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# ICT Role's In Todays Management

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## Abstract

ICT Has an impact on the lives of all individuals both at home and in the community and it is important to everyone to take advantage of its opportunities and understand its effects.

Technology is no longer being used simply as a means for automating processes. Instead it is being used as a revolutionary means of delivering services to customers. The adoption of technology has led to the following benefits: (i) Greater productivity, profitability and efficiency (ii) Faster service and customer satisfaction (iii) Convenience and flexibility (iv) 24 x 7 operations (v) Space and cost savings and much more

Information Technology has defined our job and our career. One cannot definitively say that they are not influenced by Information Technology in some way in determining, acquiring, performing or getting paid for their job. IT has had a significant impact on people's work world.

Among other development in different sectors in recent one decade we also have big achievements in ICT According to ministry of communication and information technology statistic over 88% population of Afghanistan is under Coverage of telecom and in case of internet users in 2002 we have 100 internet users but in 2013 we have 2,400,000 internet users .

But in case of using ICT efficiently and effectively in ministries and other organization we have leakage, most people use internet and ICT technology just for emailing, researching, using the social network website but they do not understand that relying their work system in technology has big advantages and ease the work.

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## **Preface:**

Most of the organizations in Afghanistan do not aware of by using of technology they can solve the problems that right now they are forcing with it. For example we have lots of corruption in an organization, it takes too much time clear one document because of bureaucracy , retrieving of information get too much time because of their hardcopy file and losing of this information is also another concern, and also in leaning system we much problems new learning comes from new technology but unfortunately we don't have a big hand to interact learning systems to Technology.

Even though we do not have hard evidence that by using information technology (IT) we can enhance learning, there are many areas related to the delivery of education that can benefit by the use of IT. In the projects we have done, we used IT to enhance access to information, facilitate deep learning and also to provide intelligent tutoring. In each case, the feedback we had from the students has been very positive. Due to many difficulties, it is hard to quantify the benefits resulting from the use of IT for the delivery of education. In this paper we highlight some of the possible benefits at a conceptual level

# Chapter 1

## 1.1 Information Technology

In the 1960s and 1970s, the term information technology (IT) was a little known phrase that was used by those who worked in places like banks and hospitals to describe the processes they used to store information. With the paradigm shift to computing technology and "paperless" workplaces, information technology has come to be a household phrase. It defines an industry that uses computers, networking, software programming, and other equipment and processes to store, process, retrieve, transmit, and protect information.

In the early days of computer development, there was no such thing as a college degree in IT. Software development and computer programming were best left to the computer scientists and mathematical engineers, due to their complicated nature. As time passed and technology advanced, such as with the advent of the personal computer in the 1980s and its everyday use in the home and the workplace, the world moved into the information age.

By the early 21st century, nearly every child in the Western world, and many in other parts of the world, knew how to use a personal computer. Businesses' information technology departments have gone from using storage tapes created by a single computer operator to interconnected networks of employee workstations that store information in a server farm, often somewhere away from the main business site. Communication has advanced, from physical postal mail, to telephone fax transmissions, to nearly instantaneous digital communication through electronic mail (email).

Great technological advances have been made since the days when computers were huge pieces of equipment that were stored in big, air conditioned rooms, getting their information from punch cards. The information technology industry has turned out to be a huge employer of people worldwide, as the focus shifts in some nations from manufacturing to service industries. It is a field where the barrier to entry is generally much lower than that of manufacturing, for example.

In the current business environment, being proficient in computers is often a necessity for those who want to compete in the workplace.

Jobs in information technology are widely varied, although many do require some level of higher education. Positions as diverse as software designer, network engineer, and database administrator are all usually considered IT jobs. Nearly any position that involves the intersection of computers and information may be considered part of this field.

Information technology is the study, design, development, implementation, support or management of computer based information systems, particularly software applications and computer hardware. It is the capability to electronically input, process, store, output, transmit and receive data and information, including text, graphics, sound and video as well as the ability to control machines of all kinds electronically.

It is comprised of computers, networks, satellite communications, robotics, e-mail, electronic games and automated office equipment. The information industry consists of all computers, communications and electronics related organizations, including hardware, software and services.

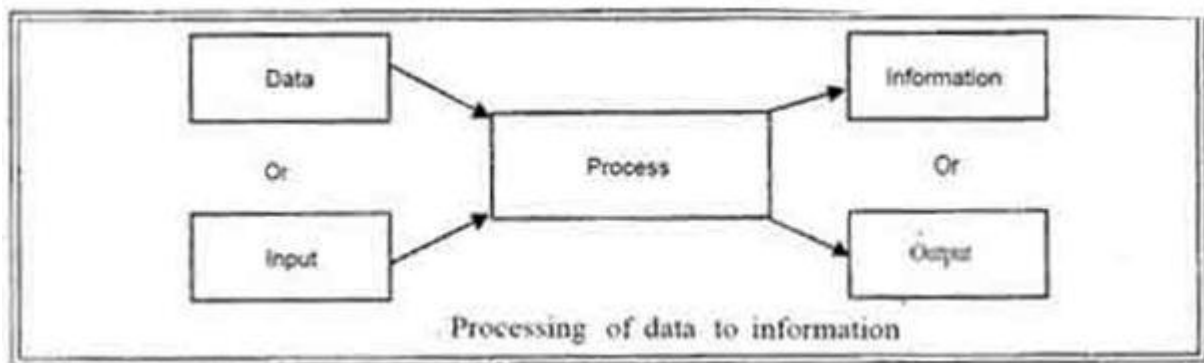
Information is the summarization of data. Data are raw facts and figures that are processed into information, such as summaries and totals. Information is the result of processing, manipulating and organizing data in a way that adds to the knowledge of the receiver. Even though information and data are often used interchangeably, they are actually very different.

Data is a set of unrelated information and as such is of no use until it is properly evaluated. Upon evaluation, once there is some significant relation between data, it is converted into information. Now this data can be used for different purposes. Till data conveys some information, they are not useful.

It is necessary to make a distinction between two terms, which are usually used interchangeably, namely data and information. Data is the material on which computer programs work upon. It can be numbers, letters of the alphabet, words, special symbols etc. But by themselves they have no meaning. For example, the following sequence of digits 240343 is meaningless by itself since it could refer to a date of birth, a part number for an automobile, the number of rupees spent on a project, population of a town, the number of people employed in a large organization etc. Once we know what the sequence refers to, then it becomes meaningful and can be called information. When we write above as 24-03-43, it may mean date of birth as 24th March 1943.

A set of words would be data but text would be information. For example "ANNUAL EXAMINATION, AMIT ABH, JYOTSNA, PHYSICS" is a set of data and "JYOTSNA SCORED THE HIGHEST MARKS IN PHYSICS IN ANNUAL EXAMINATION" is information. This is not the end of affair, information may be processed or manipulated further of course e.g. a printed text may be reorganized. Also information received from one source or system may become data input for another system. In case of examination, score card is information about the individual but is actually a source of input data for making merit list of the entire board or university. Data is something like raw materials used in production processes practiced in factories or industries. In a paper manufacturing factory bamboos and old clothes are the inputs and paper is the output.

**Here is the comparison between data and information:**



Data	Information
Data is raw fact and figures. For example: 23 is data.	Information is a processes form of data. Forexample: When 23 is stored in row column form as shown below in become information: Age 23
Data is not significant to a business and of itself.	Information is significant to a business and of itself; for example 23 is insignificant for business but age 23 is significant for a business like music.
Data are atomic level pieces of information.	Information is a collection of data, for example age and 23 collected together to form information.
For example in the healthcare industry, much activity surrounds data collection. Nurses collect data every day and sometimes hourly. Examples of data include vital signs, weight, and relevant assessment parameters.	Information, however, provides answers to questions that guide clinicians to change their practices. For example, the trending of vital signs overtime provides a pattern that may lead to certain clinical decisions.
Data does not help in decision making.	As explained above information helps in decision-making.

A term that encompasses all forms of technology used to create, store, exchange and utilize information in its various forms including business data, conversations, still images, motion pictures and multimedia presentations

When it comes to technology and your business, you'll need to know enough about the topic to understand what your business needs and why. And while you won't



need to be able to disassemble and reassemble a PC against a stopwatch like a Marine does his M-16, you'll want to know a little more than simply how to turn on your computer and then launch your favorite programs.

Computers and peripherals are constantly evolving, but knowing a few general specifications in each product category will help you find the best deal on the right equipment for your business--or at least understand what a tech expert is telling you. And what a business needs is not the same for everyone. There's no one "right" PC brand or printer type any more than there's one right car for everyone out on the road today.

Your business will have its own unique set of equipment needs that probably differ from those of the company next door. And, of course, you'll have a different amount of money to spend.

When it comes to pricing, the good news is that prices for office equipment have gone down every year during the past three decades, while features have continued to improve with every new version of hardware and software that's released. That's been true in every product category every year, so you can expect to get a better price and a more capable bundle of equipment than you could have found this time last year.

Also, you can expect your computer and telecommunications equipment to be your best business allies. As we've evolved from an industrial to an information-based economy, small businesses have used their office tools to be more competitive against larger businesses, which--let's face it--have a lot of built-in market advantages.

Let's start by behaving as if you're already a Fortune 500 company--in miniature. Over the decades, large businesses have learned quite a bit about getting the most out of their office equipment. The first lesson is: You don't buy equipment; you buy systems.

As you shop for PCs, fax machines and phones, keep in mind that the goal is to make all this equipment work well together and, to the extent possible, talk to one another--that is, share data. If your personal digital assistant (PDA) can't easily transfer data to your desktop, your fax machine can't accept computer files, or you're building contact lists and address books in a lot of different and incompatible applications, you're duplicating your efforts, which means you're losing time. Efficiency today means being well connected--both inside and outside the walls of your company.

Even if you start off as a solo operator working from a home office, you're still going to need connections to clients and suppliers in the wider world. That not only means phone, fax and internet connections, but also some level of connectivity in the applications that make them work--e-mail, instant messaging, web protocols and more.

At some point, you may want to share proposals, spreadsheets and other files--not only among co-workers but possibly customers and suppliers as well. That suggests you'll want to stick with the most popular operating systems and applications to improve your chances of collaboration with others. Certainly, you'll want to do that within your own company.

Incidentally, even if you're starting as a solo operator, you'll need at least two connected computers. And if you're like many businesspeople today, you probably already own three or four "computing devices"--PC, laptop, PDA, cell phone--with a lot of wired and/or wireless connections among them and your other office equipment.

But why two desktop computers? Actually, one of those could be a laptop for travel. But you need two because of that inevitable day when your hard drive crashes or your computer gets a virus or there's some inscrutable problem with your PC's on/off button--whatever. Your PC is likely to become the heart and soul of your operation, and while computer equipment is very durable, all equipment fails.

So what will you do when that machine that holds your critical business information fails? Even if you're among that small fraction of people who back up their data religiously and have it available somewhere on tape or CD-ROM, how long will it take you to run out and buy a new PC and add all the software you regularly use configured just the way you like it so you can start loading that data? How many hours or days can your business go before you get back online with your customers?

Realistically, you don't want even one hour of lost productivity. At a minimum, you need at least one duplicate of your main PC's entire setup that you can immediately turn to without losing a step. As mentioned, that duplicate image could be a laptop used for travel. Ideally, it will be another desktop just as capable or nearly so as you're first.

That second computer doesn't have to sit idle until an emergency. It can be working in the meantime to help carry the computing load on your local area network (LAN)--and, for that matter, your wide area network, which includes your connection to the internet and your website.

Networking lets you share computing power and divvy up your workload among different systems. For example, as companies grow, they often find it cheaper and more convenient to keep master copies of software and even data on a central PC and give each employee's workstation access to more or less of it, depending on the employee's access privileges.

It's also often convenient to get your printer, fax and scanner off your desk by attaching them to a second PC that can accept jobs from all the other PCs on the network. Another increasingly common use of a second PC is as a communications server to your e-commerce web site and to house the several e-mail boxes and instant messaging archives you and co-workers will collect.

So you need to start shopping, not for computers, but for a network for your computers. That's not as complicated as it sounds, especially since Windows and other popular operating systems have networking capabilities built in these days. At the LAN level, that will be over an Ethernet connection. You'll also want to connect smaller devices to your network via various wired or wireless protocols that will be built into your different devices.

As mentioned, if you travel or work at home and the office or different spots around your home, you may prefer that your second computer be a laptop. Portables come in all shapes and sizes today, and you can easily find one powerful enough to perform any or all of the desktop duties described above.

Any PC that delivers data and other services to multiple devices is called a "server." The word "server" is also used to refer to the operating system--software like Windows 2000 or its successor, Windows XP. These operating systems include all the features you'll need to connect your server to other computers, sometimes called "clients."

The traditional way to create your LAN is to string very inexpensive Category 5 cable (it looks a lot like the typical phone line on steroids) between the Ethernet adapters of two or more PCs. You may need to buy a small and inexpensive Ethernet card to plug in to one or more of your PCs if any of them is either old or cheap. But the easier approach is to make built-in Ethernet a must-have on your

PC shopping list. (As a matter of fact, Ethernet has become such a common feature of today's business-class PCs that it may not even cost you extra for the ability to transfer data at 10 or 100 megabits per second.)

Easier still is to network your PCs wirelessly using 802.11 or Wi-Fi network adapters. These come in a variety of adapter types and connect to your PC in different ways. Similarly, unable to accept an Ethernet card, some small devices like PDAs and cell phones rely on the wireless Bluetooth or Infrared communication methodologies

## **1.2 Information and Communication Technology**

Stands for "Information and Communication Technologies." ICT refers to technologies that provide access to information through telecommunications. It is similar to Information Technology (IT), but focuses primarily on communication technologies. This includes the Internet, wireless networks, cell phones, and other communication mediums.

In the past few decades, information and communication technologies have provided society with a vast array of new communication capabilities. For example, people can communicate in real-time with others in different countries using technologies such as instant messaging, voice over IP (VoIP), and video-conferencing. Social networking websites like Facebook allow users from all over the world to remain in contact and communicate on a regular basis.

Modern information and communication technologies have created a "global village," in which people can communicate with others across the world as if they were living next door. For this reason, ICT is often studied in the context of how modern communication technologies affect society.

Information and communications technology (ICT) refers to all the technology used to handle telecommunications, broadcast media, intelligent building management systems, audiovisual processing and transmission systems, and network-based control and monitoring functions.

Although ICT is often considered an extended synonym for information technology (IT), its scope is more broad.

ICT has more recently been used to describe the convergence of several technologies and the use of common transmission lines carrying very diverse data and communication types and formats.

Techopedia explains Information and Communications Technology (ICT)

Converging technologies that exemplify ICT include the merging of audiovisual, telephone and computer networks through a common cabling system. Internet service providers (ISP) commonly provide Internet, phone and television services to homes and businesses through a single optical cable. The elimination of the telephone networks has provided huge economic incentives to implement this convergence, which eliminates many of the costs associated with cabling, signal distribution, user installation, servicing and maintenance costs.

### **1.3 Difference Between IT and ICT**

IT (Information Technology) refers to an entire industry that uses computers, networking, software and other equipment to manage information. Modern IT departments in large companies are equipped with computers, DBMS (Database Management Systems), servers and security mechanisms for storing, processing, retrieving and protecting information of the company. ICT (Information Communications Technology) is a term widely used in the context of education. Even though there is no universally accepted definition for ICT, it mainly refers to utilizing digital technologies such as computers, television, email, etc. to help individuals or organizations to use information.

#### **What is IT?**

IT refers to an entire industry that uses computers, networking, software and other equipment to manage information. Generally, IT departments are responsible for storing, processing, retrieving and protecting digital information of the company. For achieving these tasks, they are equipped with computers, DBMS, servers and security mechanisms, etc. Professionals working in IT departments range from system administrators, database administrators to programmers, network engineers and IT managers. When executing a business, IT facilitates the business by providing four sets of core services. These core services are providing information, providing tools to improve productivity, business process automation and providing means to connect with customers. Currently, IT has become an essential part in business operations and has provided lot of job opportunities worldwide.

Knowledge in IT has become essential to succeed in the workplace. Typically, IT professionals are responsible for a range of duties including simple tasks such as installing software to complex tasks such as designing and building networks and managing databases.

## **What is ICT?**

As mentioned earlier, ICT is a term widely used in the context of education. Even though there is no universally accepted definition for ICT, it mainly refers to utilizing digital technologies such as computers, television, email, etc. to help individuals or organizations to work with digital information. ICT can be seen as an extended synonym for IT. Therefore, ICT can be seen as an integration of IT with media broadcasting technologies, audio/ video processing and transmission and telephony. The term ICT first came in to picture in 1997 in a report prepared by Dennis Stevenson for the UK government. Recently, the term ICT has been used to refer to integrating telephone and audio/ visual networks with computer networks. This integration has provided large savings of costs due to the elimination of telephone networks.

**Furthermore,** IT refers to an entire industry that uses computers, networking, software and other equipment to manage information, whereas ICT can be seen as an integration of IT with media broadcasting technologies, audio/ video processing and transmission and telephony. Therefore, ICT can be seen as an extended acronym for IT. The term ICT is widely used in the context of education, whereas IT is a term widely used in the industry. In addition, recently, ICT is also used to refer to the integration of telephone and audio/ visual networks with computer networks. In simplest terms, ICT can be seen as the integration of information technology with communication technology.

Information technology (IT) is the acquisition, processing, storage and dissemination of vocal, pictorial, textual and numerical information by a microelectronics-based combination of computing and telecommunications.[1] The term in its modern sense first appeared in a 1958 article published in the Harvard Business Review, in which authors Leavitt and Whisler commented that "the new technology does not yet have a single established name. We shall call it information technology (IT).

Information and communications technology or information and communication technology,[1] usually called ICT, is often used as an extended synonym for

information technology (IT) but is usually a more general term that stresses the role of unified communications and the integration of telecommunications (telephone lines and wireless signals), intelligent building management systems and audio-visual systems in modern information technology. ICT consists of all technical means used to handle information and aid communication, including computer and network hardware, communication middleware as well as necessary software. In other words, ICT consists of IT as well as telephony, broadcast media, all types of audio and video processing and transmission and network based control and monitoring functions.[2] The expression was first used in 1997[3] in a report by Dennis Stevenson to the UK government[4] and promoted by the new National Curriculum documents for the UK in 2000.

ICT is often used in the context of "ICT roadmap" to indicate the path that an organization will take with their ICT needs.[5][6]

The term ICT is now also used to refer to the merging (convergence) of audio-visual and telephone networks with computer networks through a single cabling or link system. There are large economic incentives (huge cost savings due to elimination of the telephone network) to merge the audio-visual, building management and telephone network with the computer network system using a single unified system of cabling, signal distribution and management. See VOIP and Intelligent Infrastructure Management (IIM). This in turn has spurred the growth of organizations with the term ICT in their names to indicate their specialization in the process of merging the different network systems.

# Chapter 2

## 2.1 Management

These are standard questions that most of us in the management profession have been asked more than once. And questions we asked once in our careers too. Here, then, is a basic look at management, a primer, Management 101 from my perspective.

### 2.1.1 Art and Science

Management is both art and science. It is the art of making people more effective than they would have been without you. The science is in how you do that. There are four basic pillars: plan, organize, direct, and monitor.

**Make Them More Effective** Four workers can make 6 units in an eight-hour shift without a manager. If I hire you to manage them and they still make 6 units a day, what is the benefit to my business of having hired you? On the other hand, if they now make 8 units per day, you, the manager, have value.

The same analogy applies to service, or retail, or teaching, or any other kind of work. Can your group handle more customer calls with you than without? Sell higher value merchandise? Impart knowledge more effectively? etc. That is the value of management - making a group of individual more effective.

#### **Basic Management Skill #1: Plan**

Management starts with planning. Good management starts with good planning. And proper prior planning prevents... well, you know the rest of that one.



Without a plan you will never succeed. If you happen to make it to the goal, it will have been by luck or chance and is not repeatable. You may make it as a flash-in-the-pan, an overnight sensation, but you will never have the track record of accomplishments of which success is made.

Figure out what your goal is (or listen when your boss tells you). Then figure out the best way to get there. What resources do you have? What can you get? Compare strengths and weaknesses of individuals and other resources. Will putting four workers on a task that takes 14 hours cost less than renting a machine that can do the same task with one worker in 6 hours? If you change the first shift from an 8 AM start to a 10 AM start, can they handle the early evening rush so you don't have to hire an extra person for the second shift?

Look at all the probable scenarios. Plan for them. Figure out the worst possible scenario and plan for that too. Evaluate your different plans and develop what, in your best judgment, will work the best and what you will do if it doesn't.

**TIP:** One of the most often overlooked management planning tools is the most effective. Ask the people doing the work for their input.

### **Basic Management Skill #2: Organize**

Now that you have a plan, you have to make it happen. Is everything ready ahead of your group so the right stuff will get to your group at the right time? Is your group prepared to do its part of the plan? Is the downstream organization ready for what your group will deliver and when it will arrive?

Are the workers trained? Are they motivated? Do they have the equipment they need? Are there spare parts available for the equipment? Has purchasing ordered the material? Is it the right stuff? Will it get here on the appropriate schedule?

Do the legwork to make sure everything needed to execute the plan is ready to go, or will be when it is needed. Check back to make sure that everyone understands their role and the importance of their role to the overall success.

### **Basic Management Skill #3: Direct**

Now flip the "ON" switch. Tell people what they need to do. I like to think of this part like conducting an orchestra. Everyone in the orchestra has the music in front of them. They know which section is playing which piece and when. They know when to come in, what to play, and when to stop again. The conductor cues each section to make the music happen. That's your job here. You've given all your

musicians (workers) the sheet music (the plan). You have the right number of musicians (workers) in each section (department), and you've arranged the sections on stage so the music will sound best (you have organized the work). Now you need only to tap the podium lightly with your baton to get their attention and give the downbeat.

#### **Basic Management Skill #4: Monitor**

Now that you have everything moving, you have to keep an eye on things. Make sure everything is going according to the plan. When it isn't going according to plan, you need to step in and adjust the plan, just as the orchestra conductor will adjust the tempo.

Problems will come up. Someone will get sick. A part won't be delivered on time. A key customer will go bankrupt. That is why you developed a contingency plan in the first place. You, as the manager, have to be always aware of what's going on so you can make the adjustments required.

This is an iterative process. When something is out of sync, you need to Plan a fix, Organize the resources to make it work, Direct the people who will make it happen, and continue to Monitor the effect of the change.

#### **Is It Worth It**

Managing people is not easy. However, it can be done successfully. And it can be a very rewarding experience. Remember that management, like any other skill, is something that you can improve at with study and practice.

# Chapter 3

## 3.1 The evolving role of new information and communication technologies

New ICT can be used in many different ways; some options are more relevant for and popular among youth than are others. ICT-based interaction between young people is common. Communication between friends and strangers may occur using real names or pseudonyms (virtual personalities or net identities), or anonymously.

ICT are also used to obtain information and assistance in subject areas ranging from music and sports to medical and psychological issues. Young people often use ICT for identity development; some, for example, establish, maintain or join fan clubs on the Internet. The constantly expanding field of online gaming is an important aspect of young people's use of ICT.

Wider comparisons of young people's use of ICT are hindered by the fact that no relevant global statistics, let alone in-depth inquiries, are available. Compared with research on television and video viewing, statistics and studies on ICT use among children and teenagers are relatively scarce, even in countries with high levels of information technology development and use. In information-rich societies, the use of ICT by children and young people is largely uniform and appears to develop in very similar stages, with little cross-national variation. In the following paragraphs, comparisons involving Finland, Japan and the United States are presented. Scandinavian The evolving role of new information and communication technologies Youth and Information and Communication Technologies (ICT) World YOUTH Report, 2003 countries have been among the earliest owners and

users of information and communication technologies and may therefore function as trendsetters for ICT development in the rest of the world. Children in information societies are surrounded by more information and communication technology than any previous generation. In the developed countries, practically every child lives in a home equipped with the basic tools of the information age, including the radio, television, telephone and, to an only slightly lesser degree, the stereo and video cassette recorder.

The cell phone and the computer are central appliances of the media culture and will in time converge with digital television. In affluent countries such as Finland and Japan, the devices are used daily by increasingly younger children. In 1997, for instance, fewer than 5 per cent of Finnish 7- to 10-year-olds owned a personal mobile telephone; by 2001, the rate of ownership for the same age group had risen to 30 per cent.

In 1999, 15 per cent of Finnish 15-year-olds owned a mobile phone, but by 2001 the figure had climbed to 66 per cent. In both age groups, girls are somewhat more likely than boys to own a handset. The mobile phone has gradually become part of the everyday lives of people in developed countries. It is seen as a useful object that makes life a little easier, one that soon becomes inconspicuous and that people quickly

start to take for granted. Computers are equally pervasive. In 1998, more than 80 per cent of Finnish 8- to 10-year-olds had computers in their homes, and half were reportedly using them.<sup>41</sup> In 2001, 26 per cent percent of children in the same age group had computers in their rooms, and nearly all teenagers aged 13 to 19 years used computers at least occasionally; the devices were used most frequently to access the Internet, followed by gaming, writing, listening to music and drawing.

Internet use among young people in developed countries is continually increasing. The most elaborate and extensive surveys on the ICT behavior of youth are conducted by commercial entities. According to one such survey, Internet use among 12- to 19-year-olds in the United States primarily involves e-mailing and instant messaging between friends. The next most common uses are online gaming, downloading digital music and retrieving educational resources. Young people also use the Internet to engage in online chatting and to follow sports and world events. In a survey conducted in Finland, 8- to 10-year-olds reported using ICT primarily to access the Internet and play computer games, but also for information searches and drawing.

One of the most striking features of children's involvement in computer activities is the surprisingly low level of school-related use. Without too much exaggeration, it can be argued that ICT and the media culture represent a world of entertainment for children and youth.

Current trends suggest that as the number of broadband and wireless connections increases and usage costs drop, and as new mobile terminal devices are produced for the market, young people's use of the Internet for all of the purposes mentioned above will rise. Internet use costs are subject to market forces; more users and more service providers (increased competition) mean lower consumer prices.

Children and youth in the developed world have taken to the wonders of the media culture like fish to water. They are able to incorporate the use of ICT into their media-filled lives with relative ease and flexibility, alongside and often in association with more traditional activities. The mere existence of ICT makes the lives of today's children and youth differ in important ways from the lives of earlier generations.

The media culture and its products teach children different attitudes as well as a vast range of informal skills and information. However, children's everyday learning is often compromised and complicated by the stereotypical attitudes and cultural fantasies of a less than-ideal adult world (examples include Internet child and teenage pornography sites).

### **3.2 The Effects of Information Technology on Management**

In today's business climate, technology is advancing more rapidly than many organizations can keep up with. Frequently, a number of the larger corporations, and even small to medium-sized businesses as well, now hire technology consultants and highly educated technical staff to keep their organizations competitive and up to date with the latest technological changes and improved software and equipment that can make their businesses more efficient and productive. However, the advantages for these businesses that do stay informed and up to date with the latest technological changes is that they are able to increase revenues and profits at a faster pace and promulgate the overall success of the company.

Technology is quickly becoming a key factor in any type of business, and the latest technological innovations are what are leading to not only increased sales and

exposure, but also less costly methods of marketing and advertising and greatly increased productivity. In manufacturing, many processes that were once performed manually or machines that were operated by manpower are now being operated remotely and run by automated processes. With decreased opportunities for employment in manufacturing and less skilled trades, many workers are gaining an education and expanding their own personal skills to accommodate a changing business environment.

In administrative functions, computers have offered the benefits of readily accessible databases of information and streamlined processes as well. Virtual offices and even telephone answering systems that operate as robotic receptionists have decreased the need for many positions here as well and offered businesses a more cost-effective approach to completing simpler office tasks. In terms of sales, the internet has helped open the doors for increased globalization and the ability to increase profits by reaching more people at one time. As a result, telemarketing and door to door sales calls have become not only unwelcomed by the general public, but also an outdated means of selling goods and services.

While the overall benefit to the end consumer is lower prices, businesses still reap the rewards of these decreased costs of operation and also greater efficiency and organization. For management, the increased reliance on information technology creates a number of issues. In terms of human resources, today's human resources managers are searching for employees that are well trained with computers and know how to operate the latest technological equipment. In addition, a number of today's top firms are hiring employees that telecommute or work from a remote location, and managers are now frequently managing teams from in front of a computer.

Another aspect of increased information technology that affects today's management is security. Hacking, phishing, and other online security threats can create real issues for any type of business, but today's managers have to be prepared to deal with these kinds of threats, teach the importance of security to employees, and know how to react when security has been breached.

### **3.3 The role of Information Technology in Management**

#### **3.3.1 Definition**

Information Technology (IT) was described by Chaffey and Wood as “technology resources used for business information management”. These resources include software, hardware and telecommunication networks used for managing information.

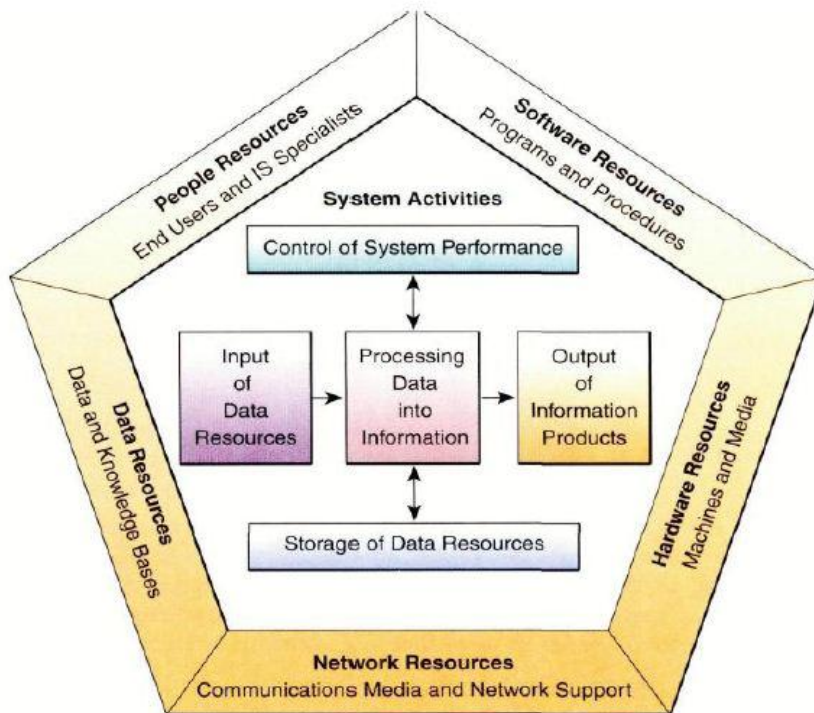
According to Benemati et al., IT is changing rapidly and considering the increasing strategic impact of IT on business operations, its successful management is of utmost importance. Irani and Love suggested that for IT management to be successful, it must be perceived as an iterative business process capable of providing organizational learning throughout the lifecycle of the technology. However, even when IT is managed successfully, the question arises, as to what role IT plays in the achievement of organizational strategic goals and objectives. In response to this question, Venkatraman et al and Franz and Klepper postulated that the proper role of IT in an organization is usually epitomized as a fit or alignment with the strategic goals of the organization. Therefore, IT can only be appropriately aligned when infrastructure put in place to implement the IT strategy is adequate; the strategy supports the organization strategy and business processes.

### **3.4 Concepts Information System And Technologies in Business**

#### **3.4.1 Why Information Systems Are Important**

An understanding of the effective and responsible use and management of information systems is important for managers and other business knowledge workers in today's global information society. Information systems and technologies have become a vital component of successful businesses and organizations. Information systems constitute an essential field of study in business administration and management, as they are considered a major functional area in business operations.

An IS Framework for Business Professionals: Figure 1.2

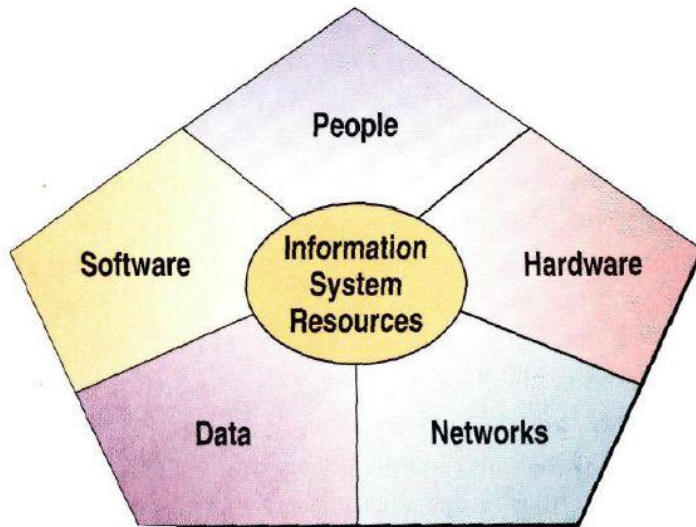


Managers or business professionals are not required to know the complex technologies, abstract behavioral concepts, or the specialized applications involved in the field of information systems. Figure 1.2 illustrates a useful conceptual framework that outlines what a manager or business professional needs to know about information systems. It emphasizes five areas of knowledge:

- Foundation Concepts
- Information Technologies
- Business Applications
- Development Processes
- Management Challenges



### 3.5 What is an Information System?



An information system (IS) can be any organized combination of people, hardware, software, communications networks, and data resources that collect, transforms, and disseminate information in an organization.

**Information Technologies:** Business professionals rely on many types of information systems that use a variety of information technologies.

For example:

**Types of IS** - Manual (paper-and-pencil) information systems

- ❖ Informal (word-of-mouth) information systems
- ❖ Formal (written procedures) information systems
- ❖ Computer-based information systems

Computer-based information systems (IS) use hardware, software, the Internet, and other telecommunications networks, computer-based data resource management techniques, and other forms of information technologies (IT) to transform data resources into a variety of information products for consumers and business professionals.

### 3.6 System Concepts - A Foundation

System concepts underlie the field of information systems. Understanding system concepts will help you understand many other concepts in the technology, applications, development, and management of information systems. System concepts help you understand:

**Technology-**That computer networks are systems of information processing components that uses a variety of hardware, software, data and telecommunication technologies.

**Applications-**That electronic business and commerce involves interconnected business information systems.

**Development-**That developing ways to use information technology n business includes designing the basic components of information systems.

**Management-**That managing information technology emphasizes the quality, strategic business value, and security of an organization's information systems.

**Other System Characteristics:** A system does not exist in a vacuum; rather, it exists and functions in an environment containing other systems.

**Subsystem:** A system that is a component of a larger system, where the larger system is its environment.

**System Boundary:** A system is separated from its environment and other systems by its system boundary.

**Interface:** Several systems may share the same environment. Some of these systems may be connected to one another by means of a shared boundary, or interface.

**Open System:** A system that interacts with other systems in its environment is called an open system (connected to its environment by exchanges of inputs and outputs).

**Adaptive System:** A system that has the ability to change itself or its environment in order to survive is called an adaptive system.

An information system model expresses a fundamental conceptual framework for the major components and activities of information systems. An information system depends on the resources of people, hardware, software, data, and networks to perform input, processing, output, storage, and control activities that convert data resources into information products.

The information systems model outlined in the text emphasizes four major concepts that can be applied to all types of information systems:

- ❖ People, hardware, software, data, and networks, are the five basic resources of information systems.
- ❖ People resources include end users and IS specialists, hardware resources consist of machines and media,
- ❖ Software resources include both programs and procedures, data resources can include data and knowledge bases, and network resources include communications media and networks.
- ❖ Data resources are transformed by information processing activities into a variety of information products for end users.

Information processing consists of input, processing, output, storage, and control activities.

The basic IS model shows that an information system consists of five major resources:

- People resources
- Hardware resources
- Software resources
- Data resources
- Network resources

### **3.7 Information System Activates:**

Information processing (or data processing) activities that occur in information system include the following:

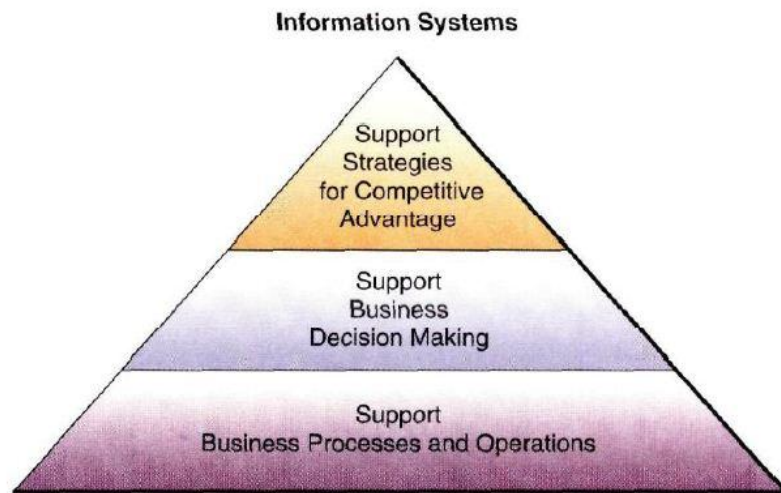
- Input of data resources
- Processing of data into information
- Output of information products
- Storage of data resources
- Control of system performance

## **3.8 Business Applications, Development, and Management**

### **3.8.1 The Fundamental Roles Of Is Applications In Business**

Information systems perform three vital roles in any type of organization. That is, they support an organization's:

- Business processes and operations
- Decision making by employees and managers
- Strategies for competitive advantage



Information Technology is increasingly important in the competitive marketplace. Managers need all the help they can get. Information systems perform three vital roles in business:

**Support Business Operations.** From accounting to tracking customers' orders, information systems provide management with support in day-to-day business operations. As quick response becomes more important, the ability of information systems to gather and integrate information across business functions is become crucial.

**Support Managerial Decision Making.** Just as information systems can combine information to help run the business better, the same information can help managers identify trends and to evaluate the outcome of previous decisions. IS helps managers make better, quicker, and more informed decisions.

**Support Strategic Advantage.** Information systems designed around the strategic objectives of the company help creates competitive advantages in the marketplace. Competitive Advantage is created or maintained with the company succeeds in performing some activity of value to customers significantly better than does its competition.

According to Porter, following one or more of these strategies can develop competitive advantage:

**Cost Strategies.** Becoming a low-cost producer in the industry allows the company to lower prices to customers. Competitors with higher costs cannot afford to compete with the low-cost leader on price.

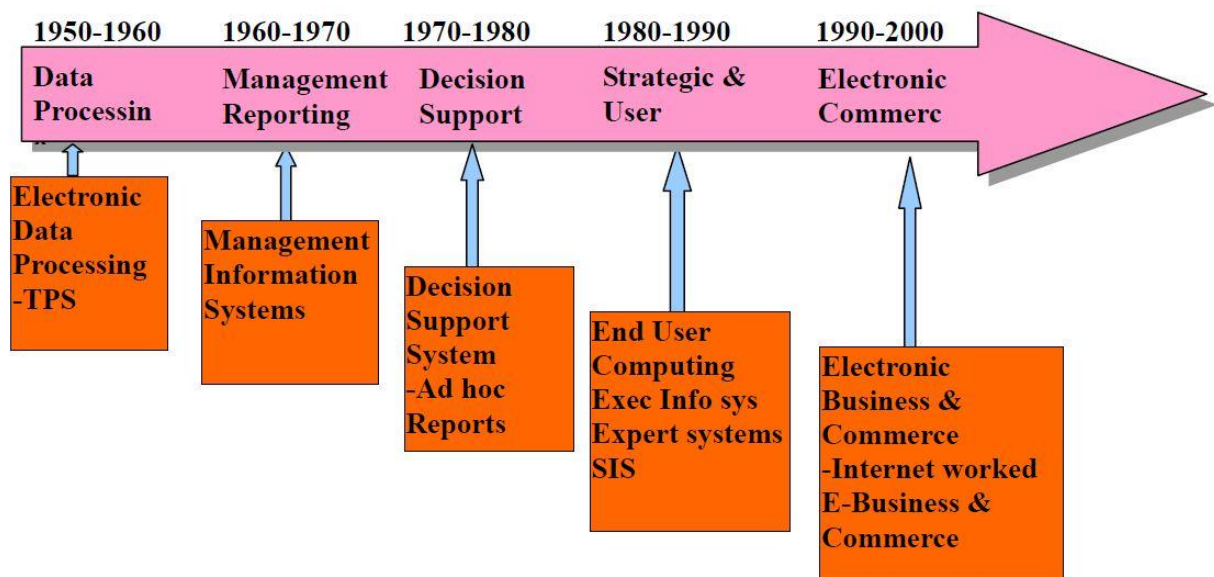
**Differentiation Strategies.** Some companies create competitive advantage by distinguishing their products on one or more features important to their customers. Unique features or benefits may justify price differences and/or stimulate demand.

**Innovation Strategies.** Unique products or services or changes in business processes can cause fundamental changes in the way an industry does business.

**Growth Strategies.** Significantly expanding production capacity, entering new global markets, diversifying into new areas, or integrating related products or services can all be a springboard to strong company growth.

**Alliance Strategies.** Establishing new business linkages and alliances with customers, suppliers, former competitors, consultants, and others can create competitive advantage

### 3.9 History of the role of Information Systems



#### **Data Processing: 1950s - 1960's:**

Electronic data processing systems. Transaction processing, record keeping and traditional accounting applications.

#### **Management Reporting: 1960s - 1970's:**

Management Information systems. Management reports of pre-specified Information to support decision-making.

### **Decision Support: 1970s - 1980s:**

Decision Support systems. Interactive ad hoc support of the managerial decision-making process.

### **Strategic and End User Support: 1980s - 1990's:**

- End User computing systems. Direct computing support for end user productivity and work group collaboration.
- Executive information systems (EIS). Critical information for top management Expert systems: Knowledge-based expert advice for end users Strategic Information Systems. Strategic products and services for competitive advantage.
- Expert Systems (ES) and other Knowledge-Based Systems Role: Expert systems can serve as consultants to users by providing expert advice in limited subject areas.
- Strategic Information Systems (SIS)

Role: Information technology becomes an integral component of business processes, products, and services that help a company gain a competitive advantage in the global marketplace

### **Electronic Business and Commerce: 1990's - 2000's:**

Internet worked e-business and e-commerce Systems. Internet worked enterprise and global e-business operations and e-commerce on the Internet, intranets, extranets, and other networks.

### 3.9 Types of Information Systems

Information Systems can be classified by the type of the support they provide an organization. Therefore, several types of information systems can be classified conceptually as either:

- Operations Support Systems
- Management Support Systems

• **Operations support systems process data generated by and used in**

Business operations. They produce a variety of information products for internal and external use. Operations support systems do not emphasize producing the specific information products that can best be used by managers.

Further processing by management information systems is usually required. The role of a business firm's operations support systems is to:

1. Effectively process business transactions
2. Control industrial processes
3. Support enterprise communications and collaboration
4. Update corporate databases.

Focus on processing the data generated by business transactions and operations. Transaction processing systems record and process data resulting from business transactions (sales, purchases, inventory changes). TPS also produce a variety of information products for internal or external use (customer statements, employee paychecks, sales receipts etc.).

TPS process transactions in two basic ways:



**Batch Processing** - transactions data is accumulated over a period of time and processed periodically.

**Real-time (or on line) processing** - data is processed immediately after a transaction occurs.

**Process Control Systems (PCS)** - Process control systems are systems, which make use of computers to control ongoing physical processes. These computers are designed to automatically make decisions, which adjust the physical production process. Examples include petroleum refineries and the assembly lines of automated factories.

**Enterprise Collaboration Systems** - Enterprise collaboration systems are information systems that use a variety of information technologies to help people work together. Enterprise collaboration systems help us:

- Collaborate - to communicate ideas
- Share resources
- Co-ordinate our cooperative work effort as members of the many formal and informal process and project teams
- The goal of enterprise collaboration systems is to use information technology to enhance the productivity and creativity of teams and work groups in the modern business enterprise.
- ✓ Management support systems focus on providing information and support for effective decision making by managers. They support the decision-making needs of strategic (top) management, tactical (middle) management, and operating (supervisory) management. Conceptually, several major types of information systems support a variety of decision-making responsibilities
- Management Information Systems (MIS)
- ✓ Decision Support Systems (DSS)
- ✓ Executive Information Systems (EIS)

Management information systems are the most common form of management support systems. They provide managerial end users with information products that support much of their day-to-day decision-making needs.

MIS provide a variety of pre specified information (reports) and displays to management that can be used to help them make more effective, structured types of day-to-day decisions. Information products provided to managers include displays and reports that can be furnished:

- On demand
- Periodically, according to a predetermined schedule
- Whenever exceptional conditions occur

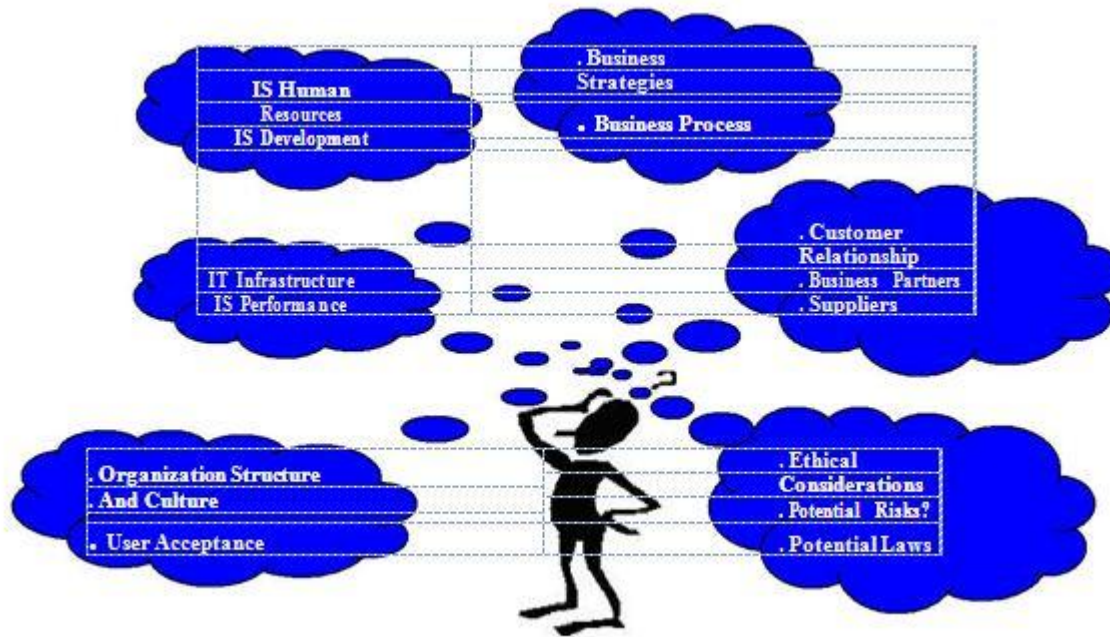
Decision support systems provide managerial end users with information in an interactive session on an ad hoc (as needed) basis. Managers generate the information they need for more unstructured types of decisions in an interactive, computer-based information system that uses decision models and specialized databases to assist the decision-making processes of managerial end users. Executive information systems provide top and middle management with immediate and easy access to selective information about key factors that are critical to accomplishing firm's strategic objectives. EIS are easy to operate and understand.

### **3.10 Other Classifications of Information Systems:**

Several other categories of information systems that support either operations or management applications include:

- Expert Systems
- Knowledge Management Systems
- Functional Business Information Systems
- Strategic Information Systems
- Cross-functional Information Systems

## Management Challenges of the Information Technology



For managerial end users, the information systems function represents:

- A major functional area of business that is important to a business' success
- An important factor affecting operational efficiency, employee productivity and morale, and customer service and satisfaction.
- A major source of information and support needed to promote effective decision making by managers.
- An important ingredient in developing competitive products and services that gives an organization a strategic advantage in the marketplace.
- A major part of the resources of an organization and its cost of doing business
- A vital, dynamic, and challenging career opportunity for many men and women.

Prospective managers and business professionals should become aware of the problems and

Opportunities presented by the use of information technology and learn how to effectively confront such managerial challenges.

Information systems can be mismanaged and misapplied so that they create both technological and business failure.

<b><i>Top Five Reasons for Success</i></b>	<b><i>Top Five Reasons for Failure</i></b>
User involvement	Lack of user input
Executive management support	Incomplete requirements and Specifications
Clear statement of requirements	Changing requirements and Specifications
Proper planning	Lack of executive support
Realistic expectations	Technological incompetence

### Developing IS Solutions: [Figure 1.20]



Developing successful information system solutions to business problems is a major challenge for business managers and professionals today. As a business professional, you will be responsible for proposing or developing new or improved use of information systems for your company. As a business manager, you will also frequently manage the development efforts of information systems specialists and other business end users.

Most computer-based information systems are conceived, designed, and implemented using some form of systematic development process. Figure 1.20 shows that:

- ❖ Several major activities must be accomplished and managed in a complete IS development cycle.
- ❖ In the development process, end users and information specialists design information system applications based on an analysis of the business requirements of an organization.
- ❖ Investigating the economic or technical feasibility of a proposed application.
- ❖ Acquiring and learning how to use the software required implementing the new system, and making improvements to maintain the business value of a system.

### **3.11 Challenges of Ethics and IT:**

As a prospective managerial end user and knowledge worker in a global society, you should also become aware of the ethical responsibilities generated by the use of information technology. For example:

- ❖ What uses of information technology might be considered improper, irresponsible, or harmful to other individuals or to society?
- ❖ What is the proper use of an organization's information resources?
- ❖ What does it take to be a responsible end user of information technology?
- ❖ How can you protect yourself from computer crime and other risks of information technology?

Ethical dimensions of information systems deal with ensuring that information technology and information systems are not used in an improper or irresponsible manner against other individuals or to society.

A major challenge for our global information society is to manage its information resources to benefit all members of society while at the same time meeting the strategic goals of organizations and nations. For example, we must use information systems to find more efficient, profitable and socially responsible ways of using the world's limited supplies of material, energy, and other resources.

### **3.12 Challenges of IT Careers:**

- Information technology and its uses in information systems have created interesting, highly paid, and challenging career opportunities.
- Employment opportunities in the field of information systems are excellent, as organizations continue to expand their use of information technology.
- Employment surveys continually forecast shortages of qualified information systems personnel in a variety of job categories.
- Job requirements in information systems are continually changing due to dynamic developments in business and information technology.

### **3.13 The IS Function:**

The information systems function represents:

- A major functional area of business that is as important to business success as the functions of accounting, finance, operations management, marketing, and human resource management.
- An important contributor to operational efficiency, employee productivity and morale, and customer service and satisfaction.

- A major source of information and support needed to promote effective decision making by managers and business professionals.
- A vital ingredient in developing competitive products and services that gives an organization a strategic advantage in the global marketplace.
- A dynamic, rewarding, and challenging career opportunity for millions of men and women.
- A key component of the resources, infrastructure, and capabilities of today's internet worked e-business enterprise.

### **3.14 IT Tools And Technologies For Managers:**

#### **3.14.1 Customer-Focused e-Business**

A key strategy by managers for becoming a successful e-business is to maximize customer value. This strategic focus on customer value recognizes that quality rather than price becomes the primary determinant in a customer's perception of value.

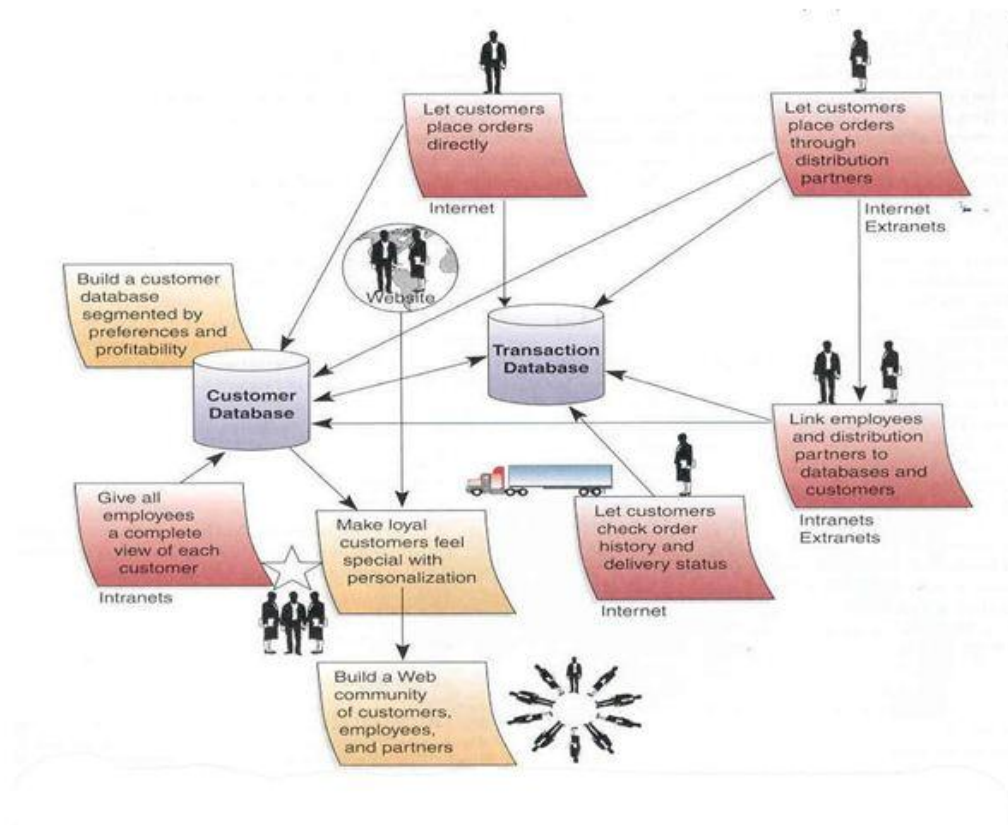
A Customer-Focused e-business, then, is one that uses Internet technologies to keep customer loyal by anticipating their future needs, responding to concerns, and providing top quality customer service.

Such technologies like intranets, the Internet, and extranet websites create new channels for interactive communications within a company, with customers, and with suppliers, business partners, and others in the external business environment. Thereby, encouraging cross-functional collaboration with customers in product development, marketing, delivery, service and technical support. A successful Customer-Focused e-business attempts to „own“ the customer's total business experience through such approaches as:

- Letting the customer place orders directly, and through distribution partners



- Building a customer database that captures customers' preferences and profitability, and allowing all employees access to a complete view of each customer.
- Letting customers check order, history and delivery status.
- Nurturing an online community of customers, employees, and business partners



For many companies, the chief business value of becoming a customer-focused e-business lies in its ability to help them:

- Keep customers loyal
- Anticipate customer's future needs
- Respond to customer concerns
- Provide top quality customer service



The concept of customer-focused e-business focuses on customer value. This strategy recognizes that quality, rather than prices, has become the primary determinant in a customer's perception of value. From a customer's point of view, companies that consistently offer the best value are able to:

- Keep track of their customers' individual preferences
- Keep up with market trends
- Supply products, services and information anytime and anywhere
- Provide customer services tailored to individual needs.

Increasingly, businesses are serving many of their customers and prospective customers via the Internet. This large and fast-growing group of customers wants and expects companies to communicate with them and service their needs at commerce websites. The Internet has become a strategic opportunity for companies large and small to offer fast, responsive, high-quality products and services tailored to individual customer preferences.

### 3.15 Reengineering Business Processes

	<b>Business Quality Improvement</b>	<b>Business Reengineering</b>
<b>Definition</b>	Incrementally Improving Existing Processes	Radically Redesigning Business Systems
<b>Target</b>	Any Processes	Strategic Business Processes
<b>Potential Payback</b>	1100%%--5500%% Improvements	1100--Fold Improvements
<b>Risk</b>	Low	High
<b>What Changes?</b>	Same Jobs --More Efficient	Big Job Cuts; New Jobs; Major Job Redesign
<b>Primary Enablers</b>	IT and Work Simplification	IT and Organizational Redesign

One of the most popular competitive strategies today is business process reengineering most often simply called re-engineering. Re engineering is the fundamental rethinking and radical redesign of business processes to achieve dramatic improvements in cost, quality, speed, and service. BPR combines a strategy

of promoting business innovation with a strategy of making major improvements to business processes so that a company can become a much stronger and more successful competitor in the marketplace. The potential payback of re-engineering is high, but also is its level of risk and disruption to the organizational environment.

### **3.15 The Role of Information Technology**

Information technology plays a major role in re-engineering business processes. The speed, information processing capabilities, and connectivity of computers and Internet technologies can substantially increase the efficiency of business processes, as well as communications and collaboration among the people responsible for their operation and management.

#### **3.15.1 Improving Business Quality**

No single approach to organizational change is appropriate for all circumstances. One important strategic thrust is continuous quality improvement, popularly called total quality management (TQM). Previous to TQM, quality was defined as meeting established standards or specifications for a product or service. Statistical quality control programs were used to measure and correct any deviations from standards.

#### **3.15.2 Total Quality Management:**

Quality is defined as meeting or exceeding the requirements and expectations of customers for a product or service. This may involve many features and attributes such as:

- Performance
- Reliability
- Durability

- Responsiveness
- Aesthetics
- Reputation

Total quality management uses a variety of tools and methods to seek continuous improvement of quality, productivity, flexibility, timeliness, and customer responsiveness. According to quality guru, Richard Schonberger, companies that use TQM are committed to:

- Even better, more appealing, less-variable quality of the product or service.
- Even quicker, less-variable response - from design and development through supplier and sales channels, offices, and plants all the way to the final user.
- Even greater flexibility in adjusting to customers' shifting volume and mix requirement.
- Even lower cost through quality improvement; rework reduction, and non-value-adding waste elimination.

### 3.15.3 Becoming an Agile Competitor

Agility in competitive performance is the ability of a business to prosper in rapidly changing, continually fragmenting global markets for high-quality, high-performance, customer-configured products and services. An agile company can:

- Make a profit in markets with broad product ranges and short model lifetimes.
- Process orders in arbitrary lot sizes.
- Offer individualized products while maintaining high volumes of production.

Agile companies depend heavily on information technology to:

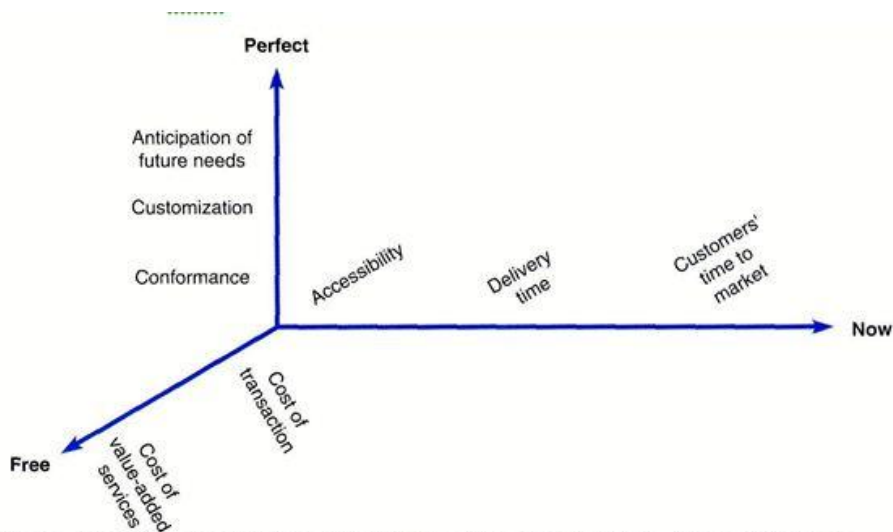
- Enrich its customers with customized solutions to their needs.

- Cooperate with other businesses to bring products to market as rapidly and cost-efficiently as possible.
- Combine the flexible, multiple organizational structures it uses.
- Leverage the competitive impact of its people and information resources.
- The Free.Perfect.Now model developed by AVNET Marshall embodies these principles into a succinct model for serving its customers in the most

### 3.15.4 Creating A Virtual Company

A virtual company (also called a virtual corporation or virtual organization) is an organization that uses information technology to link people, assets, and ideas. People and corporations are forming virtual companies as the best way to implement key business strategies that promise to ensure success in today's turbulent business climate.

Virtual Company Strategies:



Source: Adapted from Omar El Sawy, Arvind Malhotra, Sanjay Gosain, and Kerry Young, "IT Intensive Value Innovation in the Electronic Economy: Insights from Marshall Industries," *MIS Quarterly*, September 1999, p. 311. Reprinted with permission from the *MIS Quarterly*.

Several major reasons why people are forming virtual companies include:

- Share infrastructure and risk
- Link complementary core competencies
- Reduce concept-to-cash time through sharing
- Increase facilities and market coverage
- Gain access to new markets and share market or customer loyalty
- Migrate from selling products to selling solutions

### 3.16 Building The Knowledge-Creating Company

To many companies today, lasting competitive advantage can only be theirs if they become knowledge-creating companies or learning organizations. That means consistently creating new business knowledge, disseminating it widely throughout the company, and quickly building the new knowledge into their products and services.

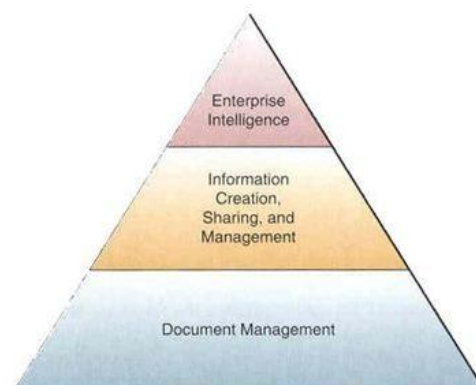
Knowledge-creating companies exploit two kinds of technology:

Explicit Knowledge - data, documents, things written down or stored on computers.

Tacit Knowledge – “how-tos” of knowledge, which reside in workers.

Successful knowledge management creates techniques, technologies, and rewards for getting employees to share what they know and to make better use of accumulated workplace knowledge.

Knowledge Management Systems: [Figure 2.16]



Knowledge management has become one of the major strategic uses of information technology. Many companies are building knowledge management systems (KMS) to manage organizational learning and business know-how. The goal of KMS is to help knowledge workers create, organize, and make available important business knowledge, wherever and whenever it's needed in an organization. This includes processes, procedures, patterns, reference works, formulas, "best practices," forecasts, and fixes. Internet and Intranet web sites, groupware, data mining, knowledge bases, discussion forums, and videoconferencing are some of the key information technologies for gathering, storing, and distributing this knowledge.

Characteristics of KMS:

- KMS are information systems that facilitate organizational learning and knowledge creation.
- KMS use a variety of information technologies to collect and edit information, assess its value, disseminate it within the organization, and apply it as knowledge to the processes of a business.
- KMS are sometimes called adaptive learning systems. That's because they create cycles of organizational learning called learning loops, where the creation, dissemination, and application of knowledge produces an adaptive learning process within a company.
- KMS can provide rapid feedback to knowledge workers, encourage behavior changes by employees, and significantly improve business performance.
- As an organizational learning process continues and its knowledge base expands, the knowledge-creating company integrates its knowledge into its business processes, products, and services. This makes it a highly innovative and agile provider of high quality products and customer services and a formidable competitor in the marketplace.

### **3.17 Enterprise Resource Planning**

Enterprise resource planning (ERP) is a cross-functional enterprise system that serves as a framework to integrate and automate many of the business Processes that must be accomplished within the manufacturing, logistics, distribution, accounting, finance, human resource functions of a business.

ERP software is a family of software modules that supports the business activities involved in these vital back office processes.

ERP is being recognized as a necessary ingredient for the efficiency, agility, and responsiveness to customers and suppliers that an e-business enterprise needs to succeed in the dynamic world of e-commerce.

Companies are finding major business value in installing ERP software in two major ways:

1. ERP creates a framework for integrating and improving their back-office systems that results in major improvements in customer service, production, and distribution efficiency.
2. ERP provides vital cross-functional business processes and supplier and customer information flows supported by ERO systems.

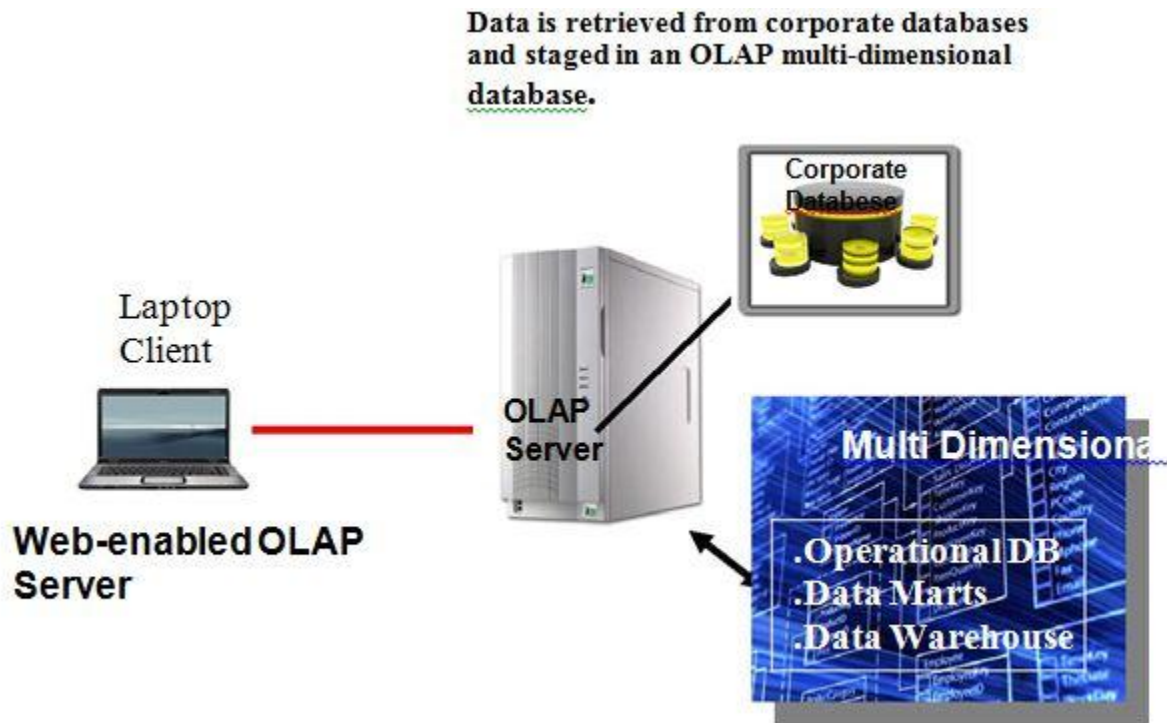
### **3.18 Online Analytical Processing**

Online Analytical Processing (OLAP) is a capability of management, decision support, and executive information systems that enables managers and analysts to interactively examine and manipulate large amounts of detailed and consolidated data from many perspectives. Basic analytical operations include:

**Consolidation.** This involves the aggregation of data. It can be simple rollups or complex groupings involving interrelated data. For example, sales offices can be rolled up to districts and districts rolled up to regions.

**Drill-Down.** OLAP can go in the reverse direction and automatically display detailed data that comprises consolidated data. For example, the sales by individual products or sales reps that make up a region's sales can be accessed easily.

**Slicing and Dicing.** This refers to the ability to look at the database from different viewpoints. For example, one slice of a database might show all sales of a product within regions. Another slice might show all sales by sales channel. By allowing rapid alternative perspectives, slicing and dicing allows a manager to isolate the information of interest for decision-making.



### 3.19 Intelligent Agents

An Intelligent Agent (IA) is a software surrogate that fulfils a stated need or activity. The IA uses built-in and learned knowledge about how an end user behaves or in answer to posed questions, to implement a software solution --such as the design of a presentation template or spreadsheet -- to solve a specific problem of interest to the end user. IAs can be grouped into two categories for business computing:

#### 3.19.1 User Interface Agents.



**Interface Tutors.** These observe computer operations, correct user mistakes, and provide hints and advice on efficient software use.

**Presentation Agents.** These show information in a variety of reporting and presentation forms and media based on user preferences.

**Network Navigation Agents.** These discover paths to information and provide ways to view information that are preferred by a user.

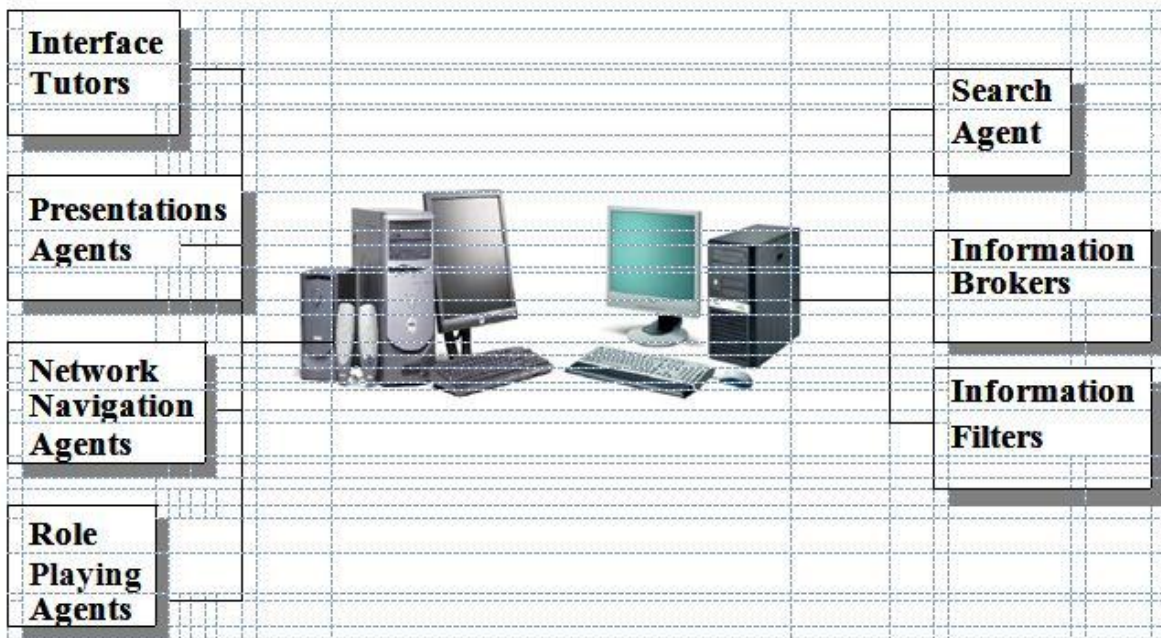
**Role-Playing Agents.** These play what-if games and other roles to help users understand Information and make better decisions.

### **3.19.2 Information Management Agents.**

**Search Agents.** These help users find files and databases, search for desired information, and suggest and find new types of information products, media, and resources.

**Information Brokers.** These provide commercial services to discover and develop information resources that fit the business or personal needs of a user.

**Information Filters.** These receive, find, filter, discard, save, forward, and notify users about products received or desired, including E-mail, voice mail, and all other information media.



### 3.19.3 Expert Systems

An Expert System (ES) is a knowledge-based information system that uses its knowledge about a specific, complex application area to act as an expert consultant to end-users. The components of an ES include:

**Knowledge Base.** A knowledge base contains knowledge needed to implement the task. There are two basic types of knowledge:

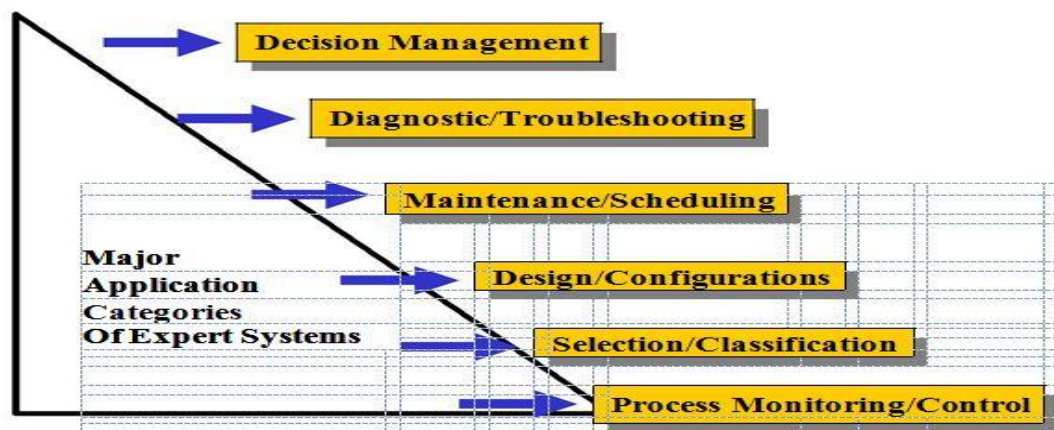
**Factual knowledge.** Facts, or descriptive information, about a specific subject area.

**Heuristics.** A rule of thumb for applying facts and/or making inferences, usually expressed as rules.

**Inference Engine.** An inference engine provides the ES with its reasoning capabilities. The inference engine processes the knowledge related to a specific problem. It then makes associations and inferences resulting in recommended courses of action.

**User Interface.** This is the means for user interactions. To create an expert system a knowledge engineer acquires the task knowledge from the human expert using knowledge acquisition tools. Using an expert system shell, which contains the user interface and inference engine software modules, the KE then encodes the knowledge into the knowledge base.

A reiterative approach is used to test and refine the expert system's knowledge base until it is deemed complete.



### Managing the IS function:

The IT organization structure has radically changed in the last few years. The shift towards decentralized IS teams and decentralized IS management, evident in the 1980's and 90's, has recently been replaced with a return to centralized control and management of IS resources.

This has resulted in the development of hybrid organization structures with both centralized and decentralized elements. Some companies have spun-off their IS organizations into subsidiaries or business units.

Others have relied on outsourcing IS functions to either application service providers or system integrators. Regardless of these organizational changes, the IS organization function still involves three major components:

- **Application Development Management.**

Involves managing activities such as systems analysis and design, project management, application programming and systems maintenance for all major e-business IT development projects.

- **IT Operations Management.**

Involves the management of hardware and software, network resources. Operational activities that must be managed include computer system operations, network management, production control, and production support.

Many of these management activities are automated. For example, system performance monitors monitor the processing of computer jobs and in some cases actually control operations at large data centers.

Most system performance monitors supply information needed by chargeback systems. These are systems that allocate costs to users based on the information services rendered.

- **Human Resource Management.**

Involves recruiting, training, and retaining qualified IS personnel. Such personnel may include managerial, technical, as well as clerical support staff.



# Chapter 4

## 4.1 Advantages of Information Technology In Business

The main advantage of implementing and improving information technology in a business is the increased efficiency that it brings. Businesses are built around all kinds of processes, and a lot of these processes are repetitive, slow, and boring for people to perform. Computers and systems can be designed and implemented to perform these processes based on strict business rules - processes such as service desk call logging, file archiving, or customer records management. These tasks could actually be done by people, but computers and systems can perform them more accurately (if designed well) and a lot faster than people could. This brings us nicely to the next advantage of information technology in business...

### 4.1.1 More Useful And Relevant Work For Employees

We humans are fantastic creatures. We have highly developed brains, capable of making complicated decisions and improving our standard of living. We shouldn't need to spend our time performing repetitive work that computers could do for us. Many automated tasks can and should be performed by information technology systems. All we would need to do is provide the input, the system would then do the processing, and provide an output. This would free up our time and allow us to perform more relevant work, such as building relationships in the business, making decisions, developing ideas, and providing service to customers - things that are hard for computer systems to do!

### **4.1.2 Better Decision Making For Management**

One of the most useful functions of and advantages of information technology is to store large amounts of data. Years and years of individual customer records, transactions, data movements and updates are stored all over company systems. This data can be used, aggregated, analysed and displayed in almost any format imaginable, to allow employees to make better decisions about their company. Data can show customer trends, financial analysis, system response times, profitable customers, anything that you have stored can be displayed in a suitable format. This allows employees - both analysts and management - to look at this data and make decisions on it to improve the company and provide a better service.

### **4.1.3 Improved Service To Customers**

Over the years, information technology in businesses has improved to a point where it has helped provide a better service to customers. This can be measured in many ways - decreased hold times for customers dialling in, more accurate information being provided to customers for their accounts, faster turnaround times for products and services, better management of information and how to apply it to a customer. All of these points can be attributed to the advantages of information technology in business.

I know I often make calls to my phone company/bank/insurance company or any other company that has incoming calls. Over the years, they have improved their systems to allow for better redirection of calls, call monitoring, account information and integration so they're able to solve my problem and answer my question quicker and easier than they could have in the past.

Of course, it's the employee who answers the questions and does the work, but it's the computer system that provides them with the information they need to do so.

Do you have any other points on the advantages of information technology in business? Post them in the area below! Stay tuned for the next post on some of the disadvantages of information technology in business.



# Chapter 5

## 5.1 The Effects of Information Technology on Education

### 5.1.1 Information technology is changing the face of education.

Information technology (IT) is the use of computers and software to create, store, manage and process information. IT helps businesses and organizations manage the flow of information and automate processes. Schools, universities and corporations are using IT to help students research topics, communicate with teachers, and collaborate on projects. IT helps educators to deliver courses, assess learning and communicate more easily.

### 5.1.2 Benefits

Students learn basic technical skills while using computers to research topics, write reports, get feedback from teachers and deliver their work electronically. E-learning, the delivery of courses via computer, allows schools to deliver classes to students who live off campus or who want to fit school around their work schedules. IT also helps corporations lower training costs and quickly deliver the latest information on product use to customers worldwide.

### **5.1.3 Considerations**

Education and training organizations considering using IT should plan for the cost of staff training, new IT infrastructure, software licensing, course ware, technical support and maintenance. Consider using an online or "cloud" IT service providers for infrastructure, software and support to control costs. Students considering online learning should think about losing some of the social aspect of classroom learning.

### **5.1.4 Drawbacks**

According to a study by the Kaiser Family Foundation, children ages eight to 18 already spend more than seven hours daily with digital media. Time spent online, combined with decreasing support for physical education in schools, are contributing factors to child obesity. In the case of K-12, Introducing more media time at school may negatively impact the development of social skills.

### **5.1.5 Potential**

A 12-year study by the U.S. Department of education shows that students often perform better with online learning than with traditional classroom education. Major universities like MIT are now putting much of their undergraduate course materials online for free. Online learning has the potential to offer anyone with an Internet connection access to an inexpensive education.

### **5.1.6 Trends**

Educational assessment is increasingly being automated to collect testing information continuously over a student's entire career in school. Expect more school districts to use automated assessment to track progress and create highly individualized study plans. As budgets become stretched, expect more states to follow Florida in allowing students to take their entire K-12 education online.



## 5.2 The Impact of Information Technology on Education in the 21st Century

What will education, especially higher education, be like in the 21st century? How will information technology impact the delivery of instruction in the next millennium?

The student population in higher education is changing. The dynamic state of technological development has made perpetual (or lifelong) learning a necessity. For this reason, more and more adults are returning to school to learn new skills or expand the skills they already have. This, according to John Chambers of CISCO Systems, will make "education the next big killer application over the Internet" (Friedman, 1999). Rodney L. Everhart, President of SCI Education Solutions and former President of LEXIS-NEXIS Information Services, agrees. He predicts that within the next 10 years, "the number of learning hours will double due to the growing number of adult learners" (Morrison, 1999).

According to a recent article in The New York Times, the increasing number of adults returning to school is the result of "demands on companies, in an intensely competitive global economy, to keep improving productivity." Everhart believes that this dramatic increase in the student population may force most educational institutions to deliver at least half of all instruction online. Offering traditional on-campus courses to a burgeoning student population would require doubling the number of campuses, classrooms, and professors. This would lead to excessive costs and a critical shortage of instructional personnel. Further Chambers insists that properly designed and implemented online courses "provide faster learning, at lower costs, with more accountability, thereby enabling both companies and schools to keep up with [rapid] changes in the global economy." Both Everhart and Chambers agree that educational institutions cannot ignore the move to online instruction if they hope to attract and keep students in the future.

However, in contrast to Chambers and Everhart, who both champion a widespread adoption of online course formats, Greg Bothun, a professor of Physics at the University of Oregon, disagrees (Bothun, 1999). He cautions that educational institutions must resist the temptation to "become more entrepreneurial in their

approach to education;" they must not succumb to issues of cost and gain. Bothun advises that in our zeal to adopt new online methods of instruction, we must remember that information and knowledge are not the same thing. Although Bothun agrees that the use of information technology in instruction does provide the context for inquiry-based and collaborative learning, he states that IT is only a tool. How we use IT in instruction will determine whether the result is improved learning that actively engages students in knowledge construction and builds the skills critical for their success in both academic and workforce environments, or a "course-in-the-box" approach whose primary goal is to deliver course material to large information-oriented classes.

Meeting the needs of a changing student population will require not only greater flexibility in the delivery format, but also greater attention to the design of courses. In particular the design of web-based courses must adhere to sound pedagogical principles. Issues such as sustainable content management, sound pedagogical strategies, and learner support should be foremost in the mind of designers of online courses. It is important to remember that information and knowledge are not the same thing. Although made possible by the hypermedia capabilities of the Internet, the use of more bandwidth intensive media does not necessarily promote a high level of instructional efficacy. Rather, strong, relevant content that is text-based appears to promote the highest instructional efficacy.

Media is useful in so far as it helps to enhance understanding of material, clarify concepts studied, and consolidate knowledge. Designers of web-based courses must remember that fancy media--complex graphics and animation--are no substitute for solid, concise content. Information technologies must be used that engage the learner with the media, and this engagement must occur in terms of stated learning objectives. Media should be used that allow the learner to interact with or self-discover underlying principles, models, and causal relationships that exist in the subject area under study.

Everhart predicts that in the future all classrooms will have multimedia delivery access available to allow students and instructors access to the Internet. This access will make it possible for the virtual and physical classrooms to mesh to create an alternative course format of "connected learning" that will combine the best of both

worlds. The changing modes of instructional delivery will demand that courses be designed to provide for greater student-student and student-teacher interactivity. As more and more courses move from the physical F2F classroom to the "connected" or virtual classroom, students will need to assume more responsibility for their own learning. They will need to become independent learners, able to think and figure things out for themselves.

Information technologies make it possible to tailor the content and delivery of instruction to the needs of individual students. The result is that individual differences in learning styles and preferences can be better accommodated. In the future, students will be able to choose the instructional format appropriate to their level of knowledge. They will have the option of taking F2F, mixed, or online courses based upon their level of knowledge in a given subject area. The traditional 12-15 week semester will likely become a thing of the past as colleges adjust their schedules to better fit those of a changing student population.

The technologies that will play a role in the classrooms of the future are many and varied. The Internet will not replace "traditional media," i.e., television, radio, film, and print. Rather Internet technologies will enhance and expand information gathered through other media. Moreover, in the future we will likely see the integration of each of these media in new and more powerful applications. Everhart predicts that as Internet 2 becomes more widely available, its greater bandwidth will facilitate videoconferencing and reduce its costs. However, he believes that since technologies like real time videoconferencing require instructors and students to be in a specific place at a specific time, they do not provide the flexibility that many students will demand.

For this reason, asynchronous technologies will likely form the backbone of many connected and virtual classrooms. Tools that allow for extended threaded discussion will be used more extensively to promote a high level of student-student and student-teacher interactivity. Collaborative learning, promoting the principles of constructivist theory will likely predominate in the higher education classroom of the future. Students will work together to construct knowledge. As the power of the Internet as an informational (re)source becomes more widely available, students will use its vast information databases to acquire and expand knowledge.

In the process, students will develop skills critical to lifelong learning--they will become knowledge gatherers, knowledge receivers, and knowledge transmitters.

Because effective use of the Internet as a source of information requires strong critical literacy skills, instructors in all disciplines will need to incorporate activities that target these skills. In this way, students will learn how to determine the validity and reliability of information they find on the Internet. Developing strong critical literacy skills will also help students evaluate information received through other media.

Reading hypertext, for example, helps students develop critical literacy and critical thinking skills. Internet hypertext has already made print a more valuable informational source. Hyperlinks provide students with immediate access to a variety of primary sources of information. Access to primary sources means that students do not need to rely on someone else's interpretation of the information. Having access to that information in its original form enables students to form their own interpretations and draw their own conclusions. As students read hypertext and follow each new link, they are taken to new and different texts. These texts may provide them with additional information and even more links to other new primary sources of information. While it is true that students need to be careful not to drown in this sea of information, it is also true that the variety of information available on the Internet exposes them to a multitude of perspectives, which they may then interpret and evaluate from their own point of view.

The Internet also offers an instructional environment in which assessment may be easily integrated into the learning process. Interactive "quizzes" can be designed that provide students' immediate feedback on the progress of their learning while they are engaged in the very process of that learning. Through Internet technology, the feedback generated by students' response choices can be designed to provide insight into not only how much the learner knows, but also the way in which s/he is conceptualizing the material. This makes assessment a much more powerful tool that can be used to improve, not just to evaluate the progress of learning.

Finally, to assure that Internet technology is used to its best educational advantage, teachers must be trained in the most effective ways to use it. They must learn how to transfer their courses to an online environment, in the process remaining faithful

to sound pedagogy and well thought out curricular goals. To do this teachers must be trained to use information technology. They must learn how to design activities for a web-based environment. They should learn how to construct educationally useful web pages. They should learn how to use hypermedia to promote educational goals. Like their students, the teachers of the 21st century will need to become lifelong learners to keep up with developing technology and its expanding uses in instruction.

### Comprehension Questions

Directions: Based on what you have read in the article, write an answer to each of the following questions. Be sure to use your own words in your answers.

1. Why are more adults returning to school to learn new skills?
2. Explain what John Chambers means when he calls education “the next big killer application over the Internet.”
3. What will be the result of the dramatic increase in the student population?
4. What would happen if schools decided to keep doing things in a traditional way?
5. According to Chambers, what benefits can well-designed online courses offer schools?
6. Chambers and Everhart both believe that it is necessary for schools to institute online courses. Explain why.
7. What potential danger does Greg Bothun see in online education?
8. Compare Bothun’s view of online education to the views of Chambers and Everhart.
9. Explain the statement, “In particular, the design of web-based courses must adhere to sound pedagogical principles.” What are the sound pedagogical principles that must be adhered to?

10. What types of materials and teaching methods seem to produce the best learning?
11. According to Everhart, what will the classrooms of the 21st century probably look like?
12. The article says that, “Information technologies make it possible to tailor the content and delivery of instruction to the needs of individual students.” Why is this so important? How does it help the teachers teach and the students learn?
13. Why will asynchronous technologies play such an important role in the 21st century classroom?
14. Based on what you have read in the article, explain the principles of the constructivist theory of education.
15. Explain the term “critical literacy” as it is defined in the article.
16. What is the advantage of having easy access to a wide range of “primary sources of information”?
17. How does the Internet make skills assessment more efficient and more reliable?
18. How must teachers change as a result of information technology and its impact on education?

## Conclusion

The role of information technology system was adopted to aid the achievement of the organizations strategic development goals. The introduction of a new business system to cover the major business areas in the organization greatly improved operational efficiency and profitability. Now, data is effortlessly accessible and reports can easily be generated thereby providing management with information to make long-term strategic plans and decisions.

The role of IT in the attainment of strategic goals has been an area of constant debate.

The characteristics of the management's role in IT development are not straightforward. They can be summarized in terms of a typology of behaviours; five distinct patterns are discernible. These patterns represent characteristic types which display markedly different levels of personal involvement. The behaviour patterns can be arranged in order of personal involvement, each subsequent pattern requiring increasing levels of time and effort expenditure, and technical expertise from the manager. The adoption of a particular behaviour pattern is thought to be largely dependent on organizational resource constraints, and hence indirectly on organizational size. However, personal characteristics, experience and predilections will also play a part in moulding the involvement level adopted. A typical pattern in the smaller firms shows the top manager to be closely involved in cycles of IT development and implementation. Recognition of the marked differences in top manager involvement patterns in IS has significant implications for the design of training and education intended for business, and for further research into business IT implementation.

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