
- There is an emphasis on functional applications to reduce costs.

Stage II – Contagion

Even though the computers are recognized as "change agents" in Stage I, Nolan acknowledged that many users become alienated by computing. Because of this, Stage II is characterized by a managerial need to explain the potential of computer applications to alienated users. This leads to the adoption of computers in a range of different areas. A problem that arises in Stage II is that project and budgetary controls are not developed. Unavoidably, this leads to a saturation of existing computer capacity and more sophisticated computer systems being obtained. System sophistication requires employing specialized professionals. Due to the shortage of qualified

individuals, implementing these employees results in high salaries. The budget for computer organization rises significantly and causes concern for management. Although the price of Stage II is high, it is evident that planning and control of computer systems is necessary.

Stage II Key points:

- There is a proliferation of applications.
- Users are superficially enthusiastic about using data processing.
- Management control is even more relaxed.
- There is a rapid growth of budgets.
- Treatment of the computer by management is primarily as just a machine.
- Rapid growth of computer use occurs throughout the organization's functional areas.
- Computer use is plagued by crisis after crisis.

Stage III – Control

Stage III is a reaction against excessive and uncontrolled expenditures of time and money spent on computer systems, and the major problem for management is the organization of tasks for control of computer operating costs. In this stage, project management and management report systems are organized, which leads to development of programming, documentation, and operation standards. During Stage III, a shift occurs from management of computers to management of data resources. This shift is an outcome of analysis of how to increase management control and planning in expending data processing operations. Also, the shift provides flexibility in data processing that is needed in a case of management's new controls. The major characteristic of Stage III is reconstruction of data processing operation.

Stage III Key points:

- There is no reduction in computer use.
- IT division's importance to the organization is greater.
- Centralized controls are put in place.
- Applications are often incompatible or inadequate.

- There is use of database and communications, often with negative general management reaction.
- End user frustration is often the outcome.

Stage IV – Integration

Stage IV features the adoption of new technology to integrate systems that were previously separate entities. This creates data processing (IT) expenditure growth rates similar to that of Stage II. In the latter half of Stage IV, exclusive reliance on computer controls leads to inefficiencies. The inefficiencies associated with rapid growth may create another wave of problems simultaneously. This is the last stage that Nolan acknowledged in his initial proposal of the stages of growth in 1973.

Stage IV Key points:

- There is rise of control by the users.
- A larger data processing budget growth exists.
- There is greater demand for on-line database facilities.
- Data processing department now operates like a computer utility.
- There is formal planning and control within data processing.
- Users are more accountable for their applications.
- The use of steering committees, applications financial planning becomes important.
- Data processing has better management controls and set standards.

Stage V – Data administration

Nolan determined that four stages were not enough to describe the proliferation of IT in an organization and added Stage V in 1979. Stage V features a new emphasis on managing corporate data rather than IT. Like the proceeding Stage VI, it is marked by the development and maturity of the new concept of data administration.

Stage V Key points:

- Data administration is introduced.
- There is identification of data similarities, its usage, and its meanings within the whole organization.
- The applications portfolio is integrated into the organization.
- Data processing department now serves more as an administrator of data resources than of machines.
- A key difference is the use of term IT/IS rather than data processing..

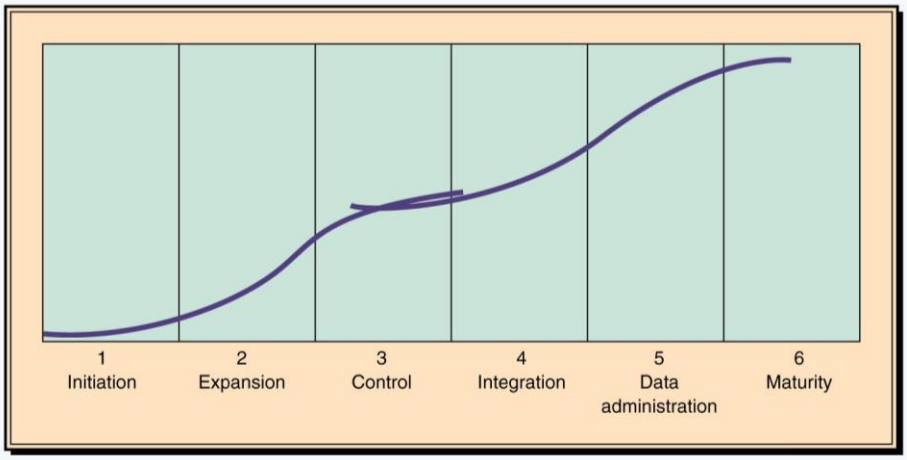
Stage VI – Maturity

In Stage VI, the application portfolio — tasks like orderly entry, general ledger, and material requirements planning — is completed and its structure "mirrors" the organization and information flows in the company. During this stage, tracking sales growth becomes an important aspect. On the average, 10% batch and remote job entry, 60% are dedicated to data base and data communications processing, 5% personal computing, 25% minicomputer processing. Management control systems are used the most in Stage VI (40%). There are three aspects of management control; manufacturing, marketing and financial. Manufacturing control demands forecasting — looking down the road for future needs. Marketing control strictly deals with research. Financial control, forecasts cash requirements for the future. Stage VI exercises high control, by compiling all of the information from Stages I through V. This allows the organization to function at high levels of efficiency and effectiveness.

Stage VI Key points:

- Systems now reflect the real information needs of the organization.
- Greater use of data resources to develop competitive and opportunistic applications.
- Data processing organisation is viewed solely as a data resource function.
- Data processing now emphasizes data resource strategic planning.
- Ultimately, users and DP department jointly responsible for the use of data resources within the organization.

- Manager of IT system takes on the same importance in the organizational hierarchy as say the director of finance or director of HR



Nolan's six stages of IS growth.

Critical success factors questions

What objectives are central to your organization

What are the critical success factors that are essential in meeting these objectives?

What decisions or actions are key to these critical factors?

What variables underlie these decisions, and how are they measured?

What information systems can supply these measures?

Information Requirements Analysis

The goal of the second stage of the model, the *information requirement analysis*, is to ensure that the various information systems, databases, and networks can be integrated to support decision making and operations. Information requirements analysis involves, Conducting a requirements analysis: activities under this include: Defining underlying organizational systems, Developing subsystem matrix, Defining and evaluating information requirements for organizational

subsystems, Defining major information categories and mapping interviews into them, Developing information matrix

Using the requirements analysis for planning : activities under this include: Identifying high payoff categories and Providing an architecture

Resource Allocation

Resource allocation consists of developing hardware, software, data communications, facilities, personnel, and financial plans needed to execute the master development plan as defined in the requirements analysis.

Project Planning

Project planning relates to the use of schedules such as Gantt charts to plan and subsequently report progress within the project environment.

Initially, the project scope is defined and the appropriate methods for completing the project are determined. Following this step, the durations for the various tasks necessary to complete the work are listed and grouped into a work breakdown structure. The logical dependencies between tasks are defined using an activity network diagram that enables identification of the critical path. Float or slack time in the schedule can be calculated using project management software.[2] Then the necessary resources can be estimated and costs for each activity can be allocated to each resource, giving the total project cost. At this stage, the project plan may be optimized to achieve the appropriate balance between resource usage and project duration to comply with the project objectives. Once established and agreed, the plan becomes what is known as the baseline. Progress will be measured against the baseline throughout the life of the project. Analyzing progress compared to the baseline is known as earned value management.

Chapter Review Questions

1. What are the stages of the Information Technology Planning.
2. Explain Nolan's Stages of IS Growth
3. What critical success factors questions should you ask yourself while doing IT Planning?

Wade J, Planning for information Technology(2010) Chapter 12

CHAPTER SEVEN

MANAGING INFORMATION SYSTEMS RESOURCE; CONTROL AND SECURITY

Learning Objectives

By the end of this chapter the learner shall be able to;

1. Explain why information systems need special protection from destruction, error, and abuse.
2. Assess the business value of security and control.
3. Evaluate elements of an organizational and managerial framework for security and control.
4. Evaluate the most important tools and technologies for safeguarding information resources.
5. Identify the challenges posed by information systems security and control and management solutions.

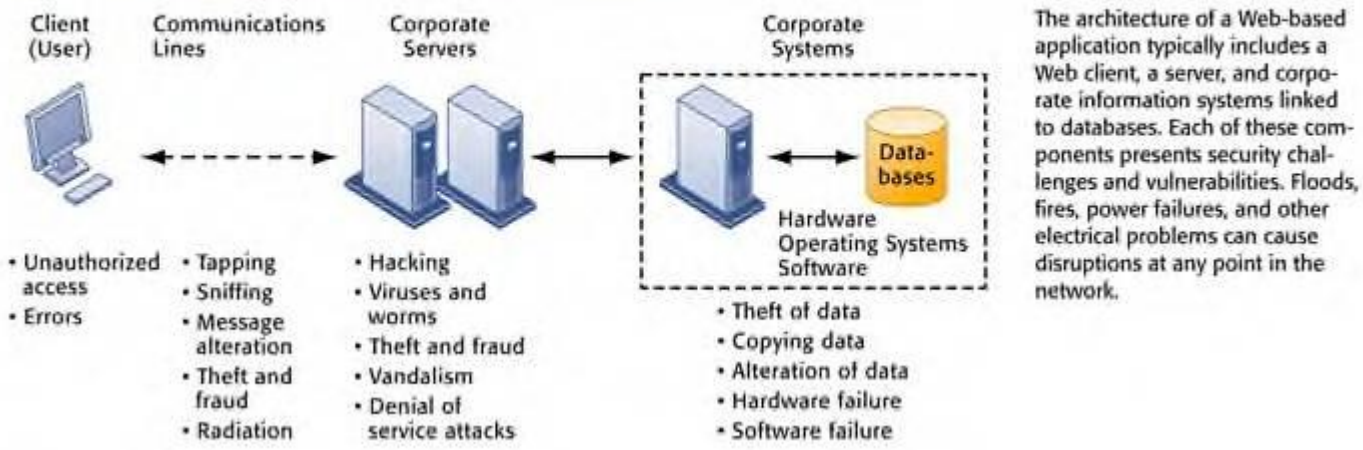
7.1 System Vulnerability and Abuse

As our society and the world itself come to depend on computers and information systems more and more, firms must put forth a better effort in making their systems less vulnerable and more reliable. The systems must also be more secure when processing transactions and maintaining data. These two issues, which we address in this chapter, are the biggest issues facing those wanting to do business on or expand their operations to the Internet. The threats are real, but so are the solutions.

Why Systems Are Vulnerable

Information systems are vulnerable to technical, organizational, and environmental threats from internal and external sources. The weakest link in the chain is poor system management. If managers at all levels don't make security and reliability their number one priority, then the threats to an information system can easily become real.

FIGURE 10-1 Contemporary security challenges and vulnerabilities.



7.2 Vulnerabilities

Internet

The internet and large public networks are more vulnerable than internal networks because they are virtually open to everyone. The internet is so huge that when abuses do occur they have an enormous widespread impact. When the internet becomes part of the corporate network, the orgaisations information are even more vulnerable to actions from outsiders.

Wireless Security Challenges

It's a difficult balancing act when it comes to making wireless systems easy to access and yet difficult to penetrate. Internet cafes, airports, hotels, and other hotspot access points need to make it easy for users to use the network systems with the 802.11 standard. Yet, because it is so easy, hackers and crackers can easily access unsuspecting users' systems and steal data or use the entry point as a way to spread malicious programs.

Malicious Software: Viruses, Worms, Trojan Horses, and Spyware

Have you ever picked up a cold or the flu from another human? Probably. You then spread it to two or three other people through touch or association. Those people spread it to two or three more people each. Pretty soon it seems that everyone on campus or at work is sick. That is how **computer viruses** are spread. You copy a file from an infected source, use the file, and maybe send it to friends or associates. The virus is now on your computer and spreads to files other than the original. You then send the same or even a different file to a few friends and their computers are infected.

A different type of **malware** called **worms** can also destroy data on computers or clog network systems with software-generated electronic transmissions. Worms are similar to viruses in that they can create additional file copies on a computer and generate emails to other computers with the infected file attached. Worms differ from viruses because they don't need human intervention to spread from one computer to another.

Trojan horses cause problems because they force a computer system to perform unexpected operations, often to the detriment of the system and the user. This type of malware is usually masked in email messages although it can be stored on Web sites.

Hackers and Cybervandalism

Hackers, those who intentionally create havoc or do damage to a computer system, have been around for a long time. Many companies don't report hackers' attempts to enter their systems because they don't want people to realize their systems are vulnerable. That makes gathering real statistics about hacking attempts and successes hard. Unauthorized access is a huge problem, though.

Some hackers penetrate systems just to see if they can. They use special computer systems that continually check for password files that can be copied. Or they look for areas of the system that have been "left open," so to speak, where they can enter the system. Sometimes they don't do any

damage, but far too often they destroy files, erase data, or steal data for their own use through the use of Trojan horse software. Other hackers attack systems because they don't like the company.

Spoofing and Sniffing

These are two other methods hackers and criminals can use to gain improper or illegal access to computer systems. **Spoofing** is becoming a common way to steal financial information through fake Web sites. The spoofed site is almost a mirror image of the real site and unless the unsuspecting user examines the spoof closely, he/she may inadvertently give out important personal and financial information.

Sniffing is a popular way to "grab" information as it passes over transmission lines whether they are hard-wired or wireless. It is almost impossible to detect and encryption is about the only way to safeguard against it.

Denial of Service Attacks

As companies and organizations expand their business to Web sites, they are opening another point of vulnerability through **denial of service attacks**. In a denial of service attack, hackers flood a network server or Web server with many thousands of false communications or requests to crash the network. The network receives so many queries that it cannot keep up with them.

Computer crime and cyber terrorism

Computer crime is any violations of criminal law that involve knowledge of computer technology for their penetration, investigation or prosecution. The computer can be an instrument of rime or a target of crime.

Identity theft

With the growth of the internet and electronic commerce, identity theft has become a matter of concern. Identity theft is a crime in which an imposter obtains key pieces of personal information, such as debit or credit card details to impersonate someone else.

Internal Threats: Employees

It is surprising to learn that most computer crime against companies is committed by current or former employees. They know the system best, are entrusted with huge amounts of data, and have the easiest access. Managers and executives need to be aware of potential internal threats to their systems and put special measures in place to safeguard systems and data. They also need to impress upon all employees how important security is throughout the system right down to the last person.

Software Vulnerability

Software errors also pose a constant threat to information systems, causing untold losses in productivity. A major problem with software is the presence of hidden bugs, or program code defects. Studies have shown that it is impossible to eliminate all bugs from large programs.

Establishing a Management Framework for Security and Control

How do you help prevent some of the problems we've discussed? One of the best ways is to institute **controls** into your information system the same way you might in any other system; through methods, policies, and procedures.

7.3 General Controls

General controls in information systems consist of the systems software and manual procedures used to control the design, security and use of the programs and the data files in the overall system. You can compare the general controls to the overall security system of a building, which

may consist of outside door locks, fencing around the building, and employee passes. General controls wouldn't be concerned with what happens in one particular area of the building.

Table 10-3 describes the types of general controls, including **administrative controls**, used in information systems

TABLE 10-3 General Controls

Type of General Control	Description
Software controls	Monitor the use of system software and prevent unauthorized access of software programs, system software, and computer programs. System software is an important control area because it performs overall control functions for the programs that directly process data and data files.
Hardware controls	Ensure that computer hardware is physically secure and check for equipment malfunction. Computer equipment should be specially protected against fires and extremes of temperature and humidity. Organizations that are dependent on their computers also must make provisions for backup or continued operation to maintain constant service.
Computer operations controls	Oversee the work of the computer department to ensure that programmed procedures are consistently and correctly applied to the storage and processing of data. They include controls over the setup of computer processing jobs and computer operations and backup and recovery procedures for processing that ends abnormally.
Data security controls	Ensure that valuable business data files on either disk or tape are not subject to unauthorized access, change, or destruction while they are in use or in storage.
Implementation controls	Audit the systems development process at various points to ensure that the process is properly controlled and managed. The systems development audit looks for the presence of formal reviews by users and management at various stages of development; the level of user involvement at each stage of implementation; and the use of a formal cost-benefit methodology in establishing system feasibility. The audit should look for the use of controls and quality assurance techniques for program development, conversion, and testing and for complete and thorough system, user, and operations documentation.
Administrative controls	Formalize standards, rules, procedures, and control disciplines to ensure that the organization's general and application controls are properly executed and enforced.

Application Controls

We've talked about controls for the general use of an information system. Application controls are specific controls within each computer application used in the system.

TABLE 10-4 Application Controls

Name of Control	Type of Application Control	Description
Control totals	Input, processing	Totals established beforehand for input and processing transactions. These totals can range from a simple document count to totals for quantity fields, such as total sales amount (for a batch of transactions). Computer programs count the totals from transactions input or processed.
Edit checks	Input	Programmed routines that can be performed to edit input data for errors before they are processed. Transactions that do not meet edit criteria are rejected. For example, data might be checked to make sure they are in the right format (for instance, a nine-digit social security number should not contain any alphabetic characters).
Computer matching	Input, processing	Matches input data with information held on master or suspense files and notes unmatched items for investigation. For example, a matching program might match employee time cards with a payroll master file and report missing or duplicate time cards.
Run control totals	Processing, output	Balance the total of transactions processed with total number of transactions input or output.
Report distribution logs	Output	Documentation specifying that authorized recipients have received their reports, checks, or other critical documents.

Security Policy

Companies spend a lot of money on physical security such as locks on doors or fences around supply depots. They need to do the same thing for their information systems. Because of the increasing liability for security breaches, many companies are now establishing a **chief security officer** position to help ensure the firm maximizes the protection of information resources. Some tools available to the CSO are:

- Security policy: principle document that determines security goals and how they will be achieved
- Acceptable use policy: outlines acceptable and unacceptable uses of hardware and telecommunications equipment
- Authorization policy: determines what access users may have to information resources
- Authorization management systems: manages access to each part of the information system.

Technologies and Tools for Security and Control

Access Control

Access control consists of all the policies and procedures a company uses to prevent improper access to systems by unauthorized insiders and outsiders. To gain access a user must be authenticated. Authentication refers to the ability to know that a person is who or she claims to be . this can be established by using passwords. **Biometric authentication** is becoming more popular as a method of protecting systems and data as the technology is refined. While you may have seen the fingerprint or facial recognition techniques only on sci-fi movies, rest assured it may be the next wave of security that's installed in your organization.

Firewalls, Intrusion Detection Systems, and Antivirus Software

Firewalls detect and prevent intruders from accessing the network while intrusion detection systems detect intruders.

Antivirus Software

Antivirus Software is designed to check computer systems and drives for the presence of computer viruses.

Securing wireless networks

Security is easily penetrated because of the very nature of the spectrum transmission used in wi-fi. Unless users take stringent precautions to protect their computers, it's relatively easy for hackers to obtain access to files. Wireless networks can be secured through the use of encryption. Encryption is the coding and scrambling of messages to prevent unauthorized access to or understanding of the data being transmitted.

7.4 Management Challenges

There's a reason why we explain all those methods and procedures and processes in future chapters for building good, solid information systems. They ensure system quality so that the product produced by the system is as good as it can be.

Designing Systems that are Neither Overcontrolled nor Undercontrolled

You should be realistic about security and system controls. If you institute five layers of entry into your Web site, people probably won't use it that much. They'll either ignore it or find a way around your controls. You have to analyze the system and determine those areas that should receive more security and controls and those that probably can use less. You probably don't want to go to the expense of checking absolutely every transaction that is entered into the system, so you check a sampling of the data. Just make sure the sampling is large enough to detect any exceptions.

Implementing an Effective Security Policy

Does your company devote enough resources to information systems security? If your company is like the majority, sadly the answer to that question will be no.

Solution Guidelines

While there is no surefire way to protect systems and data from every threat, great and small, businesses need to take a more firm-wide approach to security. Every person in the organization, from the CEO down, needs to be involved in security. Organizations must control access through firewalls, transaction logs, access security, and output controls. Software programs that track "footprints" of people accessing the system can be a good way to detect intruders, what they did, what files they accessed, and how they entered your system initially.

A few methods an organization can use to beef up security are:

- What firm resources are the most critical to control and secure?
- What level of system downtime is acceptable?
- What is the minimum acceptable level of performance for software and systems?
- How much is the business willing to invest to protect its information assets?

Chapter Review Questions

1. Why are computer systems more vulnerable ? Describe the common threats against contemporary information systems.
2. Why are internet and wireless networks so difficult to secure?
3. What is a hacker? How do hackers create security problems and damage systems?
4. What is identity theft? Why is it such a big problem today?

Laudon K, Laudon J, Management Information Systems, Managing the digital firm (Ninth Edition) page 341-371.

CHAPTER EIGHT

Redesigning the Organization with Information Systems

Learning Objectives

By the end of this chapter the learner shall be able to;

1. Demonstrate how building new systems produces organizational change.
2. Explain how a company can develop information systems that fit its business plan.
3. Identify and describe the core activities in the systems development process.
4. Evaluate alternative methods for building information systems and alternative methodologies for modeling systems.
5. Assess the challenges of building information systems and management solutions.

8.1 SYSTEMS AS PLANNED ORGANIZATIONAL CHANGE

Building a new information system is one kind of planned organizational change. The introduction of a new information system involves much more than new hardware and software. It also includes changes in jobs, skills, management, and organization. When we design a new information system, we are redesigning the organization. System builders must understand how a system will affect the organization as a whole. Linking Information Systems to the Business Plan Deciding which new systems to build should be an essential part of the organizational planning process. Organizations need to develop an information systems plan that supports their overall business plan and in which strategic systems are incorporated into top-level planning. Once specific projects have been selected within the overall context of a strategic plan for the business and the systems area, an information systems plan can be developed. The plan serves as a road map indicating the direction of systems development (the purpose of the plan), the rationale, the current systems situation, new developments to consider, the management strategy, the implementation plan, and the budget. The plan contains a statement of corporate goals and specifies how information technology will support the attainment of those goals. The report shows how general goals will be achieved by specific systems projects. It identifies specific target dates and mile-stones that can be used later to evaluate the plan's progress in terms of how many objectives were actually attained in the time frame specified in the plan. The plan indicates

the key management decisions concerning hardware acquisition; telecommunications; centralization/ decentralization of authority, data, and hardware; and required organizational change. Organizational changes are also usually described, including management and employee training requirements; recruiting efforts; changes in business processes; and changes in authority, structure, or management practice.

Establishing Organizational Information Requirements

To develop an effective information systems plan, the organization must have a clear understanding of both its long- and short-term information requirements. Two principal methodologies for establishing the essential information requirements of the organization as a whole are enterprise analysis and critical success factors.

Enterprise Analysis (Business Systems Planning)

Enterprise analysis (also called business systems planning) argues that the firm's information requirements can be understood only by examining the entire organization in terms of organizational units, functions, processes, and data elements. Enterprise analysis can help identify the key entities and attributes of the organization's data.

To do enterprise analysis, you first ask each manager or a large sample of managers the following:

- How they use information
- Where they get information
- What their environments are like
- What their objectives are
- How they make decisions
- What their information needs really are

You then compile that input into logical application groups. Now you can get an idea of how the processes work, who uses them, and how they fit together.

8.2 Strategic Analysis or Critical Success Factors

Critical Success Factors (CSFs) are simply the goals managers feel will make the organization a success. Using this method does broaden the scope of the analysis to include entire industries, the broader environment in addition to the firm itself and its managers. That's why it's called "strategic analysis." Basically, you contact several top managers, ask them what they think will make the organization succeed, and then combine the results into a cohesive picture.

TABLE 14-2 Critical Success Factors and Organizational Goals

Example	Goals	CSF
Profit concern	Earnings/share Return on investment Market share New product Energy standards	Automotive industry Styling Quality dealer system Cost control
Nonprofit	Excellent health care Meeting government regulations Future health needs	Regional integration with other hospitals Improved monitoring of regulations Efficient use of resources

Source: Rockart (1979).

8.3 Systems Development and Organizational Change

Information technology can promote various degrees of organizational change, ranging from incremental to far-reaching. Figure 14-3 shows four kinds of structural organizational change that are enabled by information technology: (1) automation, (2) rationalization, (3) reengineering, and (4) paradigm shifts. Each carries different rewards and risks.

Automation - The most common form of IT-enabled organizational change is automation. The first applications of information technology involved assisting employees with performing their tasks more efficiently and effectively. Calculating paychecks and payroll registers, giving bank tellers instant access to customer deposit records, and developing a nation wide network of airline reservation terminals for airline reservation agents are all examples of early automation.

Rationalisation – Is a more deeper form of organizational change. Rationalization of procedures is the streamlining of standard operating procedures.
Business Process Reengineering (BPR) A more powerful type of organizational change in which business processes are analyzed, simplified, and redesigned. Using information technology, organizations can rethink and streamline their business processes to improve speed, service, and quality. Business reengineering reorganizes work flows, combining steps to cut waste and eliminating repetitive, paper-intensive tasks (sometimes the new design eliminates jobs as well). It is much more ambitious than rationalization of procedures, requiring a new vision of how the process is to be organized**.**

Paradigm Shifts- This is a more radical form of business change is called a paradigm shift. A paradigm shift involves rethinking the nature of the business and the nature of the organization. Paradigm shifts and reengineering often fail because extensive organizational change is so difficult to orchestrate.

8.4 Business Process Reengineering and Process Improvement

Business Process Reengineering

In order to make BPR successful, you must first redesign the process, then apply computing power to the new processes. If problems existed in the process before the new system was installed and those problems aren't resolved, the new system could actually make them worse.

Very few processes in business are as efficient as they can possibly be. It's a fact of life. The idea behind successful BPR is to find improvements or even new opportunities. For instance, Federal Express and UPS both have online package tracking systems. That simple process was never economically feasible before the Internet. They had to reengineer their business processes to incorporate this new paradigm shift.

Steps in Effective Reengineering

BPR attempts fail 70 percent of the time. That's an astonishing figure when you think about it. What if your car failed to start 70 percent of the time? Some of the reasons for the high failure rate are lack of planning, management's inability to fully comprehend the enormity and complexity of the effort, and the fact that BPR usually takes much longer than expected. There is no single method for implementing business process re-engineering. However, there are a number of steps in the process which may be identified.

• Identify the business vision and process improvement objectives.
• Select the processes for improvement.
• Understand and measure existing processes.
• Re-design the process.
• Manage the implications of the process redesign.

Key success factors in process re-engineering

Research suggests that the following factors contribute to the overall success of process re-engineering initiatives.

• Effective use of teams.
• Commitment of appropriate time and resources.
• The right focus (a clear understanding of the scope and goals of the initiative).
• Strong communications program to keep people up to speed on the initiative.
• Realistic planning and schedules.
• Effective training and education.

Total quality management (TQM)

Total quality management is a strategy which aims to raise awareness of the importance of quality throughout the organisation and ensure that it is embedded throughout the organisation's activities and processes. It aims to remove inconsistencies in processes so that high performance standards can be achieved.

Six sigma

Six sigma focuses on preventing variations in process which cause defects. It is a five-step methodology which consists of the following stages.

1. Define process improvement goals.
2. Measure key aspects of the current process.
3. Analyse alternatives.
4. Design details and optimise the design.
5. Verify the design.

8.5 How Information Systems Support Quality Improvements

Here are some ways companies can use information systems to achieve total quality management:

- Simplify processes by using information to determine what the processes are in the first place
- Identify **benchmark** targets
- Gather, process, and store customer feedback in information systems that are available company-wide
- Reduce cycle time by providing information earlier in the process
- Redesign the process or redesign the product by using information about the process
- Improve production processes by using available information from internal and external sources

8.6 Overview of Systems Development

Systems development includes every resource and every step that goes into producing an information system that solves a problem or helps the organization take advantage of new

opportunities

FIGURE 14-5 *The systems development process.*

Building a system can be broken down into six core activities.

Systems analysis – is the analysis of the problem that the organization will try to solve with an information system

The systems analysis would include a feasibility study to determine whether that solution was feasible or achievable

System design – describes what a system should do to meet information requirements and system design shows how the system will fulfill this objective. It's a the overall plan or model for that system**.**

Programming - The system specifications that were prepared during the design stage are translated into software program code.

Testing – Exhaustive and thorough testing must be conducted to ascertain whether the system produces right results

Conversion – Is a process of changing from the old system to the new system

Production and maintenance

Production and maintenance – After the new system is in place and is working, the system is said to be in production. During this stage the system will be reviewed by both users and technical specialists for improvement.

Modeling and Designing Systems: Structured and Object-Oriented Methodologies

There's always more than one way to accomplish a task. The trick is to use the one that works best for the job you're trying to accomplish.

Structured Methodologies

Traditionally, systems have been structured in a very orderly manner. The methods used to build the systems began at the top and progressed to the lowest detail always with an eye towards keeping the processes separated from the data.

Object-Oriented Development

Most software development methods keep data and processes separate. **Object-oriented software development** combines the two and treats them as one object. More importantly, the objects are created once and, if they are done right, can be used many times over. That reduces the cost of creating new objects once you have built up a library of objects. It also makes it easier to create new software, because you aren't continually starting from scratch.

Computer-Aided Software Engineering

This provides software tools to automate the methodologies to reduce the amount of repetitive work the developers need to do.

Management Opportunities, Challenges, and Solutions

Until a few years ago it was common for system development to take months if not years. That time frame has shortened to days or weeks. Pundits refer to "Internet time" as a reference for the much more rapid development of systems that some companies experience now. Unfortunately, some of the more important steps of development may be slighted or overlooked altogether in the rush to get a product out the door. Unfortunately, customers may be the ones to suffer the most from the mistakes.

8.7 Management Opportunities and Challenges

Opportunities

The most demanding aspect of application development for the digital firm lies in the rapid expansion of the Internet. New uses for Web sites are introduced all the time and companies are challenged to accommodate the new technologies in their old processes. Customers and suppliers are constantly requesting new applications based on the Internet.

Management Challenges

The systems development process for e-commerce and e-business concerns is more complicated because it may involve more entities than traditional processes. If an e-business process includes a firm's suppliers, the system may have to be designed and built with two different sets of requirements merged into one. Old systems were built for one or two types of computing devices. Now a firm must build its systems for desktops, laptops, cell phones, personal digital appliances, Web servers, mainframes, and even iPod-type devices. Software considerations are greater than at any time in the history of computing. Networked environments are now the norm.

New Interorganizational System Requirements

We've discussed how digital firms now open their systems to a variety of users inside and outside the immediate organizational structure. From suppliers to customers to business partners, the digital firm must design and build information systems to meet a variety of users. This trend will only continue as networks take even greater precedence in the computing environment.

Solution Guidelines

Digital firms can't hold onto their old systems that fit requirements developed ten or even five years ago. Continual change, growth, and migration is required to remain competitive in today's

business environment. New development processes that allow a firm to build systems to meet today's and tomorrow's requirements must be faster and easier than ever before.

Rapid Application Development (RAD)

Supply and demand. The supply of technical specialists is not enough to support the demand for new systems, or maintenance of the old ones. Something has to fill the gap – that's why you see so many new methods already on the market and more advanced, easier-to-use tools coming down the road. The shortage of skilled technicians is also why you see more and more companies moving away from the structured methods we've reviewed. There just isn't enough time.

Rapid Application Development (RAD) reduces the time it takes to build systems by using many of the tools that we've discussed. You can choose from prototyping or fourth-generation tools to develop systems much more quickly. End users and techies can work hand-in-hand with **joint application design (JAD)** tools to reduce the development time for new applications.

Component-Based Development

Component-based development is simply the practice of developing reusable components that are commonly found in many software programs. Create a "Save File" function for one application and use it in all applications. Not only does it save development time but creates functions that users have to learn only once and use multiple times. In short, why keep re-inventing the wheel when it works just fine across a multitude of vehicles.

Web Services and Service-Oriented Computing

The Internet and the Web provide the open standards that so many businesses and users now demand and were lacking from closed or proprietary systems. Advancing upon that openness is a new idea called Web services.

Chapter Review Questions

1. In the spectrum of organizational change, which is the most radical type of change: automation, rationalization of procedures, business reengineering, or paradigm shifts?

2. What are some of the reasons business process reengineering efforts fail?
3. What kinds of problems provide evidence of information systems failure?
4. What project management techniques can be used to control project risk?

Suggested Further Reading

Laudon K, Laudon J, Management Information Systems, Managing the digital firm (Ninth Edition) page 494-527.

CHAPTER NINE

IMPACT OF IT IN ORGANISATIONS AND SOCIETY

Learning Objectives

At the end of the chapter the learner shall be able to;

1. Analyze the relationship among ethical, social, and political issues that are raised by information systems.
2. Identify the main moral dimensions of an information society and specific principles for conduct that can be used to guide ethical decisions.
3. Evaluate the impact of contemporary information systems and the Internet on the protection of individual privacy and intellectual property.
4. Assess how information systems have affected everyday life.
5. Identify the principal management challenges posed by the ethical and social impact of information systems and management solutions.

9.1 Understanding Ethical and social issues Related to Systems

Ethics refers to the principles of right and wrong that individuals, acting as free moral agents, use to make choices to guide their behaviors. Information systems raise new ethical questions for both individuals and societies because they create opportunities for intense social change, and thus threaten existing distributions of power, money, rights, and obligations. Like other technologies, such as steam engines, electricity, telephone, and radio, information technology can be used to achieve social progress, but it can also be used to commit crimes and threaten cherished social values. The development of information technology will produce benefits for many and costs for others.

Ethical issues in information systems have been given new urgency by the rise of the Internet and electronic commerce. Internet and digital firm technologies make it easier than ever to

assemble, integrate, and distribute information, unleashing new concerns about the appropriate use of customer information, the protection of personal privacy, and the protection of intellectual property.

Other pressing ethical issues raised by information systems include establishing accountability for the consequences of information systems, setting standards to safeguard system quality that protect the safety of the individual and society, and preserving values and institutions considered essential to the quality of life in an information society.

9.2 Five moral dimensions of the information Age

Five Moral Dimensions of the Information Age

The major ethical, social, and political issues raised by information systems include the following moral dimensions:

- Information rights and obligations. What information rights do individuals and organizations possess with respect to information about themselves? what can they protect? What obligations do individuals and organizations have concerning this information?
- Property rights and obligations. How will traditional intellectual property rights be protected in a digital society in which tracing and accounting for ownership are difficult and ignoring such property rights is so easy?
- Accountability and control. Who can and will be held accountable and liable for the harm done to individual and collective information and property rights?
- System quality 'What standards of data and system quality should we demand to protect individual rights and the safety of society?
- Quality of life. What values should be preserved in an information and knowledge based society? Which institutions should we protect from violation? Which cultural values and practices are supported by the new information technology?

Key Technology Trends That Raise Ethical Issues

Ethical issues long preceded information technology. Nevertheless, information technology has heightened ethical concerns, taxed existing social arrangements, and made some laws obsolete or severely crippled. There are four key technological trends responsible for these ethical stresses and they are summarized in Table 4-2.

The doubling of computing power every 18 months has made it possible for most Organizations to use information systems for their core production processes. As a result, our dependence on systems and our vulnerability to system errors and poor data quality

TABLE 4-2 TECHNOLOGY TRENDS THAT RAISE ETHICAL ISSUES

TREND	IMPACT
Computing power doubles every 18 months	More organizations depend on computer systems for critical operations.
Data storage costs rapidly declining	Organizations can easily maintain detailed databases on individuals.
Data analysis advances	Companies can analyze vast quantities of data gathered on individuals to develop detailed profiles of individual behavior.
Networking advances and the Internet	Copying data from one location to another and accessing personal data from remote locations are much easier.

9.3 Ethics In An Information Society

Ethics is a concern of humans who have freedom of choice. Ethics is about individual choice: When faced with alternative courses of action, what is the correct moral choice? What are the main features of ethical choice?

Basic Concepts: Responsibility, Accountability, And Liability

Ethical choices are decisions made by individuals who are responsible for the consequences of their actions. **Responsibility** is a key element of ethical action. Responsibility means that you accept the potential costs, duties, and obligations for the decisions you make. **Accountability** is a feature of systems and social institutions: It means that mechanisms are in place to determine who took responsible action, who is responsible. Systems and institutions in which it is impossible to find out who took what action are inherently incapable of ethical analysis or ethical action.

Liability is a feature of political systems in which a body of laws is in place that

permits individuals to recover the damages done to them by other actors, systems, or organizations. **Due process** is a related feature of law-governed societies and is a process in which laws are known and understood and there is an ability to appeal to higher authorities to ensure that the laws are applied correctly.

9.4 Ethical Analysis

When confronted with a situation that seems to present ethical issues, how should you analyze it? The following five-step process should help.

1. Identify and describe clearly the facts. Find out who did what to whom, and where, when, and how. In many instances, you will be surprised at the errors in the initially reported facts, and often you will find that simply getting the facts straight helps define the solution. It also helps to get the opposing parties involved in an ethical dilemma to agree on the facts.

2. Define the conflict or dilemma and identify the higher-order values involved. Ethical, social, and political issues always reference higher values. The parties to a dispute all claim to be pursuing higher values (e.g., freedom, privacy, protection of property, and the free enterprise system). Typically, an ethical

issue involves a dilemma: two diametrically opposed courses of action that support worthwhile values. For example, the chapter-ending case study illustrates two competing values: the need to protect citizens from terrorist acts and the need to protect individual privacy.

3. Identify the stakeholders. Every ethical, social, and political issue has stakeholders: players in the game who have an interest in the outcome, who have invested in the situation, and usually who have vocal opinions. Find out the identity of these groups and what they want. This will be useful later when designing a solution.

4. Identify the options that you can reasonably take. You may find that none of the options satisfy all the interests involved, but that some options do a better job than others. Sometimes arriving at a good or ethical solution may not always be a balancing of consequences to stakeholders.

5. Identify the potential consequences of your options. Some options may be ethically correct but disastrous from other points of view. Other options may work in one instance but not in other similar instances. Always ask yourself, "What if I choose this option consistently over time?"

Candidate Ethical Principles

Once your analysis is complete, what ethical principles or rules should you use to make a decision? What higher-order values should inform your judgment? Although you are the only one who can decide which among many ethical principles you will follow, and how you will prioritize them, it is helpful to consider some ethical principles with deep roots in many cultures that have survived throughout recorded history.

1. Do unto others as you would have them do unto you (the **Golden Rule**). Putting yourself into the place of others, and thinking of yourself as the object of the decision, can help you think about fairness in decision making.

2. If an action is not right for everyone to take, it is not right for anyone **(Immanuel Kant's Categorical Imperative)**. Ask yourself, "If everyone did this, could the organization, or society, survive?"

3. If an action cannot be taken repeatedly, it is not right to take at all **(Descartes' rule of change)**. This is the slippery-slope rule: An action may bring about a small change now that is acceptable, but if it is repeated, it would bring unacceptable changes in the long run. In the vernacular, it might be stated as
"once started down a slippery path, you may not be able to stop."

4. Take the action that achieves the higher or greater value (the **Utilitarian Principle**). This rule assumes you can prioritize values in a rank order and understand the consequences of various courses of action.

5. Take the action that produces the least harm or the least potential cost (**Risk Aversion Principle**). Some actions have extremely high failure costs of very low probability (e.g., building a nuclear generating facility in an urban area) or extremely high failure costs of moderate probability (speeding and automobile accidents). Avoid these high-failure-cost actions, paying greater attention obviously to high-failure-cost potential of moderate to high probability.

6. Assume that virtually all tangible and intangible objects are owned by someone else unless there is a specific declaration otherwise. (This is the **ethical "no free lunch" rule**.) If something someone else has created is useful to you, it has value, and you should assume the creator wants compensation for this work. Although these ethical rules cannot be guides to action, actions that do not easily pass these rules deserve some very close attention and a great deal of caution. The appearance of unethical behavior may do as much harm to you and your company as actual unethical behavior.

Professional Codes of Conduct

Most professional organizations have a code of conduct by which they expect their members to abide. The Association of Computing Machinery (ACM) has an excellent set of standards that apply to all of us, whether we belong to ACM or not.

Some Real-World Ethical Dilemmas

Individuals, companies, and corporations are being forced to deal with these new ethical and social issues in ways never before imagined. Employ the ethical analysis we just discussed to the real-world situations presented here and in the text.

No issue has been harder for organizations to deal with than that of e-mail. Should companies be allowed to read employees' e-mails, especially if they are personal? Should employees be allowed to send personal e-mails to begin with? Should e-mails be used against a person or company in a court of law. If so, how?

9.5 Property Rights: Intellectual Property

Contemporary information systems have severely challenged existing law and social practices that protect private intellectual property. **Intellectual property** is considered to be intangible property created by individuals or corporations.

Information technology has made it difficult to protect intellectual property because computerized information can be so easily copied or distributed on networks. Intellectual

property is subject to a variety of protections under three different legal traditions: trade secrets, copyright, and patent law.

Trade Secrets

Any intellectual work product—a formula, device, pattern, or compilation of data-used for a business purpose can be classified as a **trade secret**, provided it is not based on information in the public domain. Protections for trade secrets vary from state to state. In general, trade secret laws grant a monopoly on the ideas behind a work product, but it can be a very tenuous monopoly.

Software that contains novel or unique elements, procedures, or compilations can be included as a trade secret.

Copyright

Copyright is a statutory grant that protects creators of intellectual property from having their work copied by others for any purpose during the life of the author plus an additional 70 years after the author's death. For corporate-owned works, copyright protection lasts for 95 years after their initial creation.

Patents

A **patent** grants the owner an exclusive monopoly on the ideas behind an invention for 20 years. The congressional intent behind patent law was to ensure that inventors of new machines, devices, or methods receive the full financial and other rewards of their labor and yet still make widespread use of the invention possible by providing detailed diagrams for those wishing to use the idea under license from the patent's owner. The granting of a patent is determined by the Patent Office and relies on court rulings

Challenges to Intellectual Property Rights

Contemporary information technologies, especially software, pose severe challenges to existing intellectual property regimes and, therefore, create significant ethical, social, and political issues. Digital media differ from physical media like books, periodicals, CDs, and newspapers in terms of ease of replication; ease of transmission; ease of alteration; difficulty in classifying a software work as a program, book, or even music; compactness—making theft easy; and difficulties in establishing uniqueness.

The proliferation of electronic networks, including the Internet, has made it even more difficult to protect intellectual property. Before widespread use of networks, copies of software, books, magazine articles, or films had to be stored on physical media, such as paper, computer disks, or videotape, creating some hurdles to distribution. Using networks, information can be more widely reproduced and distributed.

The Internet was designed to transmit information freely around the world, including copyrighted information. With the World Wide Web in particular, you can easily copy and distribute virtually anything to thousands and even millions of people around the world, even if they are using different types of computer systems. Information can be illicitly copied from one place and distributed through other systems and networks even though these parties do not willingly participate in the infringement.

9.6 Quality Of Life: Equity, Access, and Boundaries

The negative social costs of introducing information technologies and systems are beginning to mount along with the power of the technology. Many of these negative social consequences are not violations of individual rights or property crimes. Nevertheless, these negative consequences can be extremely harmful to individuals, societies, and political institutions. Computers and information technologies potentially can destroy valuable elements of our culture and society even while they bring us benefits. If there is a balance of good and bad consequences of using information systems, who do we hold responsible for the bad consequences? Next, we briefly examine some of the negative social consequences of systems, considering individual, social, and political responses.

Balancing Power: Center Versus Periphery

An early fear of the computer age was that huge, centralized mainframe computers would centralize power at corporate headquarters and in the nation's capital, resulting in a Big Brother society, as was suggested in George Orwell's novel *1984*. The shift toward highly decentralized computing, coupled with an ideology of empowerment of thousands of workers, and the decentralization of decision making to lower organizational levels have reduced the fears

of power centralization in institutions. Yet much of the empowerment described in popular business magazines is trivial. Lower-level employees may be empowered to make minor decisions, but the key policy decisions may be as centralized as in the past.

Rapidity of Change: Reduced Response Time to Competition Information systems have helped to create much more efficient national and international markets. The now-more-efficient global marketplace has reduced the normal social buffers that permitted businesses many years to adjust to competition. Time-based competition has an ugly side: The business you work for may not have enough time to respond to global competitors and may be wiped out in a year, along with your job. We stand the risk of developing a "just-in-time society" with "just-in-time jobs" and "just-in-time" workplaces, families, and vacations.

Maintaining Boundaries: Family, Work, and Leisure

Parts of this book were produced on trains and planes, as well as on family vacations and during what otherwise might have been "family" time. The danger to ubiquitous computing, telecommuting, nomad computing, and the "do anything anywhere" computing environment is that it might actually come true. If so, the traditional boundaries that separate work from family and just plain leisure will be weakened.

Dependence and Vulnerability

Today, our businesses, governments, schools, and private associations, such as churches, are incredibly dependent on information systems and are, therefore, highly vulnerable if these systems fail. With systems now as ubiquitous as the telephone system, it is startling to remember that there are no regulatory or standard-setting forces in place that are similar to telephone, electrical, radio. television, or other public-utility technologies. The absence of standards and the criticality of some system applications will probably call forth demands for national standards and perhaps regulatory oversight.

Computer Crime and Abuse

New technologies, including computers, create new opportunities for committing crime by creating new valuable items to steal, new ways to steal them, and new ways to harm others. **Computer crime** is the commission of illegal acts through the use of a computer or against a computer system.

Employment: Trickle-Down Technology and Reengineering Job Loss

Reengineering work is typically hailed in the information systems community as a major benefit of new information technology. It is much less frequently noted that redesigning business processes could potentially cause millions of mid-level managers and clerical workers to lose their jobs. One economist has raised the possibility that we will create a society run by a small "high tech elite
of corporate professionals . . . in a nation of the permanently unemployed" (Rifkin, 1993).

Equity and Access: Increasing Racial and Social Class Cleavages

Does everyone have an equal opportunity to participate in the digital age? Will the social, economic, and cultural gaps that exist in the United States and other societies be reduced by information systems technology? Or will the cleavages be increased, permitting the better off to become even more better off relative to others?

These questions have not yet been fully answered because the impact of systems technology on various groups in society has not been thoroughly studied.

Health Risks: RSI, CVS, and Technostress

The most important occupational disease today is **repetitive stress injury (RSI)**. RSI occurs when muscle groups are forced through repetitive actions often with high-impact loads (such as tennis) or tens of thousands of repetitions under low-impact loads (such as working at a computer keyboard).

9.7 Management Opportunities, Challenges, and Solutions

Managers have an obligation to ensure policies are in place to help guide their employees in the ethical and legal use of technology. The challenge is to create policies that are fair and reasonable to both the employer and employee. The material presented in this chapter can be starting point for deciding new policies or revisions to current policies as new technology is introduced to the workplace. Rest assured, it will be a continuous requirement for every manager in every company.

Solution Guidelines

Many firms have not established a Code of Ethics or Employee Conduct for Computing in today's workplace. Some corporations are confused about what to include and how to approach this new dilemma. Following Laudon and Laudon's five moral dimensions would be a good start! Businesses and their managers should recognize:

- The information rights to privacy and freedom
- The property rights to individual ideas and efforts
- The accountability, liability, and control issues involved in using technology
- The system quality requirements of businesses and individuals
- The quality of life impact of technology

Chapter Review Questions

1. Discuss why wireless networks are more susceptible to security problems and how businesses can protect them.

2. Discuss the difference between general controls and application controls that organizations should use in their information system design. Which general controls are users and managers responsible for?
3. Discuss the threat employees pose to information system security.

Laudon K, Laudon J, Management Information Systems, Managing the digital firm (Ninth Edition) page 340-375

Sample papers

Mt Kenya University

UNIVERSITY EXAMINATION 2010/2011

SCHOOL OF PURE AND APPLIED SCIENCES

DEPARTMENT OF INFORMATION TECHNOLOGY

EXAMINATION FOR BACHELOR OF BUSINESS INFORMATION TECHNOLOGY

BIT 2207: MANAGEMENT INFORMATION SYSTEMS Time : 2Hours

Answer Question one and any other Two Questions Date: DEC 2010

Question 1

Case Study

The automobile plant of DaimlerChrysler in Germany, has 13,000 employees and produces more than 800 cars per day. Each day, 70 rail cars and 500 trucks transport parts, components and materials to the factory, which occupies an area of about 1 million square meters. This plant uses a just-in-time delivery system: all the parts and components must be delivered to the plant's various assembly stations just at the moment when they are needed.

Nearly 20 year ago , Daimler management realized that the intraplant transport capacity was not utilized efficiently because there was no way to manage plant deliveries effectively. Once arriving at the plant, drivers moved their trucks to their leading points not knowing if they would arrive there in the right order or if the loading would be free. The trucks were not always able to deliver the required material during the agreed timeframe. Material on the trucks might arrive too soon, or urgently needed material might not be available because the truck was

waiting in line. Daimler needed a better way to make decisions about organisisng its in-plant deliveries.

The company decided to use the Transportation Efficiency Support System (TESYS) to solve this problem. TESYS is a decision-support and optimization software system which synchronises deliveries with the capacities of loading points within the area of a plant and with the current needs of production.

When a delivery arrives at the Daimler's plan, requests for unloading are submitted to the plan't control board using either an automated order reception model or the telephone. The system optimizes the assignment, showing the shortest and quickest routes. New delivery instructions are transmitted to the appropriate driver using two way radio.

(a) What is the role played by the Daimler'S TESYS in decision making?

(4 marks)

(b) Distinguish between Management Information System (MIS) and Decision Support System (DSS) such as the one used by DaimlerChrysler. (8 marks)

(c) Distinguish and explain the difference between 'model-driven DSS' and 'data-driven DSS'. (8 marks)

(d) What would be the relevance of the TESSYS in the Daimler's Executive Support System (2 marks)

(e) What major factors contributed to the success of the implementation of Daimler'S TESYS Decision Support system? (4 marks)

(f) There are three levels of I.T. Infrastructure. Which level/s of infrastructure support/s the TESYS Decision Support system and what hardware components are in those levels (4 marks)

Question 2.

a) Information is required both for strategic decision making and for operational purposes. Explain, with examples, how strategic information differs from operational information. (4 marks)

b) i) Distinguish between structured and unstructured decisions. (4 marks)

ii) Give an example of EACH type of decision that clearly illustrates the differences. (4 marks)

c) Describe in general terms, how developments in Information Technology have altered the Information Systems that support decision making.

(8 marks)

(Total 20 marks)

Question 3.

It is sometimes claimed that there are four organisational levels; operational, knowledge, management and strategic.

a) For EACH of these organisational levels, give a brief description of its position in the management hierarchy, **and** the types of decision made at each level. (12 marks)

b) Evaluate the usefulness of this four level model in the context of:-

i) A large centrally planned organisation.

ii) A more flexibly organised "learning organisation". (8 marks)

(Total 20 marks)

Question 4.

a) Managing I.T. infrastructure poses both opportunities and challenges. Explain the different challenges of managing I.T. infrastructure (8 marks)

b) Information systems are vulnerable to several threats. Explain the different common threats against contemporary Information systems (12 marks)

Question 5.

a) Explain the key technological trends that heighten ethical concerns (8 marks)
b) Identify and describe six ethical principles (12 marks)

Mt Kenya University

UNIVERSITY EXAMINATION 2010/2011

SCHOOL OF PURE AND APPLIED SCIENCES

DEPARTMENT OF INFORMATION TECHNOLOGY

SEMSTER I EXAMINATION FOR BACHELOR OF BUSINESS INFORMATION TECHNOLOGY

BIT 2207/BBM 322 MANAGEMENT INFORMATION SYSTEMS

DATE: APRIL 2011 **TIME: 2 HOURS**

INSTRUCTIONS: *Answer question **ONE** (compulsory in SECTION A) and any other **TWO** questions in SECTION B*

SECTION A

QUESTION ONE

a) Explain the term information system [3 marks]

b) Explain the term "groupware" and highlight four tasks performed by the groupware [3 marks]

c) A company's ability to preserve tacit knowledge that is embedded in the minds of the experienced employees can be seen as the most important criteria of successful knowledge management systems. Do you agree with this statement? Explain how this is done. [4 marks]

d) Distinguish between formal and informal information systems giving a valid example of each. [4 marks]

e) Mega, a leading local commuter coach services have been in the top ranks for more than 20 years since its operations nationwide. In view of global economic turmoil which will have tremendous impact on the national economy as well, Mega believes that the company should be more effective in their services operations. One of the ways is to be selective in their services: destinations, frequency and resource allocation. You are the Chief Information Officer of Mega. With your vast knowledge of how information systems can provide critical information to assist the company to be more effective, prepare a proposal to the top management. Your proposal should highlight what type(s) of information systems that should be implemented and describe the system(s) functions in detail. [12 marks]

e) "A key requirement in today's business environment is the ability to communicate more effectively, both internally with the employees and externally with the trading partners and customers." Explain the nature of the communication infrastructure required to support such a communication as stated [4 marks]

SECTION B

QUESTION TWO

a) Information systems (IS) have always been regarded as enablers for organizational transformation in ways that systems help in jobs automation, information processing and provide useful input for decision making. Discuss this statement in reference to decision making process in an organization [10 marks]

b) Although some companies find difficulties in justifying their information systems Investment other companies reported significant benefits from their IS projects. Discuss the various techniques that an organization can use to justify an investment in information systems. [10 marks]

QUESTION THREE

Management Information Systems should facilitate decision-making at all levels of management. Each level requires information with different characteristics and with differing degree of profitability.

Required:

Distinguish the characteristics of information systems used for strategic planning and those used for operational control [12 marks]

clearly explain the term information systems security and list the main goals of IS security [8 marks]

QUESTION FOUR

a) (i) What is a group decision support system? [3 marks]

(ii) State the differences between GIS and GDSS in relation as information systems

"An information system does not necessarily have to rely on computers". Comment on this statement giving a valid example[4 Marks]

b) Explain any four security controls needs to be implemented to ensure information system security during implementation [4 marks]

c) Briefly explain the role of computers/information technology in an information system. [2 Marks]

d) Describe the term Strategic Information Systems as used in organizations[3marks]

e) Distinguish between structured and unstructured decisions. (4 marks)

QUESTION FIVE

a) Describe the architectural components of the Management Information System. [3 marks]

b) Identify and explain five principle goals of IS disaster recovery planning in an organization [10marks]

c) Evaluate any three major causes of information systems failure [6 marks

d) Explain the term BPR (1 mark)