Introduction

By the mid-1960s, many users and builders of information processing systems developed a more comprehensive vision of what computers could do for organizations. This vision was termed as Management Information System (MIS). It enlarged the scope of data processing to add systems for supporting management and administrative activities including planning, scheduling, analysis and decision making.

Before one can explain management information systems, the terms *Systems*, *Data, Information, Knowledge, Wisdom,* **and** *Management* must briefly be defined:

A system is a group of interrelated components working together toward a common goal by accepting inputs and producing outputs in an organized transformation process.

The organization is also a system of people where people are selected on the basis of number, quality and ability and are placed in hierarchical order plan and execute the business activities to achieve certain goals and objectives.

- **Input**: involves capturing and assembling elements that enter the system to be processed. For example, raw materials, energy, data, and human efforts must be secured and organized for processing.

- **Processing**: involves transformation process that converts input into output. Examples are a manufacturing process, or mathematical calculations.

- **Output:** involves transferring elements that have been produced by a transformation process to their ultimate destination. For example, finished products, human

services, and management information must be transmitted to their human users.

A system with feedback and control components is sometimes called a cybernetic system, that is, a self-monitoring, self-regulating system

- □ **Feedback** is data about the performance of a system. For example, data about sales performance is feedback to a sales manager.

- • **Control** involves monitoring and evaluating feedback to determine whether a system is moving toward the achievement of its goal

For example, a sales manager exercises control when he or she reassigns salespersons to new sales territories after evaluating feedback about their sales performance

DIKW Hierarchy

DIKW refers to data, information, knowledge and wisdom; it is an information hierarchy where each layer adds certain attributes over and above the previous one. Data is the most basic level; Information adds context; Knowledge adds how to use it; and wisdom adds when to use it.

Data item refer to an elementary description of things, events, activities, and transactions that are recorded, classified, and stored, but not organized to convey any specific meeting A single piece of data is called a datum Managers have to put in place procedures and tools to ensure data are recorded

Information is data that have been organized so that they have meaning and value to the recipient Data items typically are processed into information by means of an application

Knowledge consists of data and/or information that have been organized and processed to convey understanding, experience, accumulated learning, and expertise as they apply to a current problem or activity

Wisdom الحكمه the process by which we also discern, or judge, between right and wrong, good and bad. Many scientists believe that computers do not have, and will never have the ability to posses' wisdom.

Management is the process of allocating an organization's inputs, including human and resources, by planning, organizing, directing, and controlling for the purpose of producing goods or services desired by customers so that organizational objectives are accomplished.

A management information system (MIS) is a system or process that provides the information necessary to manage an organization effectively. It is used by managers throughout the organization to help them in directing, planning, coordinating, communicating, and decision-making.

An institution's MIS should be designed to achieve the following goals:

♦ Enhance communication among employees.

♦ Deliver complex material throughout the institution.

♦ Provide an objective system for recording and aggregating information.

♦ Reduce expenses related to labor-intensive manual activities.

♦ Support the organization's strategic goals and direction.

Principles of Management

Division of Work: Division of work or work specialization results in efficient use of resources and increases productivity

Authority and Responsibility: Authority means right to give order or command

Discipline: الانضباط. Discipline means following rules, regulations, policies and procedures by all employees of organization

Unity of Command: An employee should receive orders from one supervisor only to avoid possible confusion and conflict

Subordination of Individual Interest to General Interest: The interests of one employee or group should not be given importance over the interests and goals of organization

Remuneration: مكافأهCompensation and the methods of compensation should be fair to both the employee and the employer

Centralization: The centralization of authority and power to some extent is necessary

Stability of Personnel Tenure: Stability of tenure of personnel in the organization increases the efficiency of the employees and is a symbol of sound management

Initiative: Managers should encourage and develop the subordinates to take initiative. It is the result of creative

thinking and imagination and helps in formulating, planning also its execution.

Impact تأثير of MIS

1. **Ability to link and enable employees**

2. **Increases boundary spanning**

3. **Ability to store and retrieve information at any instance**

4-Helps in forecasting and long term planning

Functions of Manager

1. **Planning التخطيط** is the process of determining the goals and objectives and strategies for achieving goals of the organization

2. **Organizing التنظيم** means deciding what work needs to be done, assigning the tasks, and arranging them into a decision-making framework. Organization involves evolving the structure of the people working in the organization and their roles. Also organizing involves determining activities required to achieve the established objectives, grouping these activities in a logical basis for handling by persons, managers and, finally assigning persons to the job designed

3. **Staffing التوظيف** The primary purposes of staffing are to find, hire, train, develop, reward and retain the required amount of good people, helping them meet their needs while they help the company meet its goal.

4. **Directing التوجيه** is influencing people's behavior through motivation التحفيز, communication, group dynamics, leadership and disciples.

5. **Controlling السيطره** is the management function, in which managers set and communicate performance standards for people, processes, and devices.

Coordinating التنسيق This function brings a harmony الانسجام and smoothness in the various group activities and individual efforts directed towards goals .
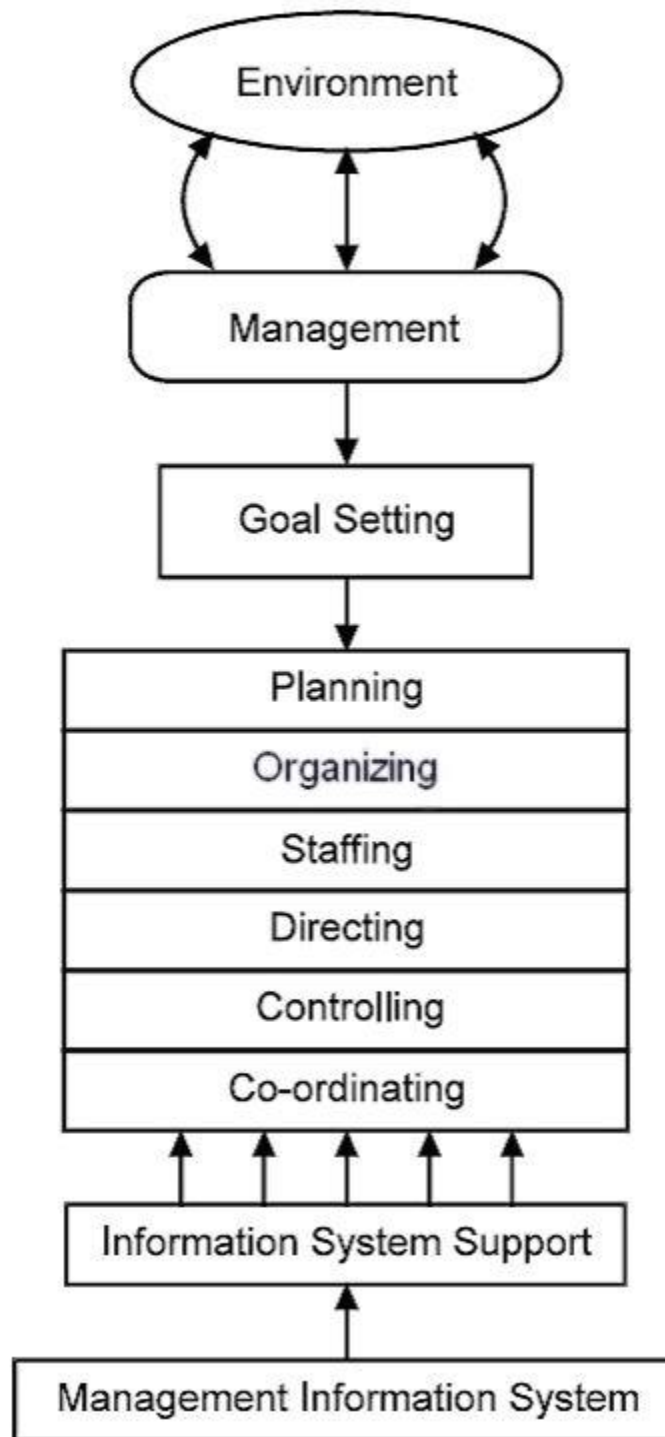
Functions of maneger

Organization Structure and Theory

An organization is the rational coordination of the activities of a number of people for the achievement of some common explicit purpose or goal, through division of labor or function, and through a hierarchy of authority and responsibility.

The organization structure is built on four basic principles:

♦ Hierarchy of authority.	التسلسل الهرمي للسلطة
♦ Specialization.	التخصص
♦ Standardization (or formulation).	المعيارية
♦ Centralization.	المركزية

An organization's structure may be of many types, the most common of these being:

• The hierarchical organizational structure
• The flat organizational structure.

A hierarchical organizational structure is what we call the traditional structure or at times, the bureaucratic structure الهيكل البيروقراطيwhere there are one or more levels between the most junior صغارand the senior كبارmost employees .
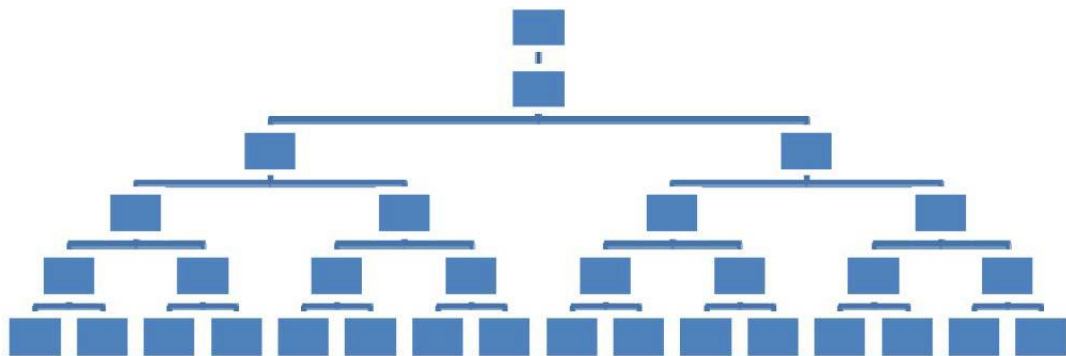
Flat organization refers to an organizational structure with few or no levels of intervening management between staff and managers. It is much more relaxed and so-called modern in approach where everyone directly reports to a single boss.

This structure is generally possible only in smaller organizations or individual units within larger organizations.
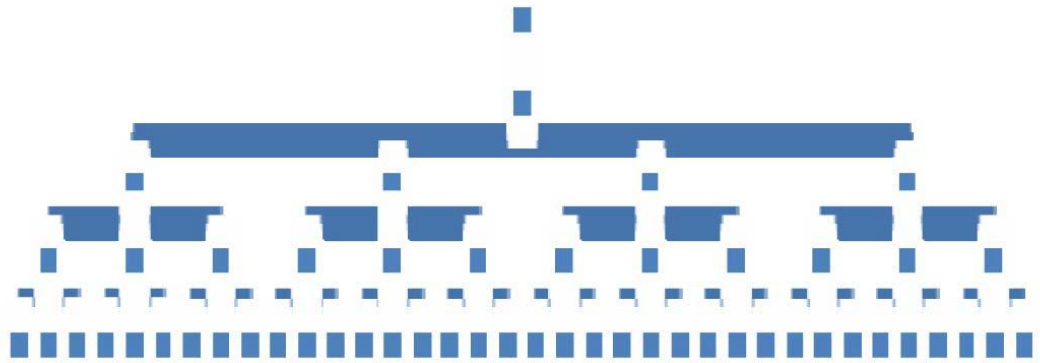
Information Systems

From a **functional perspective**; an information system is a technologically implemented medium for the purpose of recording, storing, and disseminating linguistic expressions as well as for the supporting of inference making. From a **structural perspective**; an information system consists of a collection of people, processes, data, models, technology and partly formalized language, forming a cohesive structure which serves some organizational purpose or function. *technically* as a set of interrelated components that collect (or retrieve), process, store, and distribute information to support decision making and control in an organization**.**

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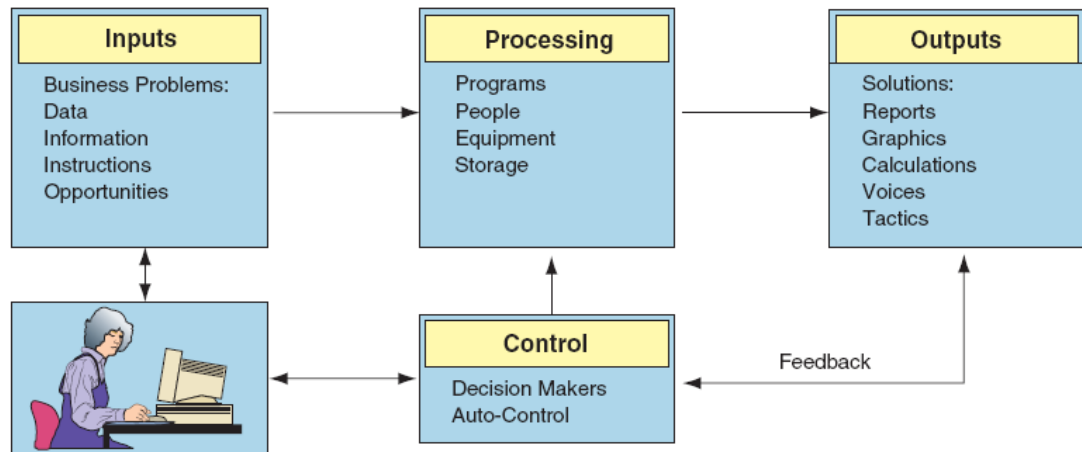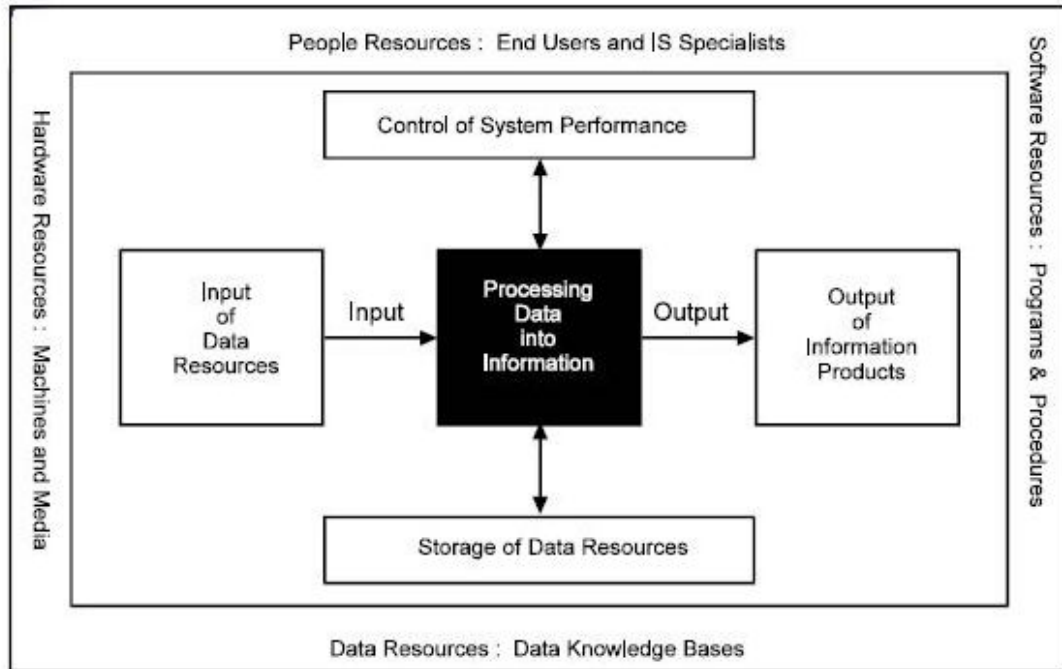
Computer-Based Information System CBIS

A computer-based information system (CBIS) is an information system that uses computer technology to perform some or all of its intended tasks.

Components of Information Systems

1. Resources of people: (end users and IS specialists, system analyst, programmers, data administrators etc.).

2. Hardware: (Physical computer equipments and associate device, machines and media).

3. Software: (programs and procedures).

4. Data: (data and knowledge bases), and

5. Networks: (communications media and network support).

Diagram labels:
- People Resources : End Users and IS Specialists
- Hardware Resources : Machines and Media
- Software Resources : Programs & Procedures
- Control of System Performance
- Input of Data Resources
- Input
- Processing Data into Information
- Output
- Output of Information Products
- Storage of Data Resources
- Data Resources : Data Knowledge Bases

People Resources

End users: (also called users or clients) are people who use an information system or the information it produces.

IS Specialists: people who actually develop and operate information systems. They include systems analysts, programmers, testers, computer operators, and other managerial, technical, and clerical IS personnel

Hardware Resources

-Machines: as computers and other equipment along with all data media, objects on which data is recorded and saved.

-Computer systems: consist of variety of interconnected peripheral devices. Examples are microcomputer systems, midrange computer systems, and large computer systems.

Software Resources

-System software, such as an operating system

-Application software, which are programs that direct processing for a particular use of computers by end users.

-Procedures, which are operating instructions for the people, who will use an information system. Examples are instructions for filling out a paper form or using a particular software package.

Data Resources

Data resources include data (which is raw material of information systems) and database. Data can take many forms, including traditional alphanumeric data, composed of numbers and alphabetical and other characters that describe business transactions and other events and entities. Text data, consisting of sentences and paragraphs used in written communications; image data, such as graphic shapes and figures; and audio data, the human voice and other sounds, are also important forms of data. Data resources must meet the following criteria:

• Comprehensiveness: means that all the data about the subject are actually present in the database.

• Non-redundancy: means that each individual piece of data exists only once in the database.

• Appropriate structure: means that the data are stored in such a way as to minimize the cost of expected processing and storage.

Network Resources

Telecommunications networks like the Internet, intranets, and extranets have become essential to the successful operations of all types of organizations and their computer-based information systems Telecommunications networks consist of computers, communications processors, and other devices interconnected by communications media and controlled by communications software.

Difference between Computers, Information technology and Information Systems

Computers provide effective and efficient ways of processing data, and they are a necessary part of an information system. An IS, however, involves much more than just computers. The successful application of an IS requires an understanding of the business and its environment that is supported by the **IS.**

Information technology broadly defined as the collection of computer systems used by an organization. Information technology, in its narrow definition, refers to the technological side of an information system. It includes the hardware, software, databases, networks, and other electronic devices. It can be viewed as a subsystem of an information system**.**

Classification of Information Systems

1. Classification by Organizational Levels

- **Functional Information Systems**

  These systems are organized in a hierarchy in which each higher-level system consists of several (even many) systems from the level below it.

- **Enterprise Information Systems**

  These systems are information systems serve several departments or the entire enterprise. These information systems together with the departmental applications comprise the **enterprise information system** (EIS). One of the most popular enterprise applications is **enterprise resources planning** (ERP) .

- **Inter-organizational Information Systems**

  Some information systems connect two or more organizations. They are referred to as inter-organizational information systems (IOS's).

  An example is the worldwide airline reservation system, which is composed of several systems belonging to different airlines. Thousands of travel agents and hundreds of airlines are connected to it. Those that support international or global operations may be especially complex. Inter-organizational information systems play a major role in e-

commerce and other web-based e-government information systems applications.

2. Classification by Mode of Data Processing

- ☐ Batch Processing Systems: The transactions are collected as they occur, but processed periodically, say, once a day or week.

  - On-line Batch Systems: The transaction information is captured by on-line data-entry devices and logged on the system, but it is processed periodically as in batch processing systems.

  - On-line Real-time Systems: The transaction data capture as well as their processing in order to update records (and generate reports) is carried out in real-time as the transaction is taking place.

3. Classification by System Objectives

- Transaction Processing Systems (TPS): Their objective is to process transactions in order to update records and generate reports, i.e., to perform score-keeping functions.

  - Process Control System (PCS): These systems are designed to make routine decision that control operational processes.

  - Decision Support Systems (DSS): Their objective is to support the managerial decisions. Usually, these systems are based on a model of the decision-making domain, and utilize techniques from management science, finance or other functional areas of business in order to build such models.

These systems are also used often for attention-directing purposes, i.e., for directing the attention of managers to a problematic aspect of operations.

• Expert Systems (ES): These systems incorporate expertise in order to aid managers in diagnosing problems or in problem solving.

• Executive Information System (EIS): These are MIS tailored to the strategic information needs of the top managers.

• Business Information Systems (BIS): As a future managerial end user, it is very important to realize that information systems directly support both operations and management activities in business functions of accounting, finance, human resource management, marketing, and operations management. Such business information systems are needed by all business functions.

Kinds of Systems

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

• **Operational-level systems :**The information systems that support them are mainly. Operational systems are used by supervisors (first-line managers), operators, and clerical employees.

• **Management-level systems:** serve the monitoring, controlling, decision-making, and administrative activities of middle managers

• **Strategic-level systems**: help senior management address strategic issues and long-term trends, both in the firm and in the external environment
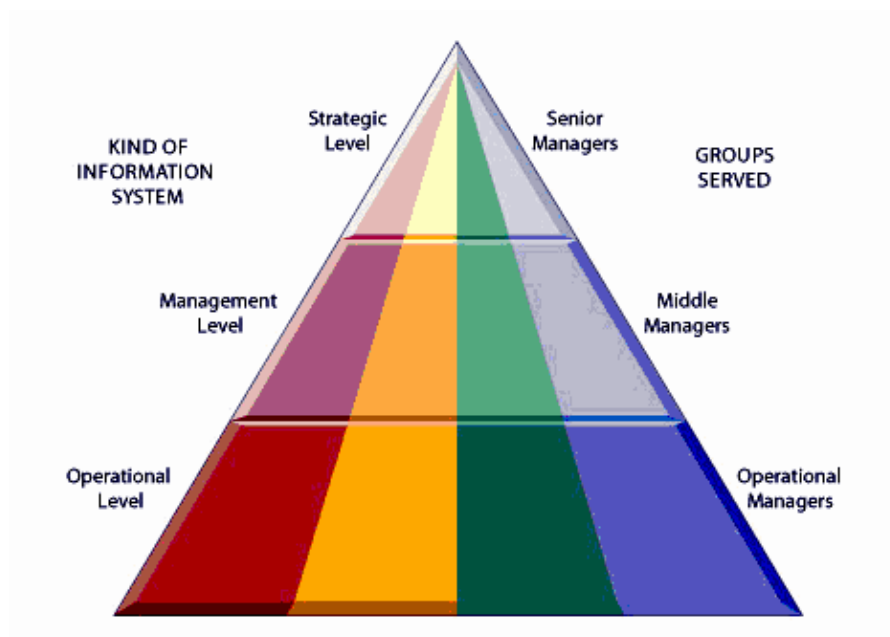
Transaction Processing Systems

It is a computerized system that performs and records the daily routine transactions necessary to manage business; they serve the organization's operational level. Examples are hotel reservation systems, payroll, employee record keeping, and shipping.

Types of Transaction Processing System (TPS's)

1. **On-line system:** involves a direct connection between operator and the TPS program. They provide immediate result and used to process a single transaction at a time. Ex: an order arrives by telephone call; it is processed at that moment and the result are produced.

2. **Batch-processing system:** This is a second type of TPS, where transactions are grouped together and processed as a unit. Example: cheque processing system in a bank.

Types of Transactions:

1. **Internal Transactions:** Those transactions, which are internal to the company and are related with the internal working of any organization. For example Recruitment Policy, Promotion Policy, Production policy etc.

2. **External Transactions:** Those transactions, which are external to the organization and are related with the external sources, are regarded as External Transaction. For example sales, purchase etc.

Transaction Processing Activities

1. Data collection: Capturing data necessary for the transaction.

2. Data editing: Check validity and completeness of data.

3. Data correction: Correct the wrong data.

4. Data manipulation: Calculate, summarize, Process data.

5. Data storage: Update transactions (on Databases).

6. Document production and reports: Create end result reports.
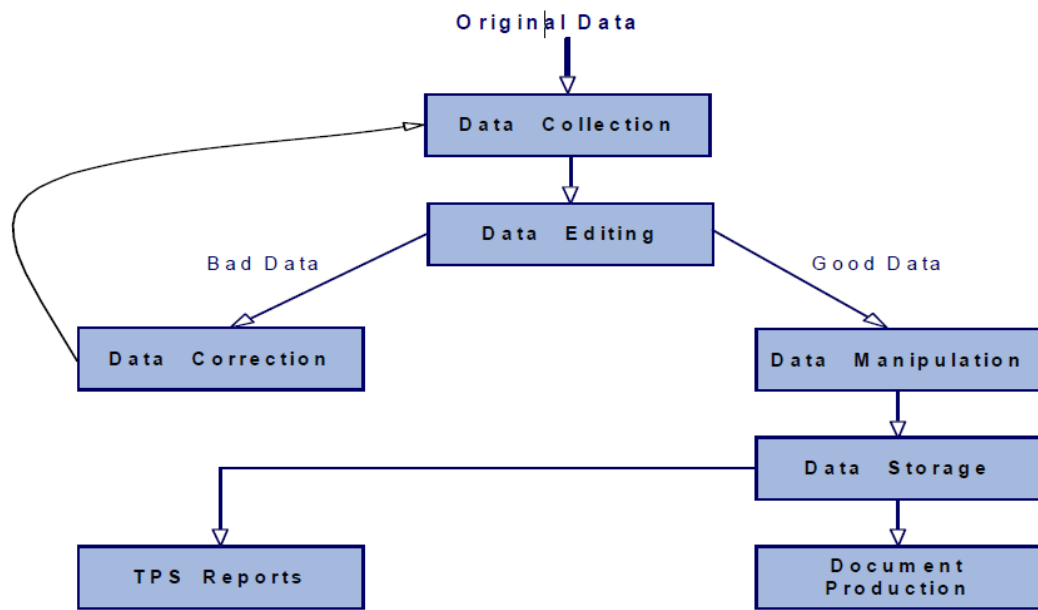
Transaction Processing Activities

Expert Systems

An expert system is a knowledge-based information system; that is, it uses its knowledge about a specific area to act as an expert consultant to users. The components of an expert system are a knowledge base and software modules that perform inferences on the knowledge and offer answers to a user's questions.

Expert systems provide answers to questions in a very specific problem area by making human like inferences about knowledge contained in a specialized knowledge base. Expert systems can provide decision support to end users in the form of advice from an expert consultant in a specific problem area.

Expert systems are being used in many different fields, including medicine, engineering, the physical sciences, and business. For example, expert systems now help diagnose illnesses, search for minerals, analyze compounds, recommend repairs, and do financial planning. Expert systems can support either operations or management activities

Expert Systems Structure

The components of an expert system include a knowledge base and software modules that perform inferences on the knowledge in the knowledge base and communicate answers to a user's questions.

The knowledge base of an expert system contains Facts about a specific area, Heuristics (thumbs of rule) that express the reasoning procedures of an expert on the subject. There are

many ways that knowledge is represented in expert systems:-

• **Case-based reasoning:** Representing knowledge in an expert system's knowledge base in the form of cases.

• **Frame-based knowledge:** Knowledge represented in the form of a hierarchy or network of frames. A frame is a collection of knowledge about an entity consisting of a complex package of data values describing its attributes.

• **Object-based knowledge:** Knowledge represented as a network of objects. An object is a data element that includes both data and the methods or processes that act on those data.

• **Rule-based knowledge:** Knowledge represented in the form of rules and statements of fact. Rules are statements that typically take the form of a premise and a conclusion such as: IF (condition), Then (conclusion).

• **Software resources:** An expert system software package contains an inference engine and other programs for refining knowledge and communicating with users. The inference engine program processes the knowledge (such as rules and facts) related to a specific problem. It then makes associations and inferences resulting in recommended courses of action for a user. User interface programs for communicating with end-users are also needed, including an explanation program to explain the reasoning process to a user if requested

Expert Systems Business Applications

Expert systems help diagnose illness, search minerals, analyze compounds, recommend repairs, and do financial planning. So from a strategic business point, expert systems can and are being used to improve every step of the product cycle of a business, from finding customers to shipping products to

providing customer service. ES provides a cost reduced solution, consistent advice with low level of errors, solution to handle equipments without the interference of human. It provides a high degree ofreliability and faster response time. It helps to solve complex problem with in a small domain.

It is capable of analyzing the problem and can construct a business model appropriate to the characteristics of the application. Based on the model necessary objectives and constraints are identified. It identifies appropriate tools to solve the model. It uses the tools to solve the problem and also does the what –if analysis aimed at understanding the sensitivity of the model.

Web-Based Systems

The concept of client/server architecture has dominated IT architecture for several decades**.**

Technically, the term **Web-based systems** refers to those applications or services that are resident on a server that is accessible using a Web browser and is therefore accessible from anywhere in the world via the Web.

The only client side software needed to access and execute Web-based applications is a Web browser environment, and of course, the applications must conform to the Internet protocols. An example of such an application would be an online store. Additionally, two other very important features of Web-based functionalities are**:**

1. The generated content/data are updated in real time, and

2. Web based systems are universally accessible via the Web to users

The major communication networks of the Web environments are the Internet, intranets, and extranets.

The Internet

Internet is actually the most democratic of all the mass media. With a very low investment, anyone can have a web page in Internet. This way, almost any business can reach a very large market, directly, fast and economically, no matter the size or location of the business. With a very low investment,

almost anybody that can read and write can have access to the World Wide Web.

Intranets

An intranet is the use of Web technologies to create a private network, usually within one enterprise. Although an intranet may be a single local area network (LAN) segment that uses the TCP/IP protocol, it is typically a complete LAN, or several interconnected LANs. A security gateway such as a firewall is used to segregate the intranet from the Internet and to selectively allow access from outside the intranet.

Extranets

Extranets connect several intranets via the Internet, by adding to the Internet a security mechanism and possibly some functionality. They form a larger virtual network that allows remote users (such as mobile employees) to securely connect over the Internet to the enterprise's main intranet.

An extranet allows controlled access from the outside, for specific business or educational purposes. In a business-to-business context, an extranet can be viewed as an extension of an organization's intranet that is extended to users outside the organization, usually partners, vendors, and suppliers, in isolation from all other Internet users.

Enterprise Web

The **Enterprise Web** is an open environment for managing and delivering Web applications. The Enterprise Web combines services from different vendors in a technology layer that spans rival platforms and business systems, creating a foundation for building applications at lower cost.

This foundation consists of the services most commonly used by Web applications, including business integration, collaboration, content management, identity management, and search, which work together via integrating technologies such as middleware, component-based development.

Internet Technology and the Digital Firm

For a number of years, companies used proprietary systems to integrate information from their internal systems and to link to their customers and trading partners. Such systems were expensive and based on technology standards that only a few companies could follow.

The Internet is rapidly becoming the infrastructure of choice for electronic commerce because it offers businesses an even easier way to link with other businesses and individuals at a very low cost. It provides a universal and easy-to-use set of technologies and technology standards for all organizations, no matter which computer system or information technology platform the organizations are using.

Trading partners can directly communicate with each other, bypassing intermediaries and inefficient multilayered procedures. Web sites are available to consumers 24 hours a day.

Internet technology is helping companies radically reduce their transaction costs, which include the costs of searching for buyers and sellers, collecting information on products, negotiating terms, writing and enforcing contracts, and transporting merchandise. Information on buyers, sellers, and prices for many products is immediately available on the Web. For example, manually processing a single customer order costs $15. Using a Web-based system, the cost drops to 80 cents per transaction.

E-Business and E-Commerce

Electronic commerce (EC or e-commerce) describes the process of buying, selling, transferring, or exchanging products, services, and/or information via computer networks, including the Internet. Some people view the term *commerce* as describing only transactions conducted between business partners

E-business refers to a broader definition of EC, not just the buying and selling of goods and services, but also servicing customers, collaborating with business partners, conducting E-learning, and conducting electronic transactions within an organization. Others view E-business as the "other than buying and selling" activities on the Internet, such as collaboration and intra-business activities**.**

Before the Internet, businesses had to make trade-offs between the *richness and reach* of their information. Richness refers to the depth and detail of information the business can supply to the customer, as well as information the business collects about the customer. Reach refers to how many people a business can connect with and how many products it can offer those people. Rich communication occurs, for example, when a sales representative meets with a customer, sharing information that is very specific to that interaction. Such an interaction is very expensive for a business because it can take place only with a small audience.

Types of E-Commerce Transactions

- **Business-to-business (B2B):** In B2B transactions, both the sellers and the buyers are business organizations. The vast majority of EC volume is of this type.

- **Collaborative commerce (c-commerce):** In c-commerce, business partners collaborate electronically. Such collaboration frequently occurs between and among business partners along the supply chain.

- **Business-to-consumers (B2C):** In B2C, the sellers are organizations, and the buyers are individuals.

- **Consumers-to-businesses (C2B):** In C2B, consumers make known a particular need for a product or service, and suppliers compete to provide the product or service to consumers. An example is Priceline.com, where the customer names a product and the desired price, and then Priceline.com tries to find a supplier to fulfill the stated need.

- **Consumer-to-consumer (C2C):** In C2C, an individual sells products or services to other individuals. (The terms interchangeable, and both will be used to describe individuals' sells products and services to each other.)

- **Intrabusiness (intraorganizational) commerce:** In this case, an organization uses EC internally to improve its operations. A special case of this is known as **B2E (business to its employees) EC**.

- **Government-to-citizens (G2C) and to others:** In this case, the government provides services to its citizens via EC technologies. Governments can do business with other governments as well as with businesses (G2B).