

1. Information System Concepts

- **System:** The term system may be defined as an orderly arrangement of a set of interrelated and interdependent elements that operate collectively to accomplish some common purpose or goal. Thus a system can be described by its parts, the way in which they related, and the goals which they are expected to achieve.
- **Type of System**
 - **According to Elements**
 - Abstract System: Also known as conceptual system or model can be defined as an orderly arrangement of interdependent ideas or constructs
 - Physical System: Physical system is a set of tangible elements which operate together or accomplish an objective. Physical system are more than conceptual construct, they display activity or behavior. The parts interact to achieve an objective.
 - **According to Interactive Behavior**
 - Open System: A system that interacts freely with its environment by taking input and returning output is termed as an open System.
 - Closed System: A system that does not interact with the environment nor changes with the change in environment is termed as a closed System
 - **According to degree of human intervention**
 - Manual System: Manual systems are the system where data collection, manipulation, maintenance and final reporting are carried out absolutely by human efforts.
 - Automated System: Automated systems are the system where computers or microprocessors are used to carry out all the tasks mentioned above. However, none of the business system is 100% automated; rather, to some extent, it depends on manual intervention, may be in a negligible way.
 - **According to working/Output**
 - Deterministic system: A deterministic system operates in a predictable manner wherein the interaction among the parts is known with certainty. If one has a description of the state of the system at a given point of time plus a description of its operation, the next state of the system may be given exactly, without error.
 - Probabilistic System: The probabilistic system can be described in terms of probable behavior, but a degree of error is always attached to the prediction of what the system will do.
- **Entropy:** Entropy is the quantitative measure of disorder in a system. System can run down and decay or can become disordered or disorganized. Presenting or offsetting an increase in entropy requires inputs of matter and energy to repair replenish and maintain the system. This maintenance input is termed as Negative Entropy.
- **Reason for using Computer in Business area**
 - a. Handling huge volume of data that is not manageable by human efforts
 - b. Storing enormous volume of data for indefinite period without any decay
 - c. Quick and accurate processing of data to match the competitive environment
 - d. Quick retrieval of information on query

- e. Quick and efficient transportation of data/information to distant places almost at no cost
- f. Availability of software tools for quick decision making in a complex situation.

➤ **General Model of a System**

- *Input* is the data flowing into the system from outside.
- *Processing* is the action of manipulating the input into a more useful form.
- *Output* is the information flowing out of a system.
- *Storage* is the means of holding information for use at a later date.
- *Feedback* occurs when the outcome has an influence on the output.

➤ **System Environment:** The external world which is outside the system boundary is known as system environment. Elements of environment are as follows

1. System Boundary: The system is inside the boundary while the environment is outside the boundary. Some examples of boundary are as follows.

System	Boundary
Human	Skin, Hair, Nails and all parts contained inside from the system; all things outside are environment
Automobile	Automobile body plus tires and all parts contained within form the system
Production	Production machine, production inventory of work in process, production employees, production procedures etc form the system. The rest of the company is in the environment

2. Subsystem: A subsystem is a part of large system. The interconnection and interactions between the subsystems are termed as interfaces. Characteristics of subsystem are as follows.
 - ✓ **Decomposition**: A complex system is difficult to comprehend when considered as a whole. Therefore, the system is decomposed or factored into subsystems. This process of decomposition is continued with subsystem divided into smaller subsystem until the smallest subsystems are of manageable size.
 - ✓ **Simplification**: simplification defined as the process of organizing subsystems so as to reduce the number of interconnections, which is a potential interface for communication among subsystems. The number of interconnections if all the subsystems interact in general. The number of interconnections if all the subsystems interact in general $1/2n(n-1)$, where n is the number of subsystems.
 - ✓ **Decoupling**: if two different subsystems are connected very tightly, very close the coordination between them is required.
3. Supra-System: A supra system refers to the entity formed by a system and other equivalent systems with which it interacts. For example, an organization may be subdivided into numerous functional areas such as marketing, finance, manufacturing, research and development, and so on. Each of these functional areas can be viewed as a subsystem of a larger organizational system because each could be considered to be a system in and of itself.
4. System Stress and System Change: A stress is a force transmitted by a system's supra-system that causes a system to change, so that the supra-system can better achieve its goals. Systems accommodate stress through a change in the form; there can be structural changes or process changes.

Information

- Information is data that have been put into a meaningful and useful context. The term 'data' and 'information' are often used interchangeably. However, the relation of data to information is that of raw material and finished product.
- **Attributes of Information**
 - *Availability*: is a very important property of information
 - *Purpose*: The basic purpose of information is to inform, evaluate, persuade and organize
 - *Mode and Format*: the modes of communication in business wither they are virtual, verbal, visual or in written form. Format of information should be so designed that it assists in decision-making, solving problems, initiating planning, controlling and searching.
 - *Decay*: value of information usually decays with time and usage and so it shoyld be refreshed from time to time.
 - *Rate*: the rate of transmission of information may be represented by the time required to understand a particular situation
 - *Frequency*: The frequency with which information is transmitted or received affects its value.
 - *Completeness*: The information should be as complete as possible.
 - *Reliability*: it is just not authenticity or correctness of information; rather it is a measure of failure or success of using information for decision-making.
 - *Validity*: it measures the closeness of the information to the purpose which it purports to serve
 - *Quality*: refers to the correctness of information.
 - *Transparency*: if information does not reveal directly what we want to know for decision-making it is not transparent
 - *Value of information*: it is defined as difference between the value of the change in decision behavior cause by the information and the cost of the information
 - *Adequacy*: to be useful, information must be adequate so that the desired actions can be initiated.
- **Information system and Its role in management**
 - Information system helps managers in effective decision-making to achieve the organizational goals
 - Based on well-designed information system, an organization will gain a edge in the competitive environments
 - Information systems help take right decision at the ight time.
 - Innovative ideas for solving critical problems may come out from good information system
 - Knowledge gathered though information system may be utilized by managers in unusual situation
 - Information system is viewed as process; it can be integrated to formulate a strategy of action or operation.
- **Components of Computer base information system**
 - Hardware
 - Software
 - Data
 - Procedures

- People

Operation Support System (OSS)

- The objective of operation support system is to improve the operational efficiency of the enterprise. These are further classified into three categories
 1. Transaction Processing System
 2. Management Information System
 3. Enterprise resource planning system
- **Transaction Processing System:** TPS at the lowest level of management is an information system that manipulates data from business transactions. Typical, a TPS involves the following activities
 1. Capturing data to organize files or database
 2. Processing of files/databases using application software
 3. Generating information in the form of reports
 4. Processing of queries from various quarters of the organization.
- *TPS Components*
 1. Inputs: Source Documents, such as customers orders, sales, slips, invoices, purchase orders etc
 2. Processing: This involves the use of journals and registers to provide a permanent and chronological record of inputs.
 3. Storage: Ledgers and file provide storage of data on both manual and computerized system.
 4. Outputs: any document generated in the system is output.
- *TPS Features*
 1. Large Volume of data
 2. Automation of basic operation
 3. Benefits are easily measurable
 4. Source of input for other system.

Management Information System (MIS)

- *Definition:* an integrated user-machine system designed for providing information to support operational control, management control and decision making functions in an organization.
- *Characteristics*
 1. Management Oriented: it means that effort for the development of the information system should be start from an appraisal of management needs and overall business objectives
 2. Management directed: because of management's orientation MIS, it is necessary that management should actively direct the system's development efforts.
 3. Integrated: Development of information should be an integrated one which means that all the functional and operational information sub-system should be tied together into one entity.
 4. Common data flows: it means the use of common input, processing and output procedures and media wherever required.
 5. Heavy Planning environment: it's taking too much time so MIS development must be viewed as future objectives.

6. Sub-system Concept
 7. Common database
 8. Computerized
- Pre-Requisites of an effective MIS
 1. Database; it defined as a 'super file' which consolidates data records formerly stored in many data files. The other important characteristics of database are as follows
 - a. It is user-oriented
 - b. It is capable of being used as a common data source, to various users, helps in avoiding duplication of efforts in storage and retrieval of data and information
 - c. It is available to authorized person only
 - d. It is controlled by a separate authority established for the purpose, known as database management system
 2. Qualified System and Management Staff
 3. Support of Top-Management
 4. Control and Maintenance of MIS
 5. Evaluation of MIS
 - Constraints in operating MIS
 1. Non-availability of experts
 2. Experts facing the problem in selecting the sub-system of MIS
 3. Non-availability of Cooperation form Staff
 - Effects of Using MIS
 1. Speed of processing and retrieval of data increases
 2. Scope of analysis widened
 3. Complexity of system design and operation increased
 4. Integrates the working of different information sub-system
 5. Increase the effectiveness of information system
 6. More comprehensive information
 - Limitations of MIS
 1. The quality of output is governed by the quantity of input.
 2. MIS is not substitute of effective managements
 3. MIS may not quickly update with Change in environments
 4. MIS can-not provide tailor-made information
 5. MIS ignores the non-quantitative factors like morals and attitudes
 6. MIS is less useful for making non-programmed decisions

Enterprise Resource Planning (ERP) system

- *Objective:* ERP is one of the latest high-end solutions that seek to streamline and integrate operation processes and information flows in the company to synergize the five major resource of an organization namely men, money, machine, materials and market. The major objectives of ERP are as follows
 1. Provide support for adopting best business practices
 2. Implement these practices with a view towards enhancing productivity and
 3. Empower the customers and suppliers to modify the implemented business processes to suit their needs
- *Myths of ERP system*
 1. There is a misconception that ERP is a Computer system

2. There is a misconception that ERP is a relevant for manufacturing organizations only
- *Characteristic*
 1. Flexible: ERP is a flexible system which may cover different languages, currencies and accounting standard etc.
 2. Modular and open: ERP system is modular and open which implies that any module can be interface or detached, whenever required, without affecting the other modules.
 3. Integrated: ERP is an integrated system as it provides data automation-automatic data exchange among different applications – that takes place between related business components.
 4. Best business Practices: ERP aims at adopting best business practices applicable worldwide and imposes its own logic on an organization's strategy and its implementation.
 - *Features*
 1. ERP provides Multi-platform like facility, manufacturing, currency and Multi-lingual facilities
 2. It supports strategic and business planning activities, operational planning and execution activities and creation of services.
 3. It has end-to-end supply chain management.
 4. It facilitates organization-wide integrated information system covering all functional areas like – production, marketing, finance and accounting and human resources.
 5. It performs core activities and increases customer service thereby augmenting the corporate image.
 6. It bridges the information gap across organizations
 7. It provides complete integration of system not only across departments but also across companies under the same management.
 8. It allows automatic introduction of latest technologies.
 9. It eliminates most of the business problems like material shortage, productivity enhancement, customer services, cash management, inventory management, quality management, prompt delivery etc.
 - *Benefits*
 1. Better use of organizational resources
 2. Lower operating costs
 3. Proactive Decision making
 4. Decentralized decision making
 5. Enhanced customer satisfaction
 6. Flexibility in business operations
 - *Limitations*
 1. An ERP system provides current status only.
 2. The methods used in ERP applications are not integrated with other organizational or divisional system. Further, they do not include external intelligence.

Management Support System(MSS)

- MSS focus on the managerial use of information resources and provide information to managers for planning and decision making.
- There are three types of MSS, Namely
 1. Decision support system(DSS)

2. Executive information (Support) System (EIS)
3. Expert System

1. Decision Support System

- Definition: DSS are a specific class of computerized information system that supports business and organizational decision-making activities.
 - Programmed Decision system: systems that replace human decision making rather than support it are sometimes called programmed decision system
- Characteristics
 1. Semi-structured and unstructured decisions: DSS solved the semi-structured problem in this manner...
 - I. Firstly, the problem is defined and formulated
 - II. It is then modeled with DSS software
 - III. Next, the model is run on the computer to provide result/Solution
 2. Flexibility to adapt to changing needs: The DSS designer understands that managers unusually do not know in advance what information they need and, even if they do, those information needs keep changing constantly, thus, rather than locking the system into rigid information producing requirements, capabilities and tools are provided by DSS to enable users to meet their own output needs.
 3. Ease of learning and use
- Components
 1. The user
 - I. Manager
 - II. Staff Specialist (Analysts)
 2. Databases
 3. Planning Languages
 - I. General purpose planning languages that allow users to perform many routine tasks
 - II. Special purpose planning languages are more limited in what they can do, but they usually do certain jobs better than the general-purpose planning languages.
 4. Model Base: Brain of DSS
- Examples
 - I. Cost accounting system
 - II. Capital budgeting system
 - III. Budget variance analysis system
 - IV. General decision support system

2. Executive Information (Support) System

- Definitions: Sometimes referred to as an Executive support system is a DSS that is designed to meet the special needs of top-level managers.
- Characteristics
 1. EIS that serves the information need of top-level managers
 2. EIS enables users to extract summary data and model complex problems without the need to learn query languages, statistical formulas or computer languages
 3. EIS provide rapid access to timely information and direct access to management report.

4. EIS is capable of accessing both internal and external data
 5. EIS provides extensive online analysis tool like trend analysis, market conditions etc.
 6. EIS can easily be given a DSS support for decision-making
- Executive role and decision making: Most executive decisions fall into one of three classes which are as follows
 1. Strategic planning: its involve determining the general, long-range direction of the organization.
 2. Tactical planning: Whereas Strategic planning addresses the general concerns of the firm, tactical planning refers to the how, when, where and what issues involved with carrying out the strategic plan.
 3. Fire fighting: Major Problems arise sometimes that must be resolved by someone at an executive level,
 - The executive decision-making environment: The type of decisions that executives must make is broad. The intuitive character of executive decision-making is reflected strongly in the types of information found most useful to executives. The characteristics of the types of information used in executive decision making are as follows.
 1. Lack of structure
 2. High degree of uncertainty
 3. Future orientation
 4. Informal Source
 5. Low level of Detail
 - Contents: the general answer to the question of what data is appropriate for inclusion is an executive information system is: whatever s interesting to executive". A practical set of principles to guide the design of measures and indicators to be included in an EIS is presented below:
 1. EIS measures must be easy to understand and collect
 2. EIS measures must be based on a balanced view of the organization's objective
 3. Performance indicators in an EIS must reflect everyone's contribution in fair and consistent manner.
 4. EIS measures must encourage management and staff to share ownership of the organization's objective.
 5. EIS information must be available to everyone in the organization.
 6. EIS measures must evolve to meet the changing needs of the organization.

3. Expert System

- Definition: an Expert system is highly developed DSS that utilize knowledge generally possessed by an expert to share a problem. A Characteristic of Expert system is the ability to declare or explain the reasoning process that was used to make decision
- Examples
 1. Accounting and finance
 2. Marketing
 3. Manufacturing
 4. Personnel
 5. General Business
- Need

1. Expert labor is expensive and scarce so for day to day duties of expert are not easy to find so EIS is needed for solve the problem of routine.
2. Moreover, no matter how bright or knowledgeable certain people are, they often can handle only few factors at a time.
- Benefits
 1. Expert system preserves knowledge that might be lost through retirement resignation or death of an acknowledged company expert
 2. Expert system put information into an active-form so it can be summoned almost as a real-life expert might be summoned
 3. Expert system assist novices in thinking the way experienced professional do.
 4. Expert system is not subject to such human falling as fatigue, being too busy, or being emotional.
 5. Expert systems can be effectively used as a strategic tool in the areas of marketing products, cutting costs and improving products.
- Components
 1. Knowledge Base: Stores the rules and data and relationships that are used to solve problems and contains specific facts about the expert area.
 2. Inference engine: The inference engine is the main processing element consisting of system of programs that requests data from the user, manipulates the knowledge base and provides a decision to the user.
 3. Knowledge Acquisition system (KAS)
 4. User interface.

➤ **Office Automation System (OAS)**

- OAS is among the newest and most rapidly expanding computer based information systems. Different office activities can be broadly grouped into the following types of operations
 1. Document Capture
 2. Document Creation
 3. Receipts and Distribution
 4. Filing, Search, Retrieval and Follow up
 5. Calculations
 6. Recording utilization of resources

➤ **Text Processing System**

- Text processing system automates the process of development of documents such as letters, reports, memos etc.

➤ **Electronic document Management System**

- The computer based document management system are at capturing the information contained in documents, stored for future reference and communicate the relevant parts to the users as and when required.