

# Study Unit 1: Introduction to Information Systems Management

## Introduction

Organizations operate in competitive environments and must continually define and redefine their business strategies to create competitive advantages. Doing so allows organizations to survive and thrive. 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 return for supply inputs. In the context of this book organization refers to any formal social institution that serve the members of the public, for example, business institution, Government institutions, Non-Governmental Organization, manufacturing firms, educational institutions etc. Information systems and organizations influence one another. Information systems are built by managers to serve the interests of the business firm. At the same time, the organization must be aware of and open to the influences of information systems to benefit from new technologies.

## Learning Outcomes of Study Unit 1

Upon completion of this study unit, you should be able to

- 1.1 Define information systems, and differentiate between information systems and information technology.
- 1.2 Enumerate and explain the types of information systems.
- 1.3 Explain IT governance concept.
- 1.4 Describe features of organizations.
- 1.5 Enlist the various qualities of information.
- 1.6 Explain the challenges of information systems.

## 1.1 Overview of Information Systems

Information systems is any organized combination of people, hardware, software, communications networks, data resources, and policies and procedures that stores, retrieves, transforms, and disseminates information in an organization. It is a set of interrelated components such as; 1) computer hardware; 2) computer software; 3) data/information ; 4) procedures; 5) people or human resources; 6) communications networks. These components work together in order to; i) collect data from the working environment; ii) process them (data) into information; iii) store them in electronic devices such as hard disks, flash disks, CDs, DVDs, and magnetic tapes. Information systems rely on computer hardware and software technology to processes and disseminate information. It consists of the following six components:

**1-Computer hardware:** It is the physical equipment used for input (keyboard, mouse, microphone, barcode readers, scanners), processing (central processing unit [CPU]), and output (monitor, speakers, printers), storage devices (floppy diskettes, CD, flash disks, optical disc, magnetic tapes. etc.) used for activities in an information systems.

**2-Computer software:** It consists of the detailed preprogrammed instructions that control and coordinate the computer hardware. Examples of those software are Microsoft window XP, 7, 8, LINUX, operating systems and Microsoft office (word processor, Excel, PowerPoint, and Access), tally, quick book, and inventory management software, sales software, banking software ,enterprise applications software and others.

**3-Communication Technology:** It consists of both physical devices and software, links the various pieces of hardware and transfers data from one physical location to another. Computers and communications equipment (modem) can be connected in networks for sharing voice, data, images, sound or even video. A **network** links two or more computers to share data or resources such as printers, scanners and databases.

**Internet** is an international network of computer networks around the world. It is both commercial and publicly owned. It connects hundreds and thousands of different computers and networks from more than 200 countries around the world. It is used for communication, organizational and business activities, research, publication, learning, and others. **Intranet** is an internal corporate network based on network technology. It is used for internal organizational communications, coordination and transactions operations. While an **Extranet**

is a private intranet extended to authorize users outside the organization. In other words, it is a network in which intranets of different organizations are accessed by authorization for the sake of communication, exchange of business and organizational information, and business transactions. Firms use networks to coordinate their activities with other firms for making purchases, collaborating on design, and other inter-organizational work. **World Wide Web** is a system with universally accepted standards for storing, retrieving, formatting and displaying

#### Box 1.1: Information Systems

Information systems is any organized combination of people, hardware, software, communications networks, data resources, and policies and procedures that stores, retrieves, transforms, and disseminates information in an organization.

### Management information Systems

Management information systems is an information system that provides information that managers or organization leaders have specified in advance as adequately meeting their information needs. It is the application of people, technologies and procedures collectively called information systems to solve business or organizational problems. It is designed to produce information needed for the successful management process, department, business or organization. Management information systems are an integrated approach for providing interpreted and relevant data that can help managers make decisions. Usually the information made available by an MIS is in the form of periodic reports, special reports, and outputs of mathematical simulations. MIS support the day-to-day operational and tactical decision-making needs of managers or organization leaders. MIS provide information in the form of reports, and displays to managers or organizational leaders, and many organizational or business professional

### Information Technology

Information technology (IT) consists of all the hardware and software that a firm needs to use in order to achieve its business objectives. This includes computer machines, storage devices, and handheld mobile devices, software, such as the Windows or Linux operating systems, the

Microsoft Office desktop productivity suite, and the many thousands of computer programs that can be found in a typical large firm.

### Computer literacy

Computer literacy focuses primarily on knowledge of information technology. In other words, it is understanding the different components of information technology and knowing how to operate it.

### Information systems literacy

It refers to broader understanding of information systems, which encompasses an understanding of the management and organizational dimensions of systems as well as the technical dimensions of systems.

### Digital Firm

A digital firm is one in which nearly all of the organization's significant business relationships with customers, suppliers, and employees are digitally enabled and mediated. Core business processes are accomplished through digital networks spanning the entire organization or linking multiple organizations. Digital firms sense and respond to their environments far more rapidly than traditional firms, giving them more flexibility to survive in turbulent times. Digital firms offer extraordinary opportunities for more flexible global organization and management. In digital firms, both time shifting and space shifting are the norm. **Time shifting** refers to business being conducted continuously, 24/7, rather than in narrow "work day" time bands of 9 a.m. to 5 p.m. **Space shifting** means that work takes place in a global workshop, as well as within national boundaries. Work is accomplished physically wherever in the world it is best accomplished. It means that allowing business to be conducted at any time (time shifting) and any place (space shifting), digital firms are ideally suited for global operations which take place in remote locations and very different time zones. With digital firms, core business processes such as purchase ordering, invoicing, payments and delivery information exchanges are accomplished through digital networks.

**Electronic business**, or e-business, refers to the use of digital technology and the Internet to execute the major business processes in the enterprise. E-business includes activities for the internal management of the firm and for coordination with suppliers and other business partners.

**E-commerce** is the part of e-business that deals with the buying and selling of goods and services over the Internet. It also encompasses activities supporting those market transactions, such as advertising, marketing, customer support, security, delivery, and payment.

**E-government** refers to the application of the Internet and networking technologies to digitally enable government and public sector agencies' relationships with citizens, businesses, and other arms of government. The technologies associated with e-business have also brought about similar changes in the public sector. Governments on all levels are using Internet technology to deliver information and services to citizens, employees, and businesses with which they work. In addition to improving delivery of government services, e-government makes government operations more efficient and also empowers citizens by giving them easier access to information and the ability to network electronically with other citizens. For example, citizens in some states can renew their driver's licenses or apply for unemployment benefits online, and the Internet has become a powerful tool for instantly mobilizing interest groups for political action and fund-raising.

## 1.2 Information Technology (IT) governance

IT governance includes the strategy and policies for using information technology within an organization. It specifies the decision rights and framework for accountability to ensure that the use of information technology supports the organization's strategies and objectives.

**Key Core Corporate Assets** Key corporate assets such as intellectual property, core competencies, and financial and human assets are managed through digital means. In a digital firm, any piece of information required to support key business decisions is available at anytime and anywhere in the firm.

## Business Process

Business processes refer to the set of logically related tasks and behaviors that organizations develop over time to produce specific business results and the unique manner in which these activities are organized and coordinated. In other words, it is a step-by-step process of transacting business or doing something. Developing a new product, generating and fulfilling an order, creating a marketing plan, and hiring an employee are examples of business processes, and the ways organizations accomplish their business processes can be a source of competitive strength. Information technology enhances business processes in two main ways:

- 1) Increasing efficiency of existing processes by automating steps that were manual.
- 2) Enabling entirely new processes that are capable of transforming the businesses by changing flow of information, replacing sequential steps with parallel steps and eliminating delays in decision making.

Figure 1.3 illustrates an example of the order fulfillment business process from sales department through accounting up to manufacturing department.

**Manufacturing and Production business processes** are: Assembling the product; Checking for quality; Producing bills of materials.

**Sales and Marketing business processes** are: Identifying customers; Making customers aware of the product; Selling the product.

**Finance and Accounting business processes** are: Paying creditors; creating financial statements Managing cash accounts.

**Human resources business processes** are: Hiring employees; Evaluating employees' job performance; Enrolling employees in benefits plans.

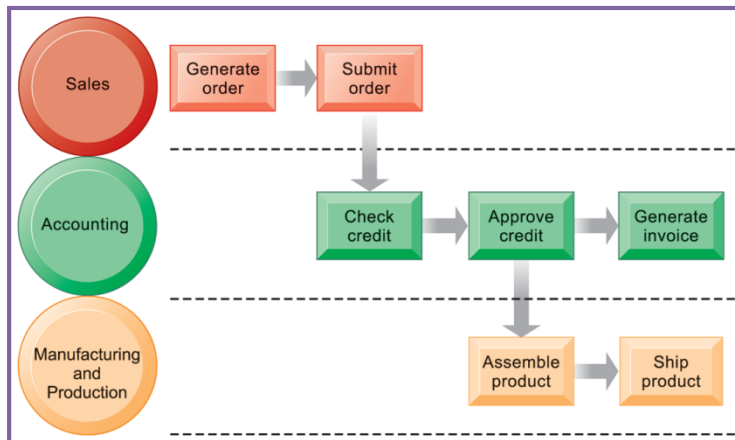


Figure 1.1: Business processes

### 1.3 Definition of Information Systems

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

From the above definition, it can be seen that an organization's information system serves two important purposes. *Firstly*, the IS records and monitors actions in operational systems, by processing, storing and reporting day-to-day transactions. The *second* major function of the organization's information system is to support managerial activities such as decision making, planning and control.

### 1.4 Data versus Information

Data are facts or figures in a raw, unprocessed form. To become useful to a decision maker, data must be transformed into information. Information is data presented in a form that is useful for decision making, adding value to the decision maker by reducing uncertainty and increasing knowledge.

**Example:** Supermarket checkout counters combine millions of data, such as a product identification number or cost of each item sold. Such data can be totaled and analyzed to provide meaning information, such as total number of bottles of dish detergent sold at a particular store, which brands of dish detergent are selling the most rapidly at the store, or the total amount spent on that brand of dish detergent at that store or region.

Three activities in an information system produce the information that needs to make decisions, control operations, analyze problems, and create new products and services. These activities are input, processing, and output. Input captures or collects raw data from within the organization or from external environment. Process converts this data input into meaningful form. Output transfers the processed information to the people who will use it or activities for which it will be used. ISs also require feedback, which is output that is returned to appropriate members of the organization to help them evaluate or correct the input stage.

Formal information systems rest on accepted and fixed definitions of data and procedures for collecting, storing, processing, disseminating, and using this data. Informal IS (such as office gossip networks) rely on unstated rules of behavior.

Formal IS can either be computer-based or manual. Manual systems use paper and ink technology. Computer based IS (CBIS) in contrast, rely on computer hardware and software technology to process and disseminate information. Therefore in our discussion when we use ISs, we will be referring to *Computer Based Information Systems (CBIS)*.

## 1.5 Five Information System Activities

The five IS activities are input, processing, output, storage and control

1. **Input:** Activities of inputting data resources
2. **Processing:** Turning the raw data into something that is meaningful information. For example sorting.
3. **Output:** The product of after processing data for example reports, graphs, pie chat.
4. **Storage:** The instrument used to store the data. For example database
5. **Control:** The ways used to maintain the quality of service, system performance. For example monitoring report, feedback and the survey.

The function of an information system is to capture organizational and business data from the working environment, process them (data) into information, and produce them as outputs in form of reports. When the report is not accurate then it is considered to be a negative feedback and it becomes an input for reprocessing. 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 input into a meaningful form. Output transfers the processed information to the people who will use it or to 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. This is illustrated in figure1. 2

The stakeholders of information system are those organizations and individuals who have interest on the information systems created by organizations. They include community members, customers, suppliers, labor union, regulatory agencies, stockholders, and competitors. Members of the community are concerned with any information systems brought into the community. They want to know whether it will come with positive or negative effect to the community. Customers would like to know whether the organization's information system can help them in transactions. Suppliers would like to know whether the organization they supply has information systems that can enable them to conduct business processes online. Labor union is always concerned with the type information systems used by their members. Regulatory agencies want to know whether organizations comply and meet the international standards of technological requirements. Stockholders as investors would like to know whether the information systems invested can yield profit and subsequently a good dividend to them. Competitors would like to know and imitate

## **1.6 Types of information system used by its rival.**

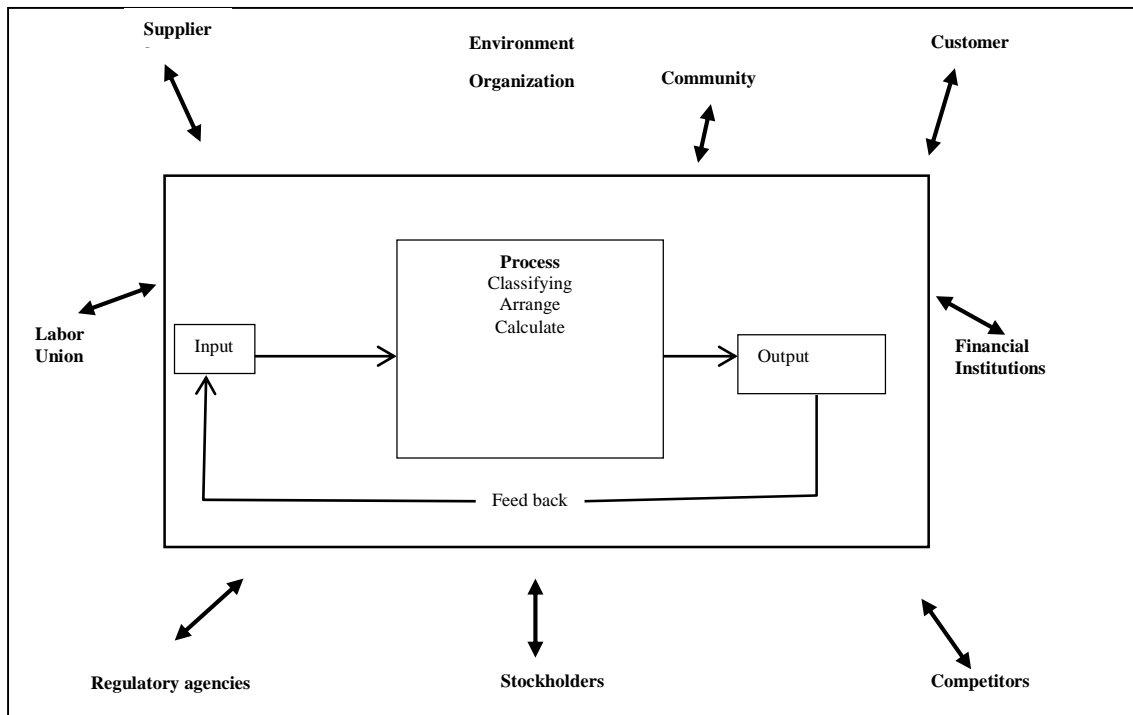


Figure 1.2: Functions and Stakeholders of Information Systems.

## 1.4 Organizations and Information Systems

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 return for supply inputs. 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.

**Organizations** are formal legal entities with internal rules and procedures that 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.

**Information systems and organizations** influence one another. Information systems are built by managers to serve the interests of the business firm. At the same time, the organization must be aware of and open to the influences of information systems to benefit from new technologies. The interaction between information technology and organizations is complex and is influenced by many mediating factors, including the organization's structure, business processes, politics, culture, surrounding environment, and management decisions. You will need to understand how information systems can change social and work life in your firm. You will not be able to design new systems successfully or understand existing systems without understanding your own business organization. Figure 1.3. illustrate the two-way relationship between organizations and information technology.

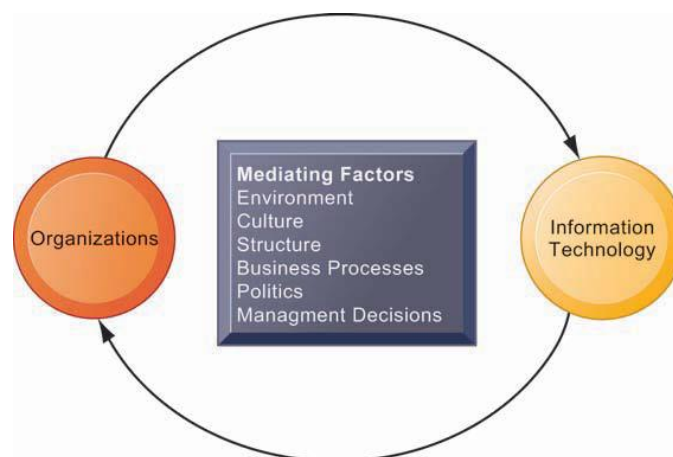


Figure 1.3: The Two-Way Relationship Between Organizations And Information Technology

This complex two-way relationship is mediated by many factors. Other factors mediating the relationship include the organizational culture, structure, politics, business processes, and environment.

A more realistic **behavioral definition of an organization** is a collection of rights, privileges, obligations, and responsibilities 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. Figure 3.2 illustrate the behavioral definition of an organization.

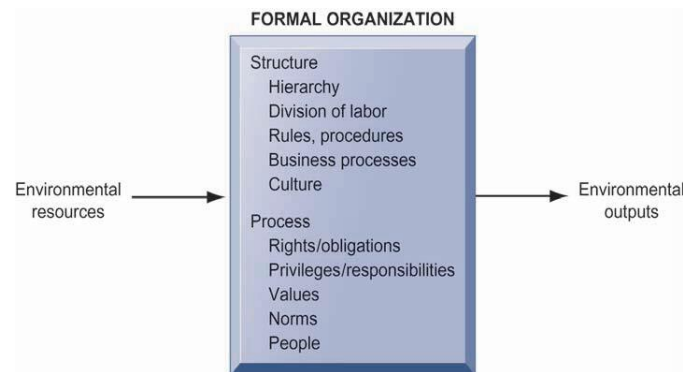


Figure 1.4: Behavioral view of an Organization.

A **technical view of organizations** encourages us to focus on how inputs are combined to create outputs when technology changes are introduced into the company. The firm is seen as infinitely malleable, with capital and labor substituting for each other quite easily. But the more realistic

behavioral definition of an organization suggests that building new information systems, or rebuilding old ones, involves much more than a technical rearrangement of machines or workers, that some information systems change the organizational balance of rights, privileges, obligations, responsibilities, and feelings that have been established over a long period of time. Changing these elements can take a long time, be very disruptive, and requires more resources to support training and learning. For instance, the length of time required to implement a new information system effectively is much longer than usually anticipated simply because there is a lag between implementing a technical system and teaching employees and managers how to use the system.

**Technological change** requires changes in who owns and controls information, who has the right to access and update that information, and who makes decisions about whom, when, and how. This more complex view forces us to look at the way work is designed and the procedures used to achieve outputs.

The **technical and behavioral** definitions of organizations are not contradictory. Indeed, they complement each other: The technical definition tells us how thousands of firms in competitive markets combine capital, labor, and information technology, whereas the behavioral model

takes us inside the individual firm to see how that technology affects the organization's inner workings.

## 1.6 Features Of Organizations

All modern organizations share certain characteristics. They are bureaucracies with clear-cut divisions of labor and specialization. Organizations arrange specialists in a hierarchy of authority in which everyone is accountable to someone and authority is limited to specific actions governed by abstract rules or procedures. These rules create a system of impartial and universal decision making. Organizations try to hire and promote employees on the basis of technical qualifications and professionalism (not personal connections). The organization is devoted to the principle of efficiency: maximizing output using limited inputs. **Other features** of organizations include their business processes, organizational culture, organizational politics, surrounding environments, structure, goals, constituencies, and leadership styles. All of these features affect the kinds of information systems used by organizations.

### Routines and Business Processes

All organizations, including business firms, become very efficient over time because individuals in the firm develop **routines** for producing goods and services. **Routines**, sometimes called *standard operating procedures*, are precise rules, procedures, and practices that have been developed to cope with virtually all expected situations. As employees learn these routines, they become highly productive and efficient, and the firm is able to reduce its costs over time as efficiency increases. For instance, when you visit a doctor's office, receptionists have a well-developed set of routines for gathering basic information from you; nurses have a different set of routines for preparing you for an interview with a doctor; and the doctor has a well-developed set of routines for diagnosing you.

**Business processes**, are collections of such routines. A business firm, in turn, is a collection of business processes. All organizations are composed of individual routines and behaviors, a collection of which make up a business process. A collection of business processes make up the business firm. New information system applications require that individual routines and business processes change to achieve high levels of organizational performance.

### Organizational Politics

People in organizations occupy different positions with different specialties, concerns, and perspectives. As a result, they naturally have divergent view points about how resources, rewards, and punishments should be distributed. These differences matter to both managers and employees, and they result in political struggle for resources, competition, and conflict within every organization.

Political resistance is one of the great difficulties of bringing about organizational change, especially the development of new information systems. Virtually all large information systems investments by a firm that bring about significant changes in strategy, business objectives, business processes, and procedures become politically charged events. Managers who know how to work with the politics of an organization will be more successful than less-skilled managers in implementing new information systems.

### Organizational Culture

**Organizational culture** encompasses this set of assumptions about what products the organization should produce, how it should produce them, where, and for whom. Generally, these cultural assumptions are taken totally for granted and are rarely publicly announced or discussed. Business processes, the actual way business firms produce value are usually hidden in the organization's culture. All organizations have bedrock, unassailable, unquestioned assumptions that define their goals and products.

**Organizational culture** is a powerful unifying force that restrains political conflict and promotes common understanding, agreement on procedures, and common practices. If we all share the same basic cultural assumptions, agreement on other matters is more likely.

At the same time, organizational culture is a powerful restraint on change, especially technological change. Most organizations will do almost anything to avoid making changes in basic assumptions. Any **technological change** that threatens commonly held cultural assumptions usually meets a great deal of resistance. However, there are times when the only sensible way for a firm to move forward is to employ a new technology that directly opposes an existing organizational culture. When this occurs, the technology is often stalled while the culture slowly adjusts.

## Organizational Environments

Organizations reside in environments from which they draw resources and to which they supply goods and services. Organizations and environment have a reciprocal relationship. On the one hand, organizations are open to, and dependent on, the social and physical environment that surrounds them. Without financial and human resources, people willing to work reliably and consistently for a set wage or revenue from customers, organizations could not exist. Organizations must respond to legislative and other requirements imposed by government, as well as the actions of customers and competitors. On the other hand, organizations can influence their environments. For example, business firms form alliances with other businesses to influence the political process; they advertise to influence customer acceptance of their products. Figure 1.5 illustrates the role of information systems in helping organizations perceive changes in their environments and also in helping organizations act on their environments. Information systems are key instruments for *environmental scanning*, helping managers identify external changes that might require an organizational response.

Environments generally change much faster than organizations. New technologies, new products, and changing public tastes and values (many of which result in new government regulations) put strains on any organization's culture, politics, and people. Most organizations are unable to adapt to a rapidly changing environment. Inertia built into an organization's standard operating procedures, the political conflict raised by changes to the existing order, and the threat to closely held cultural values inhibit organizations from making significant changes.

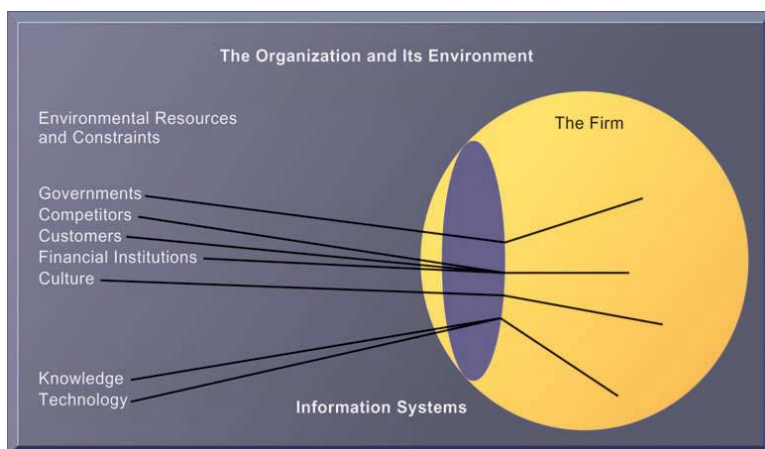


Figure 1.5: Environment and Organizations

Environments shape what organizations can do, but organizations can influence their environments and decide to change environments altogether. Information technology plays a critical role in helping organizations perceive environmental change and in helping organizations act on their environment. **Disruptive Technologies** are technologies that result from business innovations that come along to radically change the business landscape and environment. Some firms are able to create these **technologies and ride the wave to profits**; others learn quickly and adapt their business; still others are obliterated because their products, services, and business models become obsolete. They may be very efficient at doing what no longer needs to be done! There are also cases where no firms benefit, and all the gains go to consumers (firms fail to capture any profits). Disruptive technologies are tricky. Firms that invent disruptive technologies

as “first movers” do not always benefit if they lack the resources to exploit the technology or fail to see the opportunity. Some of disruptive technologies are: Microprocessor chips (1971), Personal computers (1975), Digital photography (1975), World Wide Web (1989), Internet music, video, TV services (1998), and Software as web services.

## 1.7 Organizational Structure

All organizations have a structure or shape. Mintzberg’s classification identifies five basic kinds of organizational structure. The five basic types of organizational structure are: **1)** Entrepreneurial structure (Small start-up business); **2)** Machine bureaucracy (Midsize manufacturing firm); **3)** Divisionalized bureaucracy (Fortune 500 firms, such as General Motors); **4)** Professional bureaucracy (Law firms, school systems, hospitals); **5)** Adhocracy (Consulting firms, such as the Rand Corporation). The kind of information systems you find in a business firm, and the nature of problems with these systems, often reflects the type of organizational structure. For instance, in a professional bureaucracy such as a hospital, it is not unusual to find parallel patient record systems operated by the administration, another by doctors, and another by other professional staff such as nurses and social workers. In small entrepreneurial firms, you will often find poorly designed systems developed in a rush that often quickly outgrow their usefulness. In huge multidivisional firms operating in hundreds of locations, you will often find there is not a single integrating information system, but instead each locale or each division has its set of information systems.



## 1.8 Other Organizational Features

Organizations have goals and use different means to achieve them. Some organizations have coercive goals (e.g., prisons); others have utilitarian goals (e.g., businesses). Still others have normative goals (universities, religious groups). Organizations also serve different groups or have different constituencies, some primarily benefiting their members, others benefiting clients, stockholders or the public. The nature of leadership differs greatly from one organization to another, some organizations may be more democratic or authoritarian than others. Another way organizations differ is by the tasks they perform and the technology they use. Some organizations perform primarily routine tasks that can be reduced to formal rules that require little judgment such as manufacturing auto parts, whereas others such as consulting firms work primarily with non-routine tasks.

## 1.9 Qualities of Information

Desirable qualities of information are:

- **Relevance:** Relevant information is capable of making a difference in decision by reducing uncertainty and increasing knowledge about that decision. For example, making a decision about offering credit to a new customer might include an analysis of the customer's financial statements or previous credit history. Analysis of academic levels may not be relevant.
- **Timeliness:** Information must be provided to the decision maker in sufficient time for it to be used in decision making process. Information should be given to a decision maker before a decision is made.
- **Understandability:** Information should be presented to a user in a form that permits him/her to apply it effectively to decision making situation. It has to be clear.
- **Comparability:** This is the quality of information that enables users to identify the similarity and differences in various pieces of information. If we can compare information about the same object or event collected at two or more points in time, then the information is also consistent. Consistency aids comparability in a decision making.
- **Accuracy:** This is the degree to which there is agreement between the information and the events or activities that the information is meant to represent. It is important to

assess the level of accuracy required by managers before providing the information, as accuracy requirements will differ between decisions.

- **Completeness:** This is the degree to which information includes data about every relevant event necessary to make the decision.
- **Neutrality:** This means that information is not biased towards one particular perspective or from one particular source or location. Biased information is likely to lead to decisions made wrongly or incomplete.
- **Effectiveness:** Effective information is relevant and pertinent to the business process as well as being delivered in a timely, correct and consistent manner.
- **Efficiency:** Information is efficient when it is provided through optimal use of resources.

## 1.20 Contemporary Approaches to Information Systems

**Technical Approach:** This approach emphasizes mathematically based models to study ISs, as well as physical technology and formal capabilities of these systems. The disciplines that contribute to the technical approach are Computer Science which is concerned with establishing theories of computability, methods of computation and methods of efficient data storage and access.

Management Science emphasizes the development of models for decision making and management practices. Operations Research focuses on mathematical technique for optimizing selected parameters of organizations such as transportation, inventory control and transaction costs.

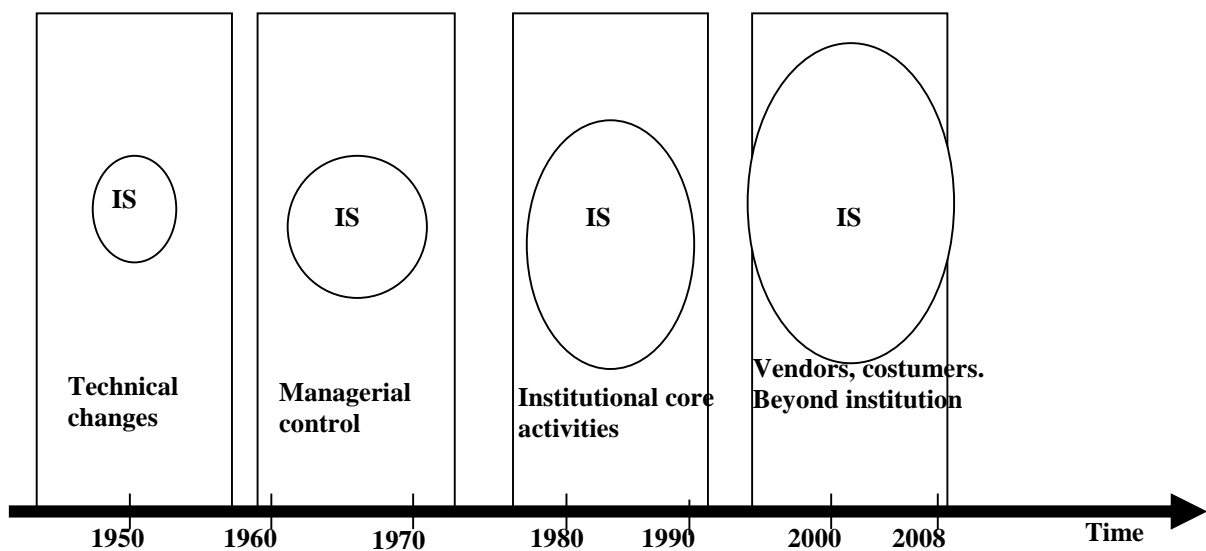
**Behavior Approach:** Behavioral approach concentrates on changes in attitudes, management and organizational policy, and behavior.

The disciplines that contribute to Behavioral Approach are: Sociology study ISs with an eye towards how groups and organizations shape the development of systems and also how systems affect individuals, groups and organizations; Psychology involves the study of ISs with an interest in how human decision makers perceive and use formal information. Economy study ISs with an interest in what impact systems have on control and cost structures within the firm and within markets.

**Socio-Technical Systems:** Management IS (MIS) combines both Technical Approach and Behavioral Approach. Problems with systems and their solutions are rarely all technical or behavioral. There is need to optimize a systems' performance as a whole. Technology must be changed and designed in such a way as to fit organizational and individual needs. Organizations and individuals must also be changed through training, learning, and planned organization change in order to facilitate the operation change to take advantage of new IT.

## 1.21 Evolution of Information Systems

*The widening scope of information systems*



Over time, information systems have come to play a larger role in life of organizations. Early systems brought about largely technical changes that were relatively easy to accomplish. Later systems affected managerial control and behavior, and influenced core institutional activities. In the digital firm era, information systems extend far beyond the boundaries of the firm to encompass vendors, customers, and even competitors.

To deliver genuine benefits, information systems must be built with a clear understanding of the organization in which they will be used. In our experience, the central organizational factors to consider when planning a new system are the following:

- The environment in which the organization must function
- The structure of the organization: hierarchy, specialization, routines, and business processes
- The organization's culture and politics
- The type of organization and its style of leadership
- The principal interest groups affected by the system and the attitudes of workers who will be using the system
- The kinds of tasks, decisions, and business processes that the information system is designed to assist.

### 1.9 Challenges of Information System

Information technology is advancing at a blind pace; there is nothing easy or mechanical about building and using ISS. There are five key challenges confronting managers.

**The Strategic Business Challenge:** *Realizing the Digital firm. How can business use IT to become competitive, effective and digitally enabled?*

Despite heavy IT investments, many organizations are not obtaining significant business benefits, nor are they becoming digitally enabled. The power of computer hardware and software has grown much more rapidly than the ability of organizations to apply and use this technology. To fully benefit from IT, realize genuine productivity, and take advantage of digital firm capabilities, many organizations actually need to be redesigned. If organizations merely automate what they are doing today, they are largely missing the potential of ISs.

**The Globalization Challenge:** *How can firms understand the business requirements of a global economic environment?*

The rapid growth in international trade and emergence of a global economy call for ISs that can support both producing and selling goods in many different countries. To develop integrated, multinational information systems, business must develop global hardware,

software, and communications standards and create cross – cultural accounting and reporting structures.

**The Information Architecture and Infrastructure Challenge:** *How can organizations develop an information architecture and information technology infrastructure that can support their goals when business conditions and technologies are changing so rapidly?*

Information architecture is the particular form that information technology takes in an organization to achieve selected goals or functions. Because managers and employees directly interact with these systems, it is critical for organizations to make sure that the information architecture meets business requirements now and in the near future.

**The Information Systems Investment Challenge:** *How can organizations determine the business value of information systems?*

Senior managers can be asked these questions: Are we receiving the kind of return on investment from our systems that we should be receiving? Do our competitors get more? Understanding the costs and benefits of building a single system is difficult.

**The Responsibility and Control Challenge:** *How can organization ensure that their information systems are used in an ethically and socially responsible manner?*

A major management challenge is making informed decisions that are sensitive to the negative consequences of information systems as well to the positive ones. Managers will also be faced with ongoing problems of security and control.

**Table 1.1 Describe the Positive and Negative Impacts of Information Systems**

No.	Benefits of ISS	Negative Impacts of ISS
1.	ISs can perform calculations or process paper work much faster than people	By automating activities that were previously performed by people, ISs may eliminate jobs
2.	ISs can help companies learn more about the purchase patterns and preferences of their customers.	ISs may allow organizations to collect personal details about people that violate their privacy.

<b>3.</b>	ISs provide new efficiencies through services such as ATMs, telephone systems...etc. Or computer controlled airplanes and air terminals.	ISs are used in so many aspects of everyday life that systems out ages can cause shut downs of businesses or transportation services, paralyzing communities.
<b>4.</b>	ISs have made possible new medical advantages in surgery, radiology, and patient monitoring.	Heavy users of ISs may suffer repetitive stress injury, techno stress, and other health problems.
<b>5.</b>	The internet distributes information instantly to millions of people across the world.	The internet can be used to distribute illegal copies of software, books, articles, and other intellectual property.

### **CASE STUDY**

#### **99 Cents Only Stores: IT Infrastructure on a Budget**

99 Cents Only Stores is one of the leading retailers in the deep-discount sales industry. The first 99 Cents Only Store opened in 1982, and as of March 31, 2006, the company operates 232 retail locations, including 164 in California, 36 in Texas, 21 in Arizona, and 11 in Nevada. The stores carry mostly name-brand general merchandise, including food and beverages, health and beauty aids, cleaning supplies, house wares, hardware, stationery, toys, gifts, pet products, and clothing.

The chain makes purchases from over a thousand suppliers, including such notables as General Electric, Colgate-Palmolive, General Mills, Johnson & Johnson, Procter & Gamble, Kraft, Nabisco, and Unilever. Stores cover an average of 22,000 square feet, and average \$4.3 million in net sales per store. Overall, 99 Cents Only Stores experienced a 13 percent company-wide increase in sales in 2004, totaling \$972 million. By 2006, total sales projected to over \$1 billion.

The majority of products can be restocked regularly. 99 Cents Only Stores also feature close-out merchandise, which is not available for reorder. The deep-discount industry is characterized by the purchase of close-out and special opportunity merchandise at costs below wholesale. Deep-discount retailers pass the savings on wholesale from these purchases to customers, who are able to buy products at prices that are well below retail.

There is increasing competition with other deep-discount retailers for this special-situation merchandise, and some competitors have more financial resources and buying power than 99 Cents Only.

99 Cents Only Stores' recipe for continued growth is to open more stores while expanding same-store sales and trying to wring more out of each dollar to keep profit margins higher than competitors. The company has set a target of expanding its store square footage by 25 percent every year and believes that the states in which it already operates have the potential to support over 400 stores. Approximately half of the new stores launched in 2004 were in Texas. These stores are serviced by a 741,000-square-foot distribution center near Houston that the company purchased for \$23 million in 2003.

How does 99 Cents Only Stores manage its widespread chain of stores while keeping down costs? The answer is, with information technology, but on a budget. In 2003, despite opening 38 new stores and beginning operations in the new distribution center in Texas, the company's IT budget did not surpass \$5 million. Although David Gold, 99 Cents Only's founder and chairman, resists computer technology in his own office, he knows that computers have played a large role in enabling his company to grow. Gold introduced Radio Shack TRS-80 personal computers to the business in the 1980s. Gold's son, Jeff, now president and COO, programmed the company's first order-entry and warehouse inventory systems on those computers.

Today the company obviously requires far more computing power. The task of choosing and implementing that power without breaking the bank fell to Robert Adams, vice president of information services for 99 Cents Only Stores. 99 Cents Only Stores is not a typical single price point business. The average 99 Cents Only Store is about five times larger than the industry standard and generates approximately four times more in sales than its competitors (\$4.3 million to \$1 million). 99 Cents Only Stores also differs from its competitors in its target customer demographic, even pursuing locations in high-income areas. David Gold says, "Rich people like to save money too, and they do it in higher volumes."

With these factors in mind, Robert Adams continues to improve and expand the company while keeping the clientele satisfied and not spending too much money. For example, he saved the company tens of thousands of dollars on database management software licenses by searching the Web for the best price available rather than simply defaulting to the usual vendor. Adams acknowledges that he is able to make such decisions because the company is family-owned and -run, which concentrates the power among only a few people. In fact, most projects that the company takes on are implemented rapidly because there are fewer people involved in the decision-making process.

At every step of the way, Adams evaluates actual cost versus business value to the company of every initiative, whether it involves technology, real estate, or the melding of the two. Because Adams has a programming background, when it comes time for the company to deploy a new system, he can effectively weigh the cost of purchasing software off the shelf against the cost of writing the software code himself or with his IT team. Because 40 percent of 99 Cents Only Stores' products flow through the inventory only once because they are close-out items, the company's systems need to be very flexible to deal with unique nonrepeating items in inventory. Given these parameters, Adams often finds that the cost of buying prepackaged software combined with the time and cost required to customize such software for the deep-discount business makes programming the company's systems in-house the better option.

One of Adams's greatest challenges was launching the company's new distribution center in Texas in 2003. The sale of the facility, which David Gold purchased for \$23 million from Albertsons, included over 200,000 square feet of refrigerated storage, approximately 500,000 square feet of dry storage, forklifts, cabling, and furniture. Working with a tight time constraint, Adams had to decide between revising the warehouse management system he had designed for the company's distribution center in City of Commerce, California, so that it could be used in Texas and purchasing a system from a developer or vendor. Adams already knew that his own system would have to be replaced in California to keep up with the company's aggressive growth plans, so he set about finding a warehouse management system that allowed for the degree and ease of customization that his company would require.



In addition to carrying close-out merchandise that only goes through inventory once, 99 Cents Only Stores sometimes receives shipments of products that aren't exactly what the company ordered. However, as Adams says, "We have to accept it, get it to our stores, and turn it fast." A system that would lock out such shipments because of inflexible rules would be a hindrance to the business.

Adams found the flexibility he needed in HighJump Software's Supply Chain Advantage software. The HighJump package addressed all of the major concerns related to the operation of the new distribution center: quick implementation, high functionality (particularly in regard to receiving), adaptability, and interoperability with the advanced automation technology of the new distribution center. One of the most attractive aspects of the package was that it didn't force 99 Cents Only Stores to change its business processes to conform to the structure of the system.

Christopher Heim, who retired as president and CEO of HighJump in 2006, explains that his company basically developed a set of tools that enables users to build their own sets of functions according to the needs of their particular businesses, "almost akin to an Excel spreadsheet." The Supply Chain Advantage system is designed in such a way that users can make changes themselves instead of relying on IT specialists, the vendor, or outside sources to upgrade and manage the system. This is especially important to Adams, who likes to avoid recurring costs that can drain a company's budget.

HighJump developers worked with Adams and his staff to integrate the system with the specific needs of 99 Cents Only Stores, including a radio frequency identification (RFID) system and a voice-based inventory picking system. The Supply Chain Advantage package includes a warehouse management system, Warehouse Advantage, that tracks the status of every product during its time in the warehouse. Warehouse Advantage works closely with a Voxware voice-based picking system, which instructs warehouse employees known as "pickers" to retrieve products that need to be released from the warehouse for shipment to stores. The Voxware system also informs pickers when storage bins need to be refilled and where to find replenishments.

The Supply Chain Advantage software module called Yard Advantage manages the company's delivery trucks, directing them to the proper locations for loading or unloading and monitoring the inventory that each truck is carrying. Customer Service Advantage creates a portal that employees at 99 Cents Only Stores retail locations can use to check on scheduled shipments. Managers use Advantage Dashboard to monitor the performance of both facilities and workers using charts and graphs that update in real time. Event Advantage alerts warehouse managers to unforeseen problems in the supply chain before they can have a negative effect on profit margin.

Adams was sufficiently satisfied with HighJump's solutions to plan for implementation of the Supply Chain Advantage systems at his company's City of Commerce distribution center. The process of installing the systems in this California center could be more complex because the center operates three shifts and employees need retraining. Furthermore, the City of Commerce center already serves 150 of 99 Cents Only Stores' retail locations. When the Texas center went online, it was responsible for far fewer stores. Adams also decided that the receiving process in City of Commerce should undergo the conversion to the HighJump system first. Once that process functions smoothly, other functions will be added.

99 Cents Only Stores planned to have the City of Commerce distribution center running on HighJump technology beginning in the fall of 2004. The need for improved systems had become very apparent. In mid-2004, the company's stock price had fallen around 50 percent. One factor contributing to the falloff was that the California distribution center was working beyond its means, which decreased productivity, affected delivery schedules, and left stores unable to replenish their shelves. Overall the chain experienced lower same-store sales and increased sales of products with lower profit margins. By 2006, 99 Cents Only Stores was seeing positive trends in same-store-sales. The company did experience a loss in net income for the quarter ending September 30, 2006 as compared to 2005. This was due to \$1.8 million in temporary labor costs to implement inventory control and initiatives, \$2 million in expenditures for consulting and accounting related to the annual audit and Sarbanes-Oxley compliance requirements. The latter resulted in several delays in filing the company's Form 10-K for fiscal 2006.

99 Cents Only Stores has to regularly reevaluate its inventory control procedures and expand its warehouse capacity. To bolster the company's leadership, CEO Eric Schiffer announced an organizational realignment in November 2006. The distribution and transportation departments were placed under the wings of Jeff Gold, who was already in charge of store operations. Jim Parros came aboard to fill the new position of Senior Vice President of Logistics. Buying and merchandise planning reported directly to Schiffer. 99 Cents Only Stores will continue to explore advanced information technology giving the highest priority to technology initiatives that promise the best return on investment (ROI). If a new project comes along that offers a better opportunity to improve the business, the company will shift gears even if the previous project has not been deployed fully. The company still receives most of the benefit of the first project, and doesn't miss out on a new opportunity. Can 99 Cents Only Stores continue to rely on the uneasy relationship between leading-edge technology and a bottom-line-oriented business to rebound from its recent struggles?

### **Case Study Questions.**

- 1.7 Analyze 99 Cents Only Stores using the value chain and competitive forces models.
- 1.8 Evaluate the current business strategy of 99 Cents Only Stores in response to its competitive environment. What is the role of information technology infrastructure in that strategy? How does it provide value for 99 Cents Only Stores?
- 1.9 How effective is 99 Cents Only Stores' strategy for IT infrastructure investments? Explain your answer.
- 1.10 How successful have 99 Cents Only Stores' strategy and use of information systems been in addressing the company's problems? What kind of problems can they solve? What are some of the problems that they cannot address?

### **Self-Review Questions (SRQ) For Study Session 1**

Now that you have completed this study unit, you can assess how well you have achieved its Learning Outcomes by answering these questions. Write your answers in your Study Diary and discuss them with your Tutor at the next Study Support Meeting or Online interactive sessions. You can also check your answers at the Self-Review Answers section which is located at the end of this Module.

1. How are information systems transforming business, and what is their relationship to globalization?
2. Describe how information systems have changed the way businesses operate and their products and services.
3. Define the following terms: i) computer literacy; ii) information literacy; iii) E-Business; iv) E-Commerce; v) information technology; vi) Management information systems; vii) Internet; viii) Intranet; ix) extranet; x) Management.
4. Describe the characteristics of a digital firm.
5. Describe the challenges and opportunities of globalization in a “flattened” world.
6. Why are information systems so essential for running and managing a business today?
7. How can information technology support a company’s business processes and decision making and give it a competitive advantage? Give examples to illustrate your answer.
8. How does the use of the Internet, intranets, and extranets by companies today support their business processes and activities?
9. Why do big companies still fail in their use of information technology? What should they be doing differently?
10. How can a manager demonstrate that he or she is a responsible end user of information systems? Give several examples.
11. What are some of the toughest management challenges in developing IT solutions to solve business problems and meet new business opportunities?
12. Why are there so many conceptual classifications of information systems? Why are they typically integrated in the information systems found in the real world?
13. Examine the information systems Challenges.
14. Discuss the evolution of information systems.
15. Distinguish between technical and behavioral approaches.
16. Examine the qualities of information.
17. What is the significance of organizational structure to information systems?
18. Describe the importance of organizational features to information systems.
20. Illustrate the functions and stakeholders of information systems.

21. What is the significance of IT governance to organizations?

### Discussion Questions

1. Information systems are too important to be left to computer specialists. Do you agree? Why or why not?
2. If you were setting up the Web site for Disney World visitors, what management, organization, and technology issues might you encounter?
3. What are some of the organizational, managerial, and social complementary assets that help make UPS's information systems so successful?

### References and Additional Reading Materials

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