BBM 220 COURSE READING MATERIALS

TECHNICAL FOUNDATION OF INFORMATION SYSTEMS

- Computer hardware
- Computer software
- Telecommunications
- Database design and management

INTRODUCTION

A computer Information System is a system composed of people and computers that processes or interprets information. The term is also sometimes used in more restricted senses to refer to only the software used to run a computerized database or to refer to only a computer system.

Information system is an academic study of systems with a specific reference to information and the complementary networks of hardware and software that people and organizations use to collect, filter, process, create and also distribute data.

Any specific information system aims to support operations, management and making. An information system is the information and communication technology that an organization uses, and also the way in which people interact with this technology in support of business processes.

The six components that must come together in order to produce an information system is:

1. **Hardware**: The term hardware refers to machinery. This category includes the computer itself, which is often referred to as the central processing unit , and all of its support equipments. Among the support equipments are input and output devices, storage devices and communications devices.
2. **Software**: The term software refers to computer programs and the manuals that support them. Computer programs are machine-readable instructions that direct the circuitry within the hardware parts of the system to function in ways that produce useful information from data. Programs are generally stored on some input / output medium, often a disk or tape.
3. **Data:** Data are facts that are used by programs to produce useful information.

Like programs, data are generally stored in machine-readable form on disk or tape until the computer needs them.

4. **Procedures**: Procedures are the policies that govern the operation of a computer system. "Procedures are to people what software is to hardware" is a common analogy that is used to illustrate the role of procedures in a system.
5. **People:** Every system needs people if it is to be useful. Often the most over-looked element of the system is the people, probably the component that most influence the success or failure of information systems. This includes "not only the users, but those who operate and service the computers, those who maintain the data, and those who support the network of computers."
6. **Feedback:** it is another component of the IS, that defines that an IS may be provided with a feedback

COMPUTER HARDWARE

Computer hardware is the collection of physical elements that constitutes a computer system. Computer hardware is the physical parts or components of a computer, such as the monitor, mouse, keyboard, computer data storage, hard disk drive , graphic cards, sound cards, memory, motherboard, and so on, all of which are physical objects that are tangible

Components

Case-The computer case is a plastic or metal enclosure that houses most of the components .

Power supply-A power supply unit converts alternating current (AC) electric power to low-voltage DC power for the internal components of the computer. Laptops are capable of running from a built-in battery, normally for a period of hours

Main board-The motherboard is the main component of a computer. It is a large rectangular board with integrated circuitry that connects the other parts of the computer including the CPU, the RAM, the disk drives as well as any peripherals connected via the ports or the expansion slots.

Expansion cards-An expansion card in computing is a printed circuit board that can be inserted into an expansion slot of a computer motherboard or backplane to add functionality to a computer system via the expansion bus. Expansions cards can be used to obtain or expand on features not offered by the motherboard.

Storage devices-Computer data storage, often called storage or memory, refers to computer components and recording media that retain digital data. Data storage is a core function and fundamental component of computers. The price of solid-state drives , which store data on flash memory, has dropped a lot in recent years, making them a better choice than ever to add to a computer to make booting up and accessing files faster

Input and output peripherals-Input devices allow the user to enter information into the system, or control its operation. Most personal computers have a mouse and keyboard, but laptop systems typically use a touchpad instead of a mouse. Other input devices include webcams, microphones, joysticks, and image scanners.

Output devices display information in a human readable form. Such devices could include printers, speakers, monitors or a Braille embosser.

COMPUTER SOFTWARE

Computer software or simply software is any set of instructions that directs a computer to perform specific operations. Computer software consists of computer programs, libraries and related non-executable data. Computer software is non-tangible, contrasted with computer hardware, which is the physical component of computers. Computer hardware and software require each other and neither can be realistically used without the other. There are two types of software

- System Software
- Application Software

System Software

The system software is collection of programs designed to operate, control, and extend the processing capabilities of the computer itself. System software is generally prepared by computer manufactures. These software products comprise of programs written in low-level languages which interact with the hardware at a very basic level. System software serves as the interface between hardware and the end users.

Some examples of system software are Operating System, Compilers, Interpreter, and Assemblers etc.

Features of system software are as follows:

- Close to system

- Fast in speed
- Difficult to design
- Difficult to understand
- Less interactive
- Smaller in size
- Difficult to manipulate
- Generally written in low-level language

Application Software

Application software products are designed to satisfy a particular need of a particular environment. All software applications prepared in the computer lab can come under the category of Application software.

Application software may consist of a single program, such as a Microsoft's notepad for writing and editing simple text. It may also consist of a collection of programs, often called a software package, which work together to accomplish a task, such as a spreadsheet package.

Examples of Application software are following:

- Payroll Software
- Student Record Software
- Inventory Management Software
- Income Tax Software
- Microsoft Office Suite Software
- Microsoft Word
- Microsoft Excel
- Microsoft PowerPoint

Features of application software are as follows:

- Close to user
- Easy to design
- More interactive
- Slow in speed

- Generally written in high-level language
- Easy to understand
- Easy to manipulate and use
- Bigger in size and requires large storage space

TELECOMMUNICATIONS

Telecommunication occurs when the exchange of information between two or more entities (communication) includes the use of technology. Communication technology uses channels to transmit information (as electrical signals), either over a physical medium (such as signal cables), or in the form of waves. The word is often used in its plural form, telecommunications, because it involves many different technologies.

History of telecommunication

The history of telecommunication began with the use of smoke signals and drums in Africa, the Americas and parts of Asia. In the 1790s, the first fixed semaphore systems emerged in Europe; however it was not until the 1830s that electrical telecommunication systems started to appear.

Timelines

Distance telecommunications-Visual, auditory and ancillary methods (non-electrical):

- Prehistoric: Fires, Beacons, Smoke signals, Communication drums, Horns
- 6th century BCE: Mail
- 5th century BCE: Pigeon post
- 4th century BCE: Hydraulic semaphores
- 15th century CE: Maritime flag semaphores
- 1672: First experimental acoustic (mechanical) telephone
- 1790: Semaphore lines (optical telegraphs)
- 1867: Signal lamps
- 1877: Acoustic phonograph

Basic electrical signals:

- 1838: Electrical telegraph. See: Telegraph history

- 1858: First trans-Atlantic telegraph cable
- 1876: Telephone. See: Invention of the telephone, History of the telephone, Timeline of the telephone
- 1880: Telephony via light beam photo phones

Advanced electrical and electronic signals:

- 1893: Wireless telegraphy
- 1896: Radio. See: History of radio.
- 1914: First North American transcontinental telephone calling
- 1927: Television. See: History of television
- 1927: First commercial radio-telephone service, U.K.–U.S.
- 1930: First experimental videophones
- 1934: First commercial radio-telephone service, U.S.–Japan
- 1936: World's first public videophone network
- 1946: Limited capacity Mobile Telephone Service for automobiles
- 1956: Transatlantic telephone cable
- 1962: Commercial telecommunications satellite
- 1964: Fiber optical telecommunications
- 1965: First North American public videophone network
- 1969: Computer networking
- 1973: First modern-era mobile (cellular) phone
- 1979: INMARSAT ship-to-shore satellite communications
- 1981: First mobile (cellular) phone network
- 1982: SMTP email
- 1983: Internet. See: History of Internet
- 1998: Mobile satellite hand-held phones
- 2003: VoIP Internet Telephony
- 2013: Google Glass

The Advantages of Telecommunication in a Business

1-Efficiency

The latest telecommunication devices combine a wide range of functionality on a single handset. Employees can use smart phones linked to a network to make conventional voice calls, send emails, visit websites, join a videoconference, access data, or work on documents. Using a single device improves efficiency and productivity, in addition to reducing equipment costs.

2-Collaboration

Telecommunication helps employees in different departments or separate locations work together more effectively. Employees can use networked telecommunication systems to send and receive emails, share documents, and collaborate via videoconference or teleconference. This can speed up decision-making and reduce the time to complete projects, such as new product development programs.

3-Time

Telecommunication systems reduce the time it takes to find information or contact colleagues. The latest telecommunication systems incorporate a feature called "presence," which enables callers to determine if the person they wish to contact is available via email, telephone, instant messaging, or another communication channel. Employees post their status on the telecommunication system with messages such as "free for calls," "busy," "away," or "do not disturb."

4-Customer Relationships

An efficient telecommunication system can strengthen customer relationships. By using call-center facilities such as call management, call routing, or interactive voice response, customer service teams can make it easier and more convenient for customers to contact a company. The contact center can then provide an efficient response for service requests, telephone orders, requests for information, or complaints. Agents in a call center can use quiet periods during shifts to make courtesy calls to customers to update them on new products or ask if they were satisfied with the service they received from the company.

5-Flexibility

Mobile telecommunication increases flexibility and choice for employees. If they wish to work from home or join meetings while they are away from the office, they can use smart phones to participate in video conferences or carry out work that requires secure access to a corporate database. Mobile telecommunication also reduces travelling costs, as employees no longer have to travel to meetings or visit the office to carry out computer-based tasks.

6-Reaching Multiple Parties

Telecommunications systems offer the advantage of bringing together or reaching multiple parties simultaneously. A user can send the same email to several different parties at one time, preventing the need to contact each party separately. The use of teleconferencing or videoconferencing in business can bring together members of an organization for a meeting who are scattered throughout a region, country or even the world; they don't need to be in the same physical location.

7-Speed

Telecommunications systems are of great benefit when speed is of the essence. The user can send a message or reach a party in seconds if necessary. In a business environment, this ensures managers have quick access to vital information they need to make rapid decisions that benefit the company. Salespeople who are away from the office can use a handheld device such as a Blackberry to obtain updated product specifications just prior to making a key presentation.

8-Cost Savings

Although telecommunications systems typically require a large upfront expenditure by an organization, they can offer significant cost savings in the long run. Sending messages or providing access to information on a computerized system reduces the need for paper, which can also reduce supply and storage costs. Teleconferencing reduces an organization's travel costs, as meeting participants do not need to fly to company headquarters and stay in a hotel, as is the case with face-to-face meetings.

9-Preventing Isolation

In addition to aiding employees working in remote locations, telecommunications systems can offer vital assistance to those who are isolated for other reasons. Disabled individuals with limited mobility or the elderly can use the Internet, email or

other electronic devices to stay in touch with family members and friends. They also have ready access to information and entertainment that makes them feel more connected to the rest of the world; it often prevents boredom or loneliness.

Disadvantages of Telecommunications

1-Separating Work and Home

- It's not difficult to fall into the trap of overworking yourself. If you work from home rather than a coffee shop or library, you may find yourself checking emails, working on projects or simply thinking about work well into your "off" time. It may also be difficult to define concrete work hours and avoid distractions at home. Family members or social interruptions may distract you, or you may be tempted to take care of chores and errands around the home, putting off your work until later.

2-Social Isolation

- When you telecommute, you get the freedom of less supervision. However, you also may become socially isolated. While some workers thrive on being able to work alone, you may not feel part of a professional community or miss the face-to-face interaction you get in a traditional office setting. Connect with other telecommuters to avoid isolation. If you're a freelancer, seek out forums, websites and blogs of others in your situation or utilize clients' resources to communicate with others in your industry.

3-Inadequate Work Environment

- When you work in an office, most of the setup is done for you because you're already in an office or cubicle. At home, it's up to you to create an efficient environment specifically for work. It needs to be well-equipped and suit your work needs. Arrange for sufficient Internet connectivity, offering bandwidth that adequately handles uploads and video streaming. Install a phone line for faxes and purchase equipment like a fax machine, copier or phone system if needed. If you transcribe or have call center duties, you also need job-specific equipment like a transcription pedal or digital calling software. Your employer may provide this to you, but if you're a freelancer, this may not be the case.

4-Staying Informed

- If you telecommute in an office where most other employees do not, your company may not have an adequate infrastructure and communication system to keep you abreast. You may not receive interoffice mail in a timely manner, for instance. Conference calls also present problems when poorly managed. Colleagues who aren't aware of call etiquette may speak over one another or forget to mute their phones to eliminate background noise. Ask your employer or client what infrastructure they have in place to assure proper communication.

DATA BASE MANAGEMENT

A database is a collection of information that is organized so that it can easily be accessed, managed, and updated. In one view, databases can be classified according to types of content: bibliographic, full-text, numeric, and images.

A database management system (DBMS) is system software for creating and managing databases. The DBMS provides users and programmers with a systematic way to create, retrieve, update and manage data.

Functions of a DBMS

So what does a DBMS really do? It organizes your files to give you more control over your data.

A DBMS makes it possible for users to create, edit and update data in database files. Once created, the DBMS makes it possible to store and retrieve data from those database files.

More specifically, a DBMS provides the following functions:

- Concurrency: concurrent access (meaning 'at the same time') to the same database by multiple users
- Security: security rules to determine access rights of users
- Backup and recovery: processes to back-up the data regularly and recover data if a problem occurs
- Integrity: database structure and rules improve the integrity of the data
- Data descriptions: a data dictionary provides a description of the data

Within an organization, the development of the database is typically controlled by database administrators (DBAs) and other specialists. This ensures the database structure is efficient and reliable.

Database administrators also control access and security aspects. For example, different people within an organization use databases in different ways. Some employees may simply want to view the data and perform basic analysis. Other employees are actively involved in adding data to the database or updating existing data. This means that the database administrator needs to set the user permissions. You don't want someone who only needs to view the database to accidentally delete parts of the database.

Pros of DBMS

There are a number of benefits to using a DBMS.

A DBMS provides automated methods to create, store and retrieve data. It may take some time to set up these methods, but once in place, a DBMS can make tedious manual tasks a thing of the past.

A DBMS reduces data redundancy and inconsistency. Have you ever had different versions of the same file on your computer hard drive? The same thing happens in organizations. A well-designed DBMS will eliminate redundancy.

A DBMS allows for concurrent access by multiple users, each with their own specific role. Some users only need to view the data, some contribute to adding new data, while others design and manage the database - all at the same time!

A DBMS increases security and reliability. Database administrators are responsible for creating backups of databases, controlling access and, in general, making sure it works the way it was intended. Having one or more specialists control these tasks is a lot more effective than having each computer user in an organization having to worry about the security of their data.

A DBMS improves data quality. It is easy to make mistakes when entering data. A DBMS makes it possible to set up rules for the database. For example, when entering the phone number of a customer you should not be entering text characters. A rule can be set up such that you cannot enter text in the phone number field. Or think of specifying the state where a customer resides. It is easier to select from a pre-defined list of states than to have to type in the name.

Skills Required of a Database Manager

- Ensuring staff know how to use the database

- Ensuring data is collected and managed in the database
- Understanding the business of the association

DECISION SUPPORT SYSTEM

Decision support system (**DSS**) is a computer-based information system that supports business or organizational decision-making activities. DSSs serve the management, operations, and planning levels of an organization (usually mid and higher management) and help people make decisions about problems that may be rapidly changing and not easily specified in advance - i.e. Unstructured and Semi-Structured decision problems. Decision support systems can be either fully computerized, human-powered or a combination of both.

While academics have perceived DSS as a tool to support decision making process, DSS users see DSS as a tool to facilitate organizational processes. Some authors have extended the definition of DSS to include any system that might support decision making. Sprague (1980) defines DSS by its characteristics:

1. DSS tends to be aimed at the less well structured, underspecified problem that upper level managers typically face;
2. DSS attempts to combine the use of models or analytic techniques with traditional data access and retrieval functions;
3. DSS specifically focuses on features which make them easy to use by non computer people in an interactive mode; and
4. DSS emphasizes flexibility and adaptability to accommodate changes in the environment and the decision making approach of the user.

DSSs include knowledge-based systems. A properly designed DSS is an interactive software-based system intended to help decision makers compile useful information from a combination of raw data, documents, and personal knowledge, or business models to identify and solve problems and make decisions.

Typical information that a decision support application might gather and present includes:

- inventories of information assets (including legacy and relational data sources, cubes, data warehouses, and data marts),
- comparative sales figures between one period and the next,
- projected revenue figures based on product sales assumptions.

History OF DSS

The concept of decision support has evolved from two main areas of research: The theoretical studies of organizational decision making done at the Carnegie Institute of Technology during the late 1950s and early 1960s, and the technical work on Technology in the 1960s. DSS became an area of research of its own in the middle of the 1970s, before gaining in intensity during the 1980s. In the middle and late 1980s, executive information systems (EIS), group decision support systems (GDSS), and organizational decision support systems (ODSS) evolved from the single user and model-oriented DSS.

According to Sol (1987) the definition and scope of DSS has been migrating over the years. In the 1970s DSS was described as "a computer-based system to aid decision making". In the late 1970s the DSS movement started focusing on "interactive computer-based systems which help decision-makers utilize data bases and models to solve ill-structured problems". In the 1980s DSS should provide systems "using suitable and available technology to improve effectiveness of managerial and professional activities", and towards the end of 1980s DSS faced a new challenge towards the design of intelligent workstations.

Components

Three fundamental components of a DSS architecture are:

1. the database (or knowledge base),
2. the model (i.e., the decision context and user criteria),
3. the user interface.- The users themselves are also important components of the architecture.

DSS components may be classified as:

1. **Inputs:** Factors, numbers, and characteristics to analyze
2. **User Knowledge and Expertise:** Inputs requiring manual analysis by the user
3. **Outputs:** Transformed data from which DSS "decisions" are generated
4. **Decisions:** Results generated by the DSS based on user criteria

Development frameworks

DSS systems are not entirely different from other systems and require a structured approach. Such a framework includes people, technology, and the development approach.

The Early Framework of Decision Support System consists of four phases:

Intelligence Searching for conditions that call for decision.

Design Developing and analyzing possible alternative actions of solution.

Choice Selecting a course of action among those.

Implementation Adopting the selected course of action in decision situation.

DSS technology levels (of hardware and software) may include:

1. The actual application that will be used by the user. This is the part of the application that allows the decision maker to make decisions in a particular problem area. The user can act upon that particular problem.
2. Generator contains Hardware/software environment that allows people to easily develop specific DSS applications. This level makes use of case tools or systems such as Crystal, Analytica and iThink.
3. Tools include lower level hardware/software. DSS generators including special languages, function libraries and linking modules

An iterative developmental approach allows for the DSS to be changed and redesigned at various intervals. Once the system is designed, it will need to be tested and revised where necessary for the desired outcome.

Classification

There are several ways to classify DSS applications. Not every DSS fits neatly into one of the categories, but may be a mix of two or more architectures.

Holsapple and Whinston classify DSS into the following six frameworks:

text-oriented DSS, database-oriented DSS, spreadsheet-oriented DSS, solver-oriented DSS, rule-oriented DSS, and compound DSS.A compound DSS is the most popular classification for a DSS. It is a hybrid system that includes two or more of the five basic structures described by Holsapple and Whinston.

The support given by DSS can be separated into three distinct, interrelated

categories: Personal Support, Group Support, and Organizational Support.

DSSs which perform selected cognitive decision-making functions and are based on artificial intelligence or intelligent agents technologies are called Intelligent Decision Support Systems (IDSS)[17]

The nascent field of Decision engineering treats the decision itself as an engineered object, and applies engineering principles such as Design and Quality assurance to an explicit representation of the elements that make up a decision.

Applications

As mentioned above, there are theoretical possibilities of building such systems in any knowledge domain.

One is the clinical decision support system for medical diagnosis. There are four stages in the evolution of clinical decision support system (CDSS). The primitive version is standalone which does not support integration. The second generation of CDSS supports integration with other medical systems. The third generation is standard-based while the fourth is service model-based.[18]

Other examples include a bank loan officer verifying the credit of a loan applicant or an engineering firm that has bids on several projects and wants to know if they can be competitive with their costs.

DSS is extensively used in business and management. Executive dashboard and other business performance software allow faster decision making, identification of negative trends, and better allocation of business resources. Due to DSS all the information from any organization is represented in the form of charts, graphs i.e. in a summarized way, which helps the management to take strategic decision. For example, one of the DSS applications is the management and development of complex anti-terrorism systems.

A growing area of DSS application, concepts, principles, and techniques is in agricultural production, marketing for sustainable development. For example, the DSSAT4package,[20][21] developed through financial support of USAID during the 80s and 90s, has allowed rapid assessment of several agricultural production systems around the world to facilitate decision-making at the farm and policy levels. There are, however, many constraints to the successful adoption on DSS in agriculture.[22]

DSS are also prevalent in forest management where the long planning horizon and the

spatial dimension of planning problems demands specific requirements. All aspects of Forest management, from log transportation, harvest scheduling to sustainability and ecosystem protection have been addressed by modern DSSs. In this context the consideration of single or multiple management objectives related to the provision of goods and services that traded or non-traded and often subject to resource constraints and decision problems. The Community of Practice of Forest Management Decision Support Systems provides a large repository on knowledge about the construction and use of forest Decision Support Systems.

Advantages of Decision Support Systems

1. **Time savings.** For all categories of decision support systems, research has demonstrated and substantiated reduced decision cycle time, increased employee productivity and more timely information for decision making. The time savings that have been documented from using computerized decision support are often substantial. Researchers, however, have not always demonstrated that decision quality remained the same or actually improved.
2. **Enhance effectiveness.** A second category of advantage that has been widely discussed and examined is improved decision making effectiveness and better decisions. Decision quality and decision making effectiveness are however hard to document and measure. Most researches have examined soft measures like perceived decision quality rather than objective measures. Advocates of building data warehouses identify the possibility of more and better analysis that can improve decision making.3.
3. **Improve interpersonal communication.** DSS can improve communication and collaboration among decision makers. In appropriate circumstances, communications- driven and group DSS have had this impact. Model-driven DSS provides a means for sharing facts and assumptions. Data-driven DSS make "one version of the truth" about company operations available to managers and hence can encourage fact-based decision making. Improved data accessibility is often a major motivation for building a data-driven DSS. This advantage has not been adequately demonstrated for most types of DSS.4.
4. **Competitive advantage.** Vendors frequently cite this advantage for business intelligence systems, performance management systems, and web-based DSS.

Although it is possible to gain a competitive advantage from computerized decision support, this is not a likely outcome. Vendors routinely sell the same product to competitors and even help with the installation. Organizations are most likely to gain this advantage from novel, high risk, enterprise-wide, inward facing decision support systems. Measuring this is and will continue to be difficult.5.

5. **Cost reduction.** Some researches and especially case studies have documented DSS cost saving from labor savings in making decisions and from lower infrastructure or technology costs. This is not always a goal of building DSS.6.

6. **Increase decision maker satisfaction.** The novelty of using computers has and may continue to confound analysis of this outcome. DSS may reduce frustrations of decision makers, create perceptions that better information is being used and/or creates perceptions that the individual is a "better" decision maker. Satisfaction is a complex measure and researchers often measure satisfaction with the DSS rather than satisfaction with using a DSS in decision making. Some studies have compared satisfaction with and without computerized decision aids. Those studies suggest the complexity and "love/ hate" tension of using computers for decision support.7.

7. **Promote learning.** Learning can occur as a by-product of initial and ongoing use of a DSS. Two types of learning seem to occur: learning of new concepts and the development of a better factual understanding of the business and decision making environment. Some DSS serve as "de facto" training tools for new employees. This potential advantage has not been adequately examined.

8. **Increase organizational control.** Data-driven DSS often make business transaction data available for performance monitoring and ad hoc querying. Such systems can enhance management understanding of business operations and managers perceive that this is useful. What is not always evident is the financial benefit from increasingly detailed data.

   Regulations like Sarbanes-Oxley often dictate reporting requirements and hence heavily influence the control information that is made available to managers. On a more ominous note, some DSS provide summary data about decisions made, usage of the systems, and recommendations of the system. Managers need to

be very careful about how decision-related information is collected and then used for organizational control purposes. If employees feel threatened or spied upon when using a DSS, the benefits of the DSS can be reduced. More research is needed on these questions.

Disadvantages of decision support system

Decision Support System can create advantages for organizations and can have positive benefits, however building and using Decision Support System can create negative outcomes in some situations.

1. Monetary cost. The decision support system requires investing in information system to collect data from many sources and analyze them to support the decision making. Some analysis for Decision Support System needs the advance of data analysis, statistics, econometrics and information system, so it is the high cost to hire the specialists to set up the system.

Overemphasize decision making. Clearly the focus of those of us interested in computerized decision support is on decisions and decision making. Implementing Decision Support System may reinforce the rational perspective and overemphasize decision processes and decision making. It is important to educate managers about the broader context of decision making and the social, political and emotional factors that impact organizational success. It is especially important to continue examining when and under what circumstances Decision Support System should be built and used. We must continue asking if the decision situation is appropriate for using any type of Decision Support System and if a specific Decision Support System is or remains appropriate to use for making or informing a specific decision.

(3) Assumption of relevance. According to Wino grad and Flores (1986), "Once a computer system has been installed it is difficult to avoid the assumption that the things it can deal with are the most relevant things for the manager's concern." The danger is that once Decision Support System become common in organizations, that managers will use them inappropriately. There is limited evidence that this occurs. Again training is the only way to avoid this potential problem.

(4) Transfer of power. Building Decision Support System, especially knowledge-driven

Decision Support System, may be perceived as transferring decision authority to a software program. This is more a concern with decision automation systems than with Decision Support System. We advocate building computerized decision support systems because we want to improve decision making while keeping a human decision maker in the "decision loop". In general, we value the "need for human discretion and innovation" in the decision making process.

(5) **Unanticipated effects.** Implementing decision support technologies may have unanticipated consequences. It is conceivable and it has been demonstrated that some Decision Support System reduce the skill needed to perform a decision task. Some Decision Support System overload decision makers with information and actually reduce decision making effectiveness. We are sure that other such unintended consequences have been documented. Nevertheless, most of the examples seem correctable, avoidable or subject to remedy if and when they occur.

(6) Obscuring responsibility. The computer does not make a "bad" decision, people do. Unfortunately some people may deflect personal responsibility to a Decision Support System. Managers need to be continually reminded that the computerized decision support system is an intermediary between the people who built the system and the people who use the system. The entire responsibility associated with making a decision using a Decision Support System resides with people who built and use the system.

(7) False belief in objectivity. Managers who use Decision Support System may or may not be more objective in their decision making. Computer software can encourage more rational action, but managers can also use decision support technologies to rationalize their actions. It is an overstatement to suggest that people using a Decision Support System are more objective and rational than managers who are not using computerized decision support.

(8) Status reduction. Some managers argue using a Decision Support System will diminish their status and force them to do clerical work. This perceptual problem can be a disadvantage of implementing a Decision Support System. Managers and IS staff who advocate building and using computerized decision support need to deal with any status issues that may arise. This perception may or should be less common now that

computer usage is common and accepted in organizations.

(9) Information overload. Too much information is a major problem for people and many Decision Support System increase the information load. Although this can be a problem, Decision Support System can help managers organize and use information. Decision Support System can actually reduce and manage the information load of a user. Decision Support System developers need to try to measure the information load created by the system and Decision Support System users need to monitor their perceptions of how much information they are receiving. The increasing ubiquity of handheld, wireless computing devices may exacerbate this problem and disadvantage.

EXECUTIVE INFORMATION SYSTEM

An **executive information system** (EIS), also known as an **executive support system (ESS)** , is a type of management information system that facilitates and supports senior executive information and decision-making needs. It provides easy access to internal and external information relevant to organizational goals. It is commonly considered a specialized form of decision support system (DSS).

EIS emphasizes graphical displays and easy-to-use user interfaces. They offer strong reporting and drill-down capabilities. In general, EIS are enterprise-wide DSS that help top-level executives analyze, compare, and highlight trends in important variables so that they can monitor performance and identify opportunities and problems. EIS and data warehousing technologies are converging in the marketplace.

In recent years, the term EIS has lost popularity in favor of business intelligence (with the sub areas of reporting, analytics, and digital dashboards).

History

Traditionally, executive information systems were mainframe computer-based programs. The purpose was to package a company's data and to provide sales performance or market research statistics for decision makers, such as , marketing directors, chief executive officer, who were not necessarily well acquainted with computers. The objective was to develop computer applications that highlighted

information to satisfy senior executives' needs. Typically, an EIS provides only data that supported executive level decisions, not all company data.

Today, the application of EIS is not only in typical corporate hierarchies, but also at lower corporate levels. As some client service companies adopt the latest enterprise information systems, employees can use their personal computers to get access to the company's data and identify information relevant to their decision making. This arrangement provides relevant information to upper and lower corporate levels.

Components

EIS components can typically be classified as:

- Hardware
- Software
- User interface
- Telecommunications

Hardware

When talking about computer hardware for an EIS environment, we should focus on the hardware that meet the executive's needs. The executive must be put first and the executive's needs must be defined before the hardware can be selected. The basic hardware needed for a typical EIS includes four components:

1. Input data-entry devices. These devices allow the executive to enter, verify, and update data immediately
2. The central processing unit (CPU), which is the important because it controls the other computer system components
3. Data storage files. The executive can use this part to save useful business information, and this part also help the executive to search historical business information easily
4. Output devices, which provide a visual or permanent record for the executive to save or read. This device refers to the visual output device such as monitor or printer

In addition, with the advent of local area networks (LAN), several EIS products for networked workstations became available. These systems require less support and less

expensive computer hardware. They also increase EIS information access to more company users.

Software

Choosing the appropriate software is vital to an effective EIS.[citation needed] Therefore, the software components and how they integrate the data into one system are important. A typical EIS includes four software components:

1. Text-handling software—documents are typically text-based
2. Database—heterogeneous databases on a range of vendor-specific and open computer platforms help executives access both internal and external data
3. Graphic base—graphics can turn volumes of text and statistics into visual information for executives. Typical graphic types are: time series charts, scatter diagrams, maps, motion graphics, sequence charts, and comparison-oriented graphs (i.e., bar charts)
4. Model base—EIS models contain routine and special statistical, financial, and other quantitative analysis

User interface

An EIS must be efficient to retrieve relevant data for decision makers, so the user interface is very important. Several types of interfaces can be available to the EIS structure, such as scheduled reports, questions/answers, menu driven, command language, natural language, and input/output.

Telecommunication

As decentralizing is becoming the current trend in companies, telecommunications will play a pivotal role in networked information systems. Transmitting data from one place to another has become crucial for establishing a reliable network. In addition, telecommunications within an EIS can accelerate the need for access to distributed data.

Applications

EIS helps executives find data according to user-defined criteria and promote information-based insight and understanding. Unlike a traditional management information system presentation, EIS can distinguish between vital and seldom-used data, and track different key critical activities for executives, both which are helpful in

evaluating if the company is meeting its corporate objectives. After realizing its advantages, people have applied EIS in many areas, especially, in manufacturing, marketing, and finance areas.

Manufacturing

Manufacturing is the transformation of raw materials into finished goods for sale, or intermediate processes involving the production or finishing of semi-manufactures. It is a large branch of industry and of secondary production. Manufacturing operational control focuses on day-to-day operations, and the central idea of this process is effectiveness and efficiency.

Marketing

In an organization, marketing executives' duty is managing available marketing resources to create a more effective future. For this, they need make judgments about risk and uncertainty of a project and its impact on the company in short term and long term. To assist marketing executives in making effective marketing decisions, an EIS can be applied. EIS provides sales forecasting, which can allow the market executive to compare sales forecast with past sales. EIS also offers an approach to product price, which is found in venture analysis. The market executive can evaluate pricing as related to competition along with the relationship of product quality with price charged. In summary, EIS software package enables marketing executives to manipulate the data by looking for trends, performing audits of the sales data, and calculating totals, averages, changes, variances, or ratios.

Financial

Financial analysis is one of the most important steps to companies today. Executives needs to use financial ratios and cash flow analysis to estimate the trends and make capital investment decisions. An EIS integrates planning or budgeting with control of performance reporting, and it can be extremely helpful to finance executives. EIS focuses on financial performance accountability, and recognizes the importance of cost standards and flexible budgeting in developing the quality of information provided for all executive levels.

Advantages of EIS

- Easy for upper-level executives to use, extensive computer experience is not required in operations

- Provides timely delivery of company summary information
- Information that is provided is better understood
- EIS provides timely delivery of information. Management can make decisions promptly.
- Improves tracking information
- Offers efficiency to decision makers

Disadvantages of EIS

- System dependent
- Limited functionality, by design
- Information overload for some managers
- Benefits hard to quantify
- High implementation costs
- System may become slow, large, and hard to manage
- Need good internal processes for data management
- May lead to less reliable and less secure data

EXPERT SYSTEM

Expert systems are computer programs that are derived from a branch of computer science research called *Artificial Intelligence* (AI). AI's scientific goal is to understand intelligence by building computer programs that exhibit intelligent behavior. It is concerned with the concepts and methods of symbolic inference, or reasoning, by a computer, and how the knowledge used to make those inferences will be represented inside the machine.

Of course, the term *intelligence* covers many cognitive skills, including the ability to solve problems, learn, and understand language; AI addresses all of those. But most progress to date in AI has been made in the area of problem solving – concepts and methods for building programs that *reason* about problems rather than calculate a solution.

AI programs that achieve expert-level competence in solving problems in task areas by bringing to bear a body of knowledge about specific tasks are called *knowledge-based* or *expert systems*. Often, the term expert systems is reserved for programs whose

knowledge base contains the knowledge used by human experts, in contrast to knowledge gathered from textbooks or non-experts. More often than not, the two terms, expert systems (ES) and knowledge-based systems (KBS), are used synonymously. Taken together, they represent the most widespread type of AI application. The area of human intellectual endeavor to be captured in an expert system is called the *task domain*. *Task* refers to some goal-oriented, problem-solving activity. *Domain* refers to the area within which the task is being performed. Typical tasks are diagnosis, planning, scheduling, configuration and design. An example of a task domain is aircraft crew scheduling,

Building an expert system is known as *knowledge engineering* and its practitioners are called *knowledge engineers*. The knowledge engineer must make sure that the computer has all the knowledge needed to solve a problem. The knowledge engineer must choose one or more forms in which to represent the required knowledge as symbol patterns in the memory of the computer – that is, he (or she) must choose a *knowledge representation*. He must also ensure that the computer can use the knowledge efficiently by selecting from a handful of *reasoning methods*. The practice of knowledge engineering is described later. We first describe the components of expert systems.

Components of an expert system

Every expert system consist of two principal parts

a) Knowledge base

b) Reasoning ir interface

APPLICATION OF EXPERT SYSTEM

1. Its application spread in a wide range i.e industrial and commercial problems
2. Diagnosis and troubleshooting of devices and systems and system of all kinds
3. Planning and scheduling
4. Configuration of manufactured objects
5. Financial decision making
6. Knowledge publishing
7. Process monitoring and control

Advantages

1. Consistent: it provides consistent answer for repetitive decisions, processes and

tasks

2. Maintains: holds and maintains levels of information
3. Clarity: it clarify the logic of decision making
4. No human need: it does not need human it works continuously
5. Multiuser: a multi user expert system can serve more users a time

Disadvantages

1. Sense: it lacks common sense needed in decision making
2. Creativeness: it cannot respond creatively like a human expert would in unusual circumstance
3. Errors: in knowledge base errors may occur and this leads wrong decisions
4. Environment: if knowledge base is changed it cannot adapt changing environments

OFFICE AUTOMATION

Office Automation Systems

Office automation systems (OAS) are configurations of networked computer hardware and software. A variety of office automation systems are now applied to business and communication functions that used to be performed manually or in multiple locations of a company, such as preparing written communications and strategic planning. In addition, functions that once required coordinating the expertise of outside specialists in typesetting, printing, or electronic recording can now be integrated into the everyday work of an organization, saving both time and money.

Types of functions integrated by office automation systems include (1) electronic publishing; (2) electronic communication; (3) electronic collaboration; (4) image processing; and (5) office management. At the heart of these systems is often a **local area network (LAN)** . The LAN allows users to transmit data, voice, mail, and images across the network to any destination, whether that destination is in the local office on the LAN, or in another country or continent, through a connecting network. An OAS makes office work more efficient and increases productivity.

Electronic Publishing

Electronic publishing systems include word processing and desktop publishing. Word processing software, (e.g., Microsoft Word, Corel Word-Perfect) allows users to create, edit, revise, store, and print documents such as letters, memos, reports, and manuscripts. Desktop publishing software (e.g., Adobe Pagemaker, Corel VENTURA, Microsoft Publisher) enables users to integrate text, images, photographs, and graphics to produce high-quality printable output. Desktop publishing software is used on a microcomputer with a mouse, scanner, and printer to create professional-looking publications. These may be newsletters, brochures, magazines, or books.

Electronic Communication

Electronic communication systems include electronic mail (e-mail), voice mail, facsimile (fax), and desktop videoconferencing.

Electronic Mail.

E-mail is software that allows users, via their computer keyboards, to create, send, and receive messages and files to or from anywhere in the world. Most e-mail systems let the user do other sophisticated tasks such as filter, prioritize, or file messages; forward copies of messages to other users; create and save drafts of messages; send "carbon copies"; and request automatic confirmation of the delivery of a message. E-mail is very popular because it is easy to use, offers fast delivery, and is inexpensive. Examples of e-mail software are Eudora, Lotus Notes, and Microsoft Outlook.

Voice Mail.

Voice mail is a sophisticated telephone answering machine. It digitizes incoming voice messages and stores them on disk. When the recipient is ready to listen, the message is converted from its digitized version back to audio, or sound. Recipients may save messages for future use, delete them, or forward them to other people.

Facsimile.

A facsimile or facsimile transmission machine (FAX) scans a document containing both text and graphics and sends it as electronic signals over ordinary telephone lines to a receiving fax machine. This receiving fax recreates the image on paper. A fax can also scan and send a document to a fax modem (circuit board) inside a remote computer. The fax can then be displayed on the computer screen and stored or printed out by the computer's printer.

Desktop Videoconferencing

Desktop videoconferencing is one of the fastest growing forms of videoconferencing. Desktop videoconferencing requires a network and a desktop computer with special application software (e.g., CUSeeMe) as well as a small camera installed on top of the monitor. Images of a computer user from the desktop computer are captured and sent across the network to the other computers and users that are participating in the conference. This type of videoconferencing simulates face-to-face meetings of individuals.

Electronic Collaboration

Electronic collaboration is made possible through electronic meeting and collaborative work systems and teleconferencing. Electronic meeting and collaborative work systems allow teams of coworkers to use networks of microcomputers to share information, update schedules and plans, and cooperate on projects regardless of geographic distance. Special software called **groupware** is needed to allow two or more people to edit or otherwise work on the same files simultaneously.

Teleconferencing is also known as videoconferencing. As was mentioned in the discussion of desktop videoconferencing earlier, this technology allows people in multiple locations to interact and work collaboratively using real-time sound and images. Full teleconferencing, as compared to the desktop version, requires special-purpose meeting rooms with cameras, video display monitors, and audio microphones and speakers.

Telecommuting and Collaborative Systems.

Telecommuters perform some or all of their work at home instead of traveling to an office each day, usually with the aid of office automation systems, including those that allow collaborative work or meetings. A microcomputer, a modem, software that allows the sending and receiving of work, and an ordinary telephone line are the tools that make this possible.

Telecommuting is gaining in popularity in part due to the continuing increase in population, which creates traffic congestion, promotes high energy consumption, and causes more air pollution. Telecommuting can help reduce these problems. Telecommuting can also take advantage of the skills of homebound people with

physical limitations.

Studies have found that telecommuting programs can boost employee morale and productivity among those who work from home. It is necessary to maintain a collaborative work environment, however, through the use of technology and general employee management practices, so that neither on-site employees nor telecommuters find their productivity is compromised by such arrangements. The technologies used in electronic communication and teleconferencing can be useful in maintaining a successful telecommuting program.

Image Processing

Image processing systems include electronic document management, presentation graphics, and multimedia systems. Imaging systems convert text, drawings, and photographs into digital form that can be stored in a computer system. This digital form can be manipulated, stored, printed, or sent via a modem to another computer. Imaging systems may use scanners, digital cameras, **video capture cards**, or advanced graphic computers. Companies use imaging systems for a variety of documents such as insurance forms, medical records, dental records, and mortgage applications.

Presentation graphics software uses graphics and data from other software tools to create and display presentations. The graphics include charts, bullet lists, text, sound, photos, animation, and video clips. Examples of such software are Microsoft Power Point, Lotus Freelance Graphics, and SPC Harvard Graphics.

Multimedia systems are technologies that integrate two or more types of media such as text, graphic, sound, voice, full-motion video, or animation into a computer-based application. Multimedia is used for electronic books and newspapers, video conferencing, imaging, presentations, and web sites.

Office Management

Office management systems include electronic office accessories, electronic scheduling, and task management. These systems provide an electronic means of organizing people, projects, and data. Business dates, appointments, notes, and client contact information can be created, edited, stored, and retrieved. Additionally, automatic reminders about crucial dates and appointments can be programmed. Projects and tasks can be allocated, subdivided, and planned. All of these actions can either be done individually or for an entire group. Computerized systems that automate these office

functions can dramatically increase productivity and improve communication within an organization.

Advantages

Automating processes reduces your involvement in mundane clerical tasks, such as organizing customer data or creating reports, and leaves you to concentrate on the parts of your business that you prefer. It allows a few employees to perform the tasks of many, such as when one machine automatically chooses, packs and labels products for shipping. Automation enables people with lower skill levels to perform higher-level tasks, such as when a clerk creates an attractive and compelling presentation by typing text into software templates that pull in third-party pictures, videos and music. Automating information systems reduces storage space, speeds retrieval and allows several employees to access the same data at the same time.

Disadvantages

Office automation can be expensive when you first invest in software and equipment. A professional office suite or a machine that scans, duplicates and binds documents, for example, can be quite expensive. Older or less-skilled employees who are used to manual methods might find it difficult to operate and adjust to automatic processes. This could require additional and time-consuming training. If the automated system does not function -- when power is interrupted, for example -- you might not be able to use manual methods to continue business. For instance, if your product catalog exists exclusively on your computer and the system goes down, you might be unable to take and process orders.

MANAGERIAL OVERVIEW OF INFORMATION SYSTEMS

INTRODUCTON TO INFORMATION SYSTEMS

An information system is any organized system for the collection, organization, storage and communication of information.

- ★ A computer Information System (IS) is a system composed of people and computers that processes or interprets information. The term is also sometimes used in more restricted senses to refer to only the software used to run a computerized database or to refer to only a computer system.
- ★ Information system is an academic study of systems with a specific reference to information and the complementary networks of hardware and software that people and organizations use to collect, filter, process, create and also distribute data. An emphasis is placed on an Information System having a definitive Boundary, Users, Processors, Stores, Inputs, Outputs and the aforementioned communication networks.

Overview

Silver et al. (1995) provided two views on IS that includes software, hardware, data, people, and procedures

The six components that must come together in order to produce an information system are:

Hardware:

The term hardware refers to machinery. This category includes the computer itself, which is often referred to as the central processing unit (CPU), and all of its support equipments. Among the support equipments are input and output devices, storage devices and communications devices.

Software:

The term software refers to computer programs and the manuals (if any) that support them. Computer programs are machine-readable instructions that direct the circuitry within the hardware parts of the system to function in ways that produce useful information from data. Programs are generally stored on some input / output medium,

often a disk or tape.

Data:

Data are facts that are used by programs to produce useful information. Like programs, data are generally stored in machine-readable form on disk or tape until the computer needs them.

Procedures: Procedures are the policies that govern the operation of a computer system. "Procedures are to people what software is to hardware" is a common analogy that is used to illustrate the role of procedures in a system.

People: Every system needs people if it is to be useful. Often the most over-looked element of the system are the people, probably the component that most influence the success or failure of information systems. This includes "not only the users, but those who operate and service the computers, those who maintain the data, and those who support the network of computers.

Feedback: it is another component of the IS, that defines that an IS may be provided with a feedback (Although this component isn't necessary to function).

Information system

Some examples of such systems are:

- ★ data warehouses
- ★ enterprise resource planning
- ★ enterprise systems
- ★ expert systems
- ★ search engines
- ★ geographic information system
- ★ global information system
- ★ office automation.

The basic components of computer based information system are:

Hardware- these are the devices like the monitor, processor, printer and keyboard, all of which work together to accept, process, show data and information.

Software- are the programs that allow the hardware to process the data.

Databases- are the gathering of associated files or tables containing related data.

Networks- are a connecting system that allows diverse computers to distribute resources.

Procedures- are the commands for combining the components above to process information and produce the preferred output.

Information system development

A computer based information system, following a definition of Langefors,[22] is a technologically implemented medium for:

- √ recording, storing, and disseminating linguistic expressions, as well as for drawing conclusions from such expressions.

System development is done in stages which include:

- ★ Problem recognition and specification
- ★ Information gathering
- ★ Requirements specification for the new system
- ★ System design
- ★ System construction
- ★ System implementation
- ★ Review and maintenance.

Information Systems for Managerial Decision-Making:

An Overview

The type of information required by decision makers in a company is directly related to:

>the level of management decision making

>the amount of structure in the decision situations managers face

The levels of management decision making that must be supported by information technology in a successful organization (independently of its size, shape, and participants)

i.Strategic management: As part of a strategic planning process top executives

develop overall organizational goals, strategies, policies, and

monitor the strategic performance of the organization and its overall direction in the political, economic, and competitive business environment

ii.Tactical management: Business unit managers and business professionals in self-directed teams

develop short- and medium-range plans, schedules, budgets and specify policies, procedures, and business objectives for their sub-units of the company, and

allocate resources and monitor the performance of their organizational sub-units, including departments, divisions, process teams, project teams, and other workgroups.

iii.Operational management: Operating managers and members of self-directed teams

develop short-range plans (e.g. weekly production schedules), and

direct the use of resources and the performance of tasks according to procedures and within budgets and schedules they establish for the teams and other workgroups of the organization.

Levels of Decision Making

Decision makers need information products whose characteristics, attributes or quality are having the three dimensions of time, content;

Decision maker at different levels of the organization are making more or less structured decisions. Typically there are three types of decision structure:

a. Unstructured decisions (usually related to the long-term strategy of the organization);

b. Semi-structured decisions (some decision procedures can be pre-specified but not enough to lead to a definite recommended decision);

c. Structured decisions (the procedure to follow, when a decision is needed, can be specified in advance).

There are three vital roles that information systems can perform for a business enterprise:

a) support of business processes and operations,

b) support of decision making by employees and managers, and

c) support of strategies for competitive .

Information Systems

Applications of Information Systems

The management classifications of information systems can be structured in four main groups of systems (O'Brien, the figure above, and chapter 10):

1.**Management Information Systems (MIS):** provide information in the form of reports and displays to managers and many business professionals that support their day-to-day decision-making needs. Usually the information has been specified in advance to adequately meet the expectations on operational and tactical levels of the organization, where the decision making situations are more structured and better defined.

2.**Decision Support Systems (DSS**) are computer-based information systems that provide interactive information support to managers and business professionals during the decision-making process. DSS use analytical models, specialized databases, a decision maker's own insights and judgments, and an interactive, computer-based modeling process to support semi-structured business decisions.

3.**Executive Information Systems (EIS) or Executive Support Systems (ESS)** are information systems that combine many of the futures of MIS and DSS. Here the information is presented in forms tailored to the preferences of the executives using the system, such as graphical user interface, customized to the executives graphics displays, exception reporting, trend analysis, and abilities to 'drill-down' and retrieve displays of related information quickly at lower levels of detail.

4.**Specialized Processing Systems (PS)** are information systems characterized as functional business systems, strategic information systems, knowledge management

systems, and expert systems.

BUSINESS INFORMATION SYSTEMS

Functional Information Systems

Functional Information System is based on the various business functions such as Production, Marketing, Finance and Personnel etc. These departments or functions are known as functional areas of business. Each functional area requires applications to perform all information processing related to the function. The popular functional areas of the business organization are:

(i) Financial Information System

(ii) Marketing Information System

(iii) Production/Marketing Information System

(iv) Human Resource Information System

Financial Information System

Financial management information system is:

Information system that tracks financial events and summarizes information

supports adequate management reporting, policy decisions, fiduciary responsibilities, and preparation of auditable financial statements

Should be designed with good relationships between software, hardware, personnel, procedures, controls and data

Generally, financial management information system refers to automating financial operations.

The Ideal FMIS Systems

An ideal or well-designed system should:

a. Collect accurate, timely, complete, reliable, consistent information

b. Provide adequate management reporting

c. Support government-wide and agency policy decisions

d. Support budget preparation and execution

e. Facilitate financial statement preparation

f. Provide information for central agency budgeting, analysis and government-wide reporting

g. Provide complete audit trail to facilitate audits.

The core of an FMIS could be expected to include the following modules and systems:

> General ledger

> Budgetary accounting

> Accounts payable

> Accounts receivable

Advantages of FMIS

There are many advantages of implementing an FMIS. A few of them are listed below:

1. Integrated financial information

2. Flexibility of reporting and additional control over expenditure

3. Less administration required within the business

Marketing Information System

Introduction

Marketing Information System (MkIS) as "a system that analyzes and assesses marketing information, gathered continuously from sources inside and outside an organization or a store."[1] Furthermore, "an overall Marketing Information System can be defined as a set structure of procedures and methods for the regular, planned collection, analysis and presentation of information for use in making marketing decisions.

A marketing information system, by contrast, is part of an ongoing data-gathering process involving initial data collection as well as routine and systematic data collection procedures. For example, a hotel manager may choose to collect data by means of a zip code analysis of guest registration information to determine the geographic profile of the guests of a hotel. This systematic and routine information gathering is not intended to address one specific question but is intend part of an overall system designed to monitor the degree of marketing success that the operation is able to achieve.[2]

Contrasting characteristics of MR and MkIS

Marketing Information System

1.Emphasis is on handling external information: It handles both internal and external data.

2.It is concerned with solving problems. It is concerned with preventing as well as soling problems.

3.It operates in a fragmented fashion – on a project-to-project basis.It operates continuously as a system.

4.It tends to focus on past information.It tends to be future oriented.

5.It is a source of input for marketing information system.It includes other subsystems besides marketing research.

Main Structure

According to Robert Harmon (2003), MkIS systems are composed on four components: (1) user interfaces, (2) applications software, (3) databases, and (4) systems support. The following is a description of each one of these components.

1. **User interfaces**. The essential element of the MkIS is the managers who will use the system and the interface they need to effectively analyze and use marketing information. The design of the system will depend on what type of decision managers need to make.

2. **Application software**. These are the programs that marketing decision makers use to collect, analyze, and manage data for the purpose of developing the information necessary for marketing decisions.

3. **Database marketing**. A marketing database is a system in which marketing data files are organized and stored.

4. **System support**. This component consists of system managers who manage and maintain the system assets including software and hardware network, monitor its activities and ensure compliance with organizational policies.

Advantages of Marketing information systems

1) Organized Data collection – Lots of data can be collected from the market. But the main word here is "Organized". Thus MIS helps you to organize your database thereby improving productivity.

2) A broad perspective – With a proper MIS in place, the complete organization can be tracked which can be used to analyze independent processes. This helps in establishing a broader perspective which helps us know which steps can be taken to facilitate improvement.

3) Storage of Important Data – Several times in pharmaceuticals, when one drug is being produced they may need data of another drug which was produced years back. Similarly in Media, photographs are stored in archives. This storage of important data plays a crucial role in execution and thus proves again that MIS is not important only for information but also for execution.

4) Avoidance of Crisis – The best way to analyse a stock (share market) is to see its past performance. Top websites like moneycontrol thrive on MIS. Similarly MIS helps

you keep tracks of margins and profits

5) Co-ordination – Consumer durables and FMCG companies have huge number of processes which needs to be co-ordinated. These companies depend completely on MIS for the proper running of the organization.

7) Analysis and Planning – MIS is critical for planning. You cannot do planning without information. For planning, the first thing which is needed is the organizations capabilities, then the business environment and finallycompetitor analysis.

8) Control – Just like MIS can help in a crisis, in normal times it provides control as you have information of the various processes going on and what is happening across the company. Thus it provides you with a sense of control.

Possible risks

Marketing Information should not be approached in an infrequent manner. If research is done this way, a firm could face these risks:

1. Opportunities may be missed.

2. There may be a lack of awareness of environmental changes and competitors' actions.

3. Data collection may be difficult to analyze over several time periods.

4. Marketing plans and decisions may not be properly reviewed.

5. Data collection may be disjointed.

6. Previous studies may not be stored in an easy to use format.

7. Time lags may result if a new study is required.

8. Actions may be reactionary rather than anticipatory. [10]

Important functions of the marketing process include the following:

i. The marketing identification function

ii. The purchase motivation function.

iii. The product adjustment function

iv. The physical distribution function

v. The communication function

vi. The transaction function

vii. The post-transaction function

Production /manufacturing Information System

Manufacturing or production information system provides information on production / operation activities of an organization and thus facilitates the decision-making process of production managers of an organization. The main decisions to be taken in manufacturing system are:

Human Resources Information System

A Human Resources Management System (HRMS) or Human Resources Information System (HRIS), refers to the systems and processes at the intersection between human resource management (HRM) and information technology.[1] It merges HRM as a discipline and, in particular, its basic HR activities and processes with the information technology field, whereas the programming of data processing systems evolved into standardized routines and packages of enterprise resource planning (ERP) software. On the whole, these ERP systems have their origin from software that integrates information from different applications into one universal database. The linkage of its financial and human resource modules through one database is the most important distinction to the individually- and proprietarily developed predecessors, which makes this software application both rigid and flexible.

Currently human resource management systems encompass:

> Payroll

>Time and attendance

>Performance appraisal

>Benefits administration

> HR management information system

> Recruiting/Learning management

> Performance record

> Employee self-service

>Scheduling

> Absence management

>Analytics

This functional information system supports the functions of human resource management of an organization. The human resource management function, in its narrow sense, it also known as personnel management .The function involves:

a. Manpower planning.

b. Staffing

c. Training and development

d. Performance evaluation, and

e. Separation activities

ETHICAL AND SOCIAL ISSUES IN INFORMATION SYSTEMS

INTRODUCTION

Technology can be a double-edged sword. It can be the source of many benefits but it can also create new opportunities for invading your privacy, and enabling the reckless use of that information in a variety of decisions about you.

Defination of terms

Understanding Ethical and Social Issues Related to Systems

Ethics

- Refers to the principles of right and wrong that individuals, acting as free moral agents, use to make choices to guide their behaviors.
- It's a branch of philosophy that involves systematic defending and recommending concepts of right and wrong.
- Set of principles of right and wrong.
- Study of general nature of moral and specific moral choices.

Ethical Issues

A problem or solution requiring a person or organization to choose alternatives that must be evaluated as right or wrong.

Social Issues

Issues that influence and is opposed by considerable number of individual within the society.

Information System

This is a system composed of people and computers that interpret and process raw data into meaningful information.

When using information systems, it is essential to ask, "What is the ethical and socially responsible course of acting?"

Ethical analysis:

A five-step process

1. Identify and clearly describe the facts
2. Define the conflict or dilemma and identify the higher-order values involved

3. Identify the stakeholders
4. Identify the options that you can reasonably take
5. Identify the potential consequences of your options

A Model for Thinking about Ethical, Social and Political Issues

Ethical, social, and political issues are closely linked. The ethical dilemma you may face as a manager of information systems typically is reflected in social and political debate.

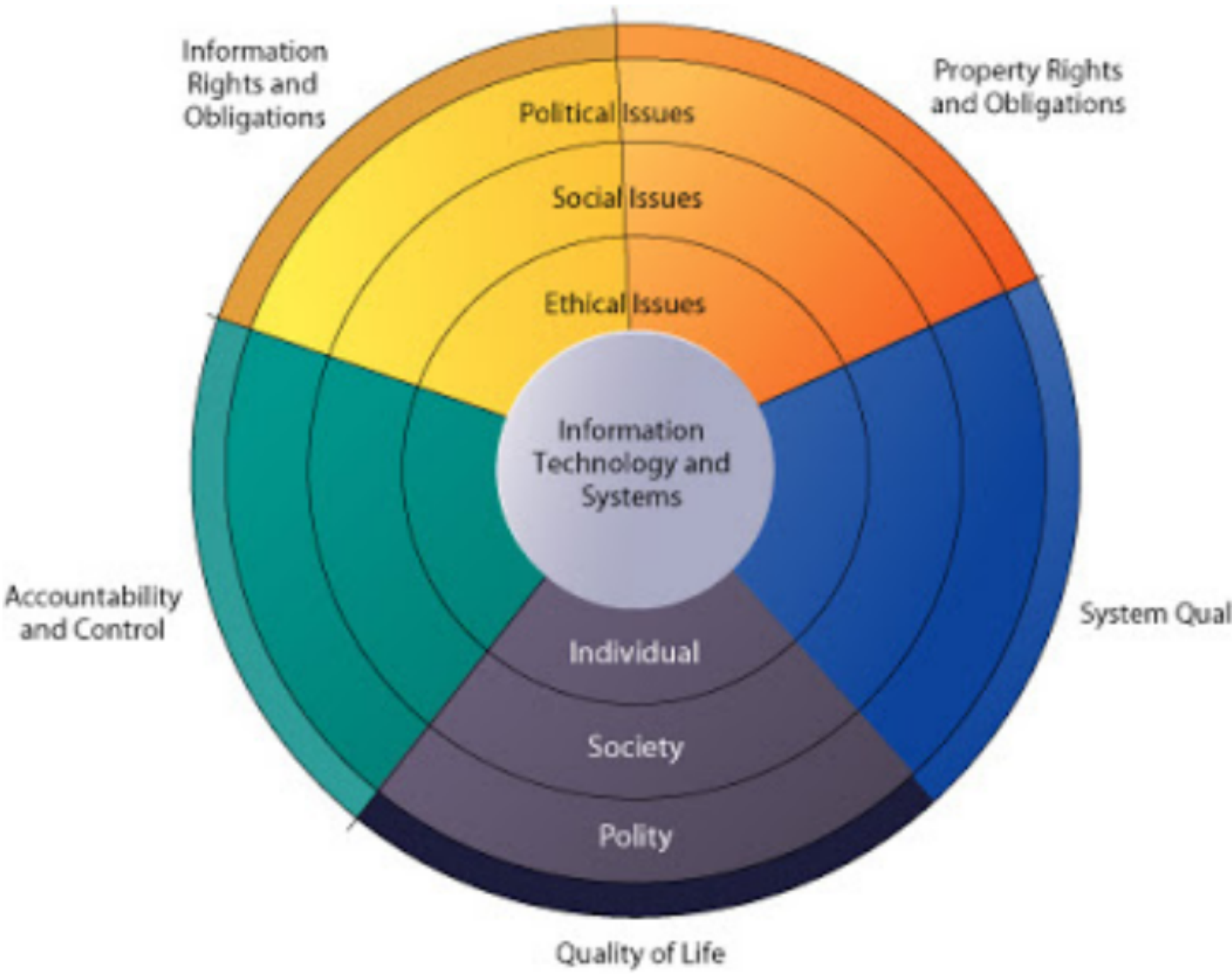


Fig. The Relationship Between Ethical, Social, and Political Issues In An Information Society

Five Moral Dimensions Of The Information Age

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

Information rights and obligations. What information rights do individuals and organizations possess with respect to themselves? What can they protect?

Property rights and obligations. How will traditional intellectual property rights be protected in a digital society in which tracing and accounting for ownership are difficult and ignoring such property rights is so easy?

Accountability and control. Who can and will be held accountable and liable for the harm done to individual and collective information and property rights?

System quality. What standards of data and system quality should we demand to protect individual rights and the safety of society?

Quality of Life. What values should be preserved in an information- and knowledge-based society?

GOLDEN ETHICAL PRINCIPLES IN MANAGEMENT INFORMATION SYSTE

These are the rules that should govern conduct and ethics of staff and management when using information systems platforms in organization.

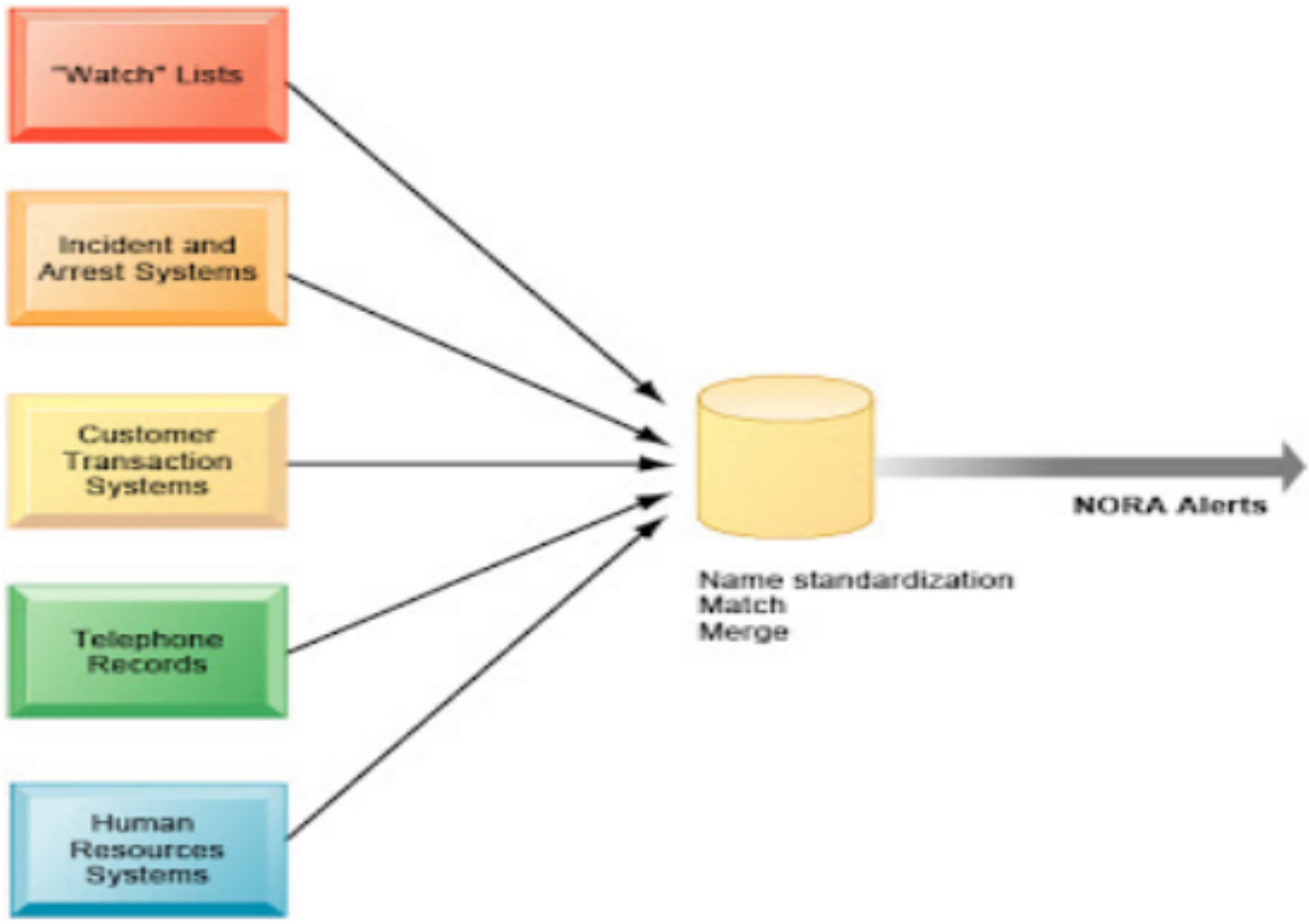
They are the :**Six Candidate Ethical Principles**

1. **Golden Rule**
   + Do unto others as you would have them do unto you
2. **Immanuel Kant's Categorical Imperative**
   + If an action is not right for everyone to take, it is not right for anyone
3. **Descartes' Rule of Change**
   + If an action cannot be taken repeatedly, it is not right to take at all
4. **Utilitarian Principle**
   + Take the action that achieves the higher or greater value
5. **Risk Aversion Principle**
   + Take the action that produces the least harm or least potential cost
6. **Ethical "no free lunch" Rule**
   + Assume that virtually all tangible and intangible objects are owned by someone unless there is a specific declaration otherwise

Key Technology Trends that Raise Ethical Issues

Profiling – the use of computers to combine data from multiple sources and create electronic dossiers of detailed information on individuals.

Non Obvious Relationship Awareness (NORA) – a more powerful profiling capabilities technology, can take information about people from many disparate sources, such as employment applications, telephone records, customer listings, and "wanted" lists, and correlated relationships to find obscure hidden connections that might help identify criminals or terrorists.



Nonobvious relationship awareness (NORA)

Ethics In An Information Society

Basic Concepts: Responsibility, Accountability, and Liability

Ethical choices are decisions made by individuals who are responsible for the consequences of their actions.

Responsibility is a key element and means that you accept the potential costs, duties, and obligations for the decisions you make.

Accountability is a feature of systems and social institutions and means mechanisms are in place to determine who took responsible action, and who is responsible.

Liability is a feature of political systems in which a body of laws is in place that permits individuals to recover the damages done to them by other actors, systems, or organizations.

Due process is a related feature of law-governed societies and is a process in which

laws are known and understood, and there is an ability to appeal to higher authorities to ensure that the laws are applied correctly.

The Moral Dimensions of Information Systems

Information Rights: Privacy And Freedom In The Internet Age

Privacy is the claim of individuals to be left alone, free from surveillance or interference from other individuals or organizations, including the state.

In most European countries, privacy protection is much more stringent than in the African countries. Unlike the African countries, European countries do not allow businesses to use personally identifiable information without consumers' prior consent. i.e

Informed consent- can be defined as consent given with knowledge of all the facts needed to make a rational decision.

Safe harbor is a private self-regulating policy and enforcement mechanism that meets the objectives of government regulators and legislation but does not involve government regulation or enforcement.

Internet Challenges to Privacy

This refers to unaccepted behavior that bridges the good conduct .

Internet technology has posed new challenges for the protection of individual privacy. Information sent over this vast network of networks may pass through many different computer systems before it reaches its final destination. Each of these systems is capable of monitoring, capturing, and storing communications that pass through it.

1. The Web server reads the user's Web browser and determines the operating system, browser name, version number, Internet address, and other information.
2. The server transmits a tiny text file with user identification information called a cookie, which the user's browser receives and stores on the user's computer hard drive.
3. When the user returns to the Web site, the server requests the contents of any cookie it deposited previously in the user's computer.
4. The Web server reads the cookie, identifies the visitor, and calls up data on the user.

Cookies -are small text files deposited on a computer hard drive when a user visits to the web sites.

Cookies identify the visitor's web browser software and track visits to the website.

Web beacons- also called web bugs, are tiny objects invisibly embedded in e-mail messages and Web pages that are designed to monitor the behavior of the user visiting a web site or sending e-mail.

Spyware can secretly install itself on an Internet user's computer by piggybacking on larger applications. Once installed, the spyware calls out to Web sites to send banner ads and other unsolicited material to the user, and it can also report the user's movements on the Internet to other computers.

Hacking which is getting into another information system without his/her knowledge for malicious purpose,this can cause very private information to be made public.

Cracking which is a form of misconduct where one decides to access unauthorized information for personal gain though it may not be intended for malicious gain.

Misinformation concerning relevant principles –information system has been badly used to spoil moral by uploading immoral pictures ,movies and music which is unethical.

PROPERTY RIGHTS

Intellectual Property

Intellectual property is considered to be intangible property created by individuals or corporations. Information technology has made it difficult to protect intellectual property because computerized information can be so easily copied or distributed on networks. Intellectual property is subject to a variety of protections under three different legal traditions: trade secrets, copyright, and patent law.

- **Challenges to intellectual property rights**
  - **Digital media different from physical media (e.g. books)**
    - Ease of replication
    - Ease of transmission (networks, Internet)
    - Difficulty in classifying software
    - Compactness
    - Difficulties in establishing uniqueness

Trade Secrets

Any intellectual work product – a formula, device, pattern, or compilation of data-used for a business purpose can be classified as a trade secret, provided it is not based on information in the public domain.

Copyright

Copyright is a statutory grant that protects creators of intellectual property from having their work copied by others for any purpose during the life of the author plus an additional 70 years after the author's death. This makes it illegal to circumvent technology-based protections of copyrighted materials

Patents

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

COMPUTER ABUSE AND CRIME

New technologies, including computers, create new opportunities for committing crimes by creating new valuable items to steal, new way to steal them, and new ways to harm others.

Computer crime- Is the commission illegal acts through the use of a computer or against a computer system. Simply accessing a computer system without authorization or with intent to do harm, even by accident, is now a federal crime.

Computer abuse- is the commission of acts involving a computer that may not illegal but that are considered unethical.

The popularity of the Internet and e-mail has turned one form of computer abuse ; spamming – into a serious problem for both individuals and businesses.

Spam -is junk e-mail sent by an organization or individual to a mass audience of Internet users who have expressed no interest in the product or service being marketed.

ADVANTAGES OF MANAGEMENT INFORMATION SYSTEM

It enhances research as required information is found at relevant sites and can be retrieved easily.

Makes marketing work easier as people get information at the right time and using the right channel thus a wide market is reached.

It's a source of power as people get knowledge of what is happening thus becoming armed with right information.

DISADVANTAGES OF MANAGEMENT INFORMATION SYSTEM

Employment:

Trickle-Down Technology and Reengineering Job Loss

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

Equity and Access: Increasing Racial and Social Class Cleavages

Several studies have found that certain ethnic and income groups in the technology era are less likely to have computers or online Internet access even though computer ownership and Internet access have soared in the past five years.

A similar digital divide exists in schools, with schools in high-poverty areas less likely to have computers, high-quality educational technology programs, or internet access availability for their students. Public interest groups want to narrow this digital divide by making digital information services – including the Internet – available to virtually everyone, just as basic telephone service is now.

Health Risks: RSI, CVS, and Techno stress

The most common occupational diseases today are:

Repetitive Stress Injury (RSI)- RSI occurs when muscle groups are forced through repetitive actions often with high-impact loads (such as tennis) or tens of thousands of repetitions under low-impact loads (such as working at a computer keyboard).The single largest source of RSI is computer keyboards.

The most common kind of computer-related RSI is carpal tunnel syndrome (CTS), in which pressure on the median nerve through the wrist's bony structure, called a carpal tunnel, produces pain. Millions of workers have been diagnosed with carpal tunnel syndrome.

Computer vision syndrome (CVS)- refers to any eyestrain condition related to display screen use in desktop computers, laptops, e-readers, smart-phones, and hand-held video games. Its symptoms, which are usually temporary, include headaches, blurred vision, and dry and irritated eyes.

Techno stress- which is stress induced by computer use. Its symptoms include aggravation, hostility toward humans, impatience, and fatigue. Techno stress is thought to be related to high levels of job turnover in the computer industry, high levels of early

retirement from computer-intense occupations, and elevated levels of drug and alcohol abuse.

Quality of Life: Equity, Access, and Boundaries

Balancing Power: Center Versus Periphery

Lower level employees may be empowered to make minor decisions but the key policy decisions may be as centralized as in the past.

Rapidity of Change: Reduced Response Time to Competition

Information systems have helped to create much more efficient national and international market. The now-more-efficient global marketplace has reduced the normal social buffers that permitted businesses many years to adjust to competition. We stand the risk of developing a "just-in-time society" with "just-in-time jobs" and "just-in-time" workplaces, families, and vacations.

Maintaining Boundaries: Family, Work, and Leisure

The danger to ubiquitous computing, telecommuting, nomad computing, and the "do anything anywhere" computing environment is that it is actually coming true. The traditional boundaries that separate work from family and just plain leisure have been weakened. The work umbrella now extends far beyond the eight-hour day.

Dependence and Vulnerability

Today our businesses, governments, schools, and private associations, such as churches are incredibly dependent on information systems and are, therefore, highly vulnerable if these systems fail. The absence of standards and the criticality of some system applications will probably call forth demands for national standards and perhaps regulatory oversight.