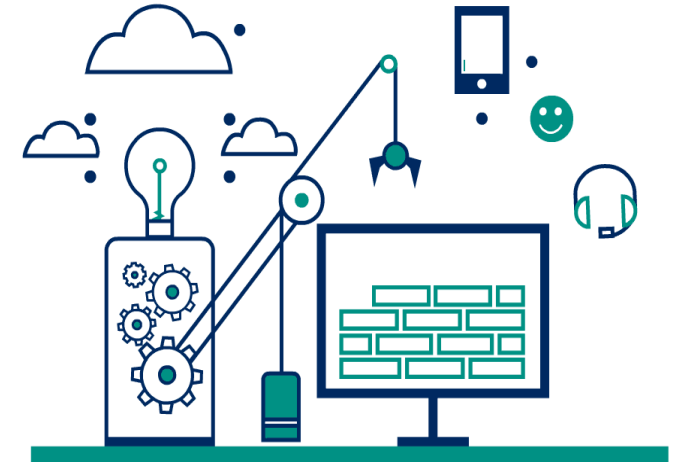
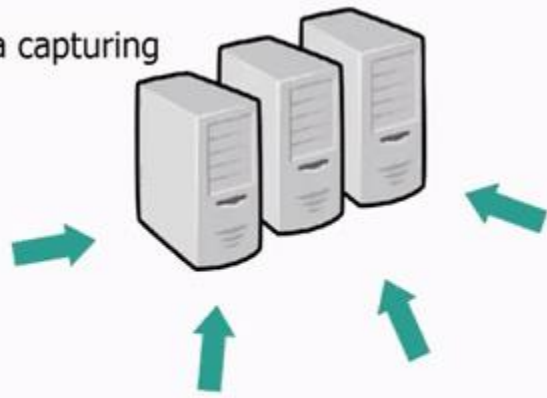


1. Data capturing



Basic of Information system and management

Unit 1



Management Information System

- Management Information System (MIS) is a study of people, technology, organizations, and the relationships among them in a broader sense.
- However in precise terms MIS is a software system that focuses on the management of information technology to provide efficiency and effectiveness or strategy decision making.
- The term is often used in the academic study of businesses and has connections with other areas, such as information systems, information technology, informatics, e-commerce and computer science.



Learning Objectives

- After going through this unit you should be able to:
 - Know the fundamental management concepts
 - Understand the basic concepts of Information Systems
 - Understand and apply core knowledge in Information Systems
 - Identify and analyze requirements for information systems
 - Understand and apply design principles in Information Systems.
 - Identify the basic components of Management Information Systems.
 - Conceptualize information systems as combinations of hardware and software technologies.
 - Know the applications of information systems in various levels of Management

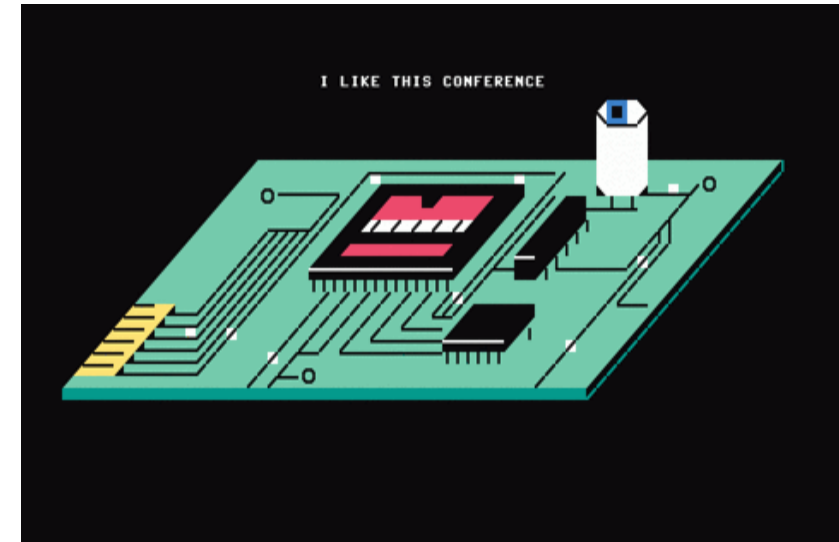


Basic Concepts

- Management Information System is an accumulation of 3 different terms as explained below:-
 1. Management
 2. Information
 3. System



Management



Management

- We can define management in many ways like, “Manage Man Tactfully” or Management is an art of getting things done by others.
- However, for the purpose of Management Information System, management comprises the process and activity that a manager does in the operation of their organization, i.e., to plan, organize, direct and control operations.

Information

- Information simply means processed data or in the layman language, data which can be converted into meaningful and useful form for a specific user.



System

- The system can be explained in a following ways:
 - System can be defined as a set of elements joined together for a common objective.
 - A group of interrelated or interacting elements forming a unified whole e.g., business organization as systems.
 - A group of interrelated components working together towards a common goal by accepting input and producing output in an organized transformation process.



Overview of Management Concepts

- Every business unit has some objectives of its own. These objectives can be achieved with the coordinated efforts of several personnel.
- The works of a number of persons are properly co-ordinated to achieve the objectives through the process of management.
- Management is a vital aspect of the economic life of man, which is an organised group activity.
- It is considered as the indispensable institution in the modern social organization marked by scientific thought and technological innovations.
- One or the other form of management is essential wherever human efforts are to be undertaken collectively to satisfy wants through some productive activity, occupation or profession

Overview of Management Concepts

- It is management that regulates man's productive activities through coordinated use of material resources. **Without the leadership provided by management, the resources of production remain resources and never become production.**
- Management is the integrating force in all organized activity. Whenever two or more people work together, to attain a common objective, they have to coordinate their activities.
- They also have to organize and utilize their resources in such a way as to optimize the results. **Management is usually defined as planning, directing and controlling the business operations.**
- Management is the process of allocating and organizations input including human and economic resources by planning, organizing, directing and controlling for the purpose of producing goods or services desired by customers so that organizational objectives are accomplished.

Functions of Management

- Management has been defined as a process of getting things done through others. This process is identified in a set of functions performed by managers to accomplish the goals.
 - A manager is thus someone who defines, plans, guides, helps out, and assesses the work of others, frequently people for whom the manager is accountable in an organization.
 - The following mentioned management functions will involve creative problem solving.
1. Planning
 2. Organizing
 3. Directing
 4. Staffing
 5. Controlling



Functions of Management

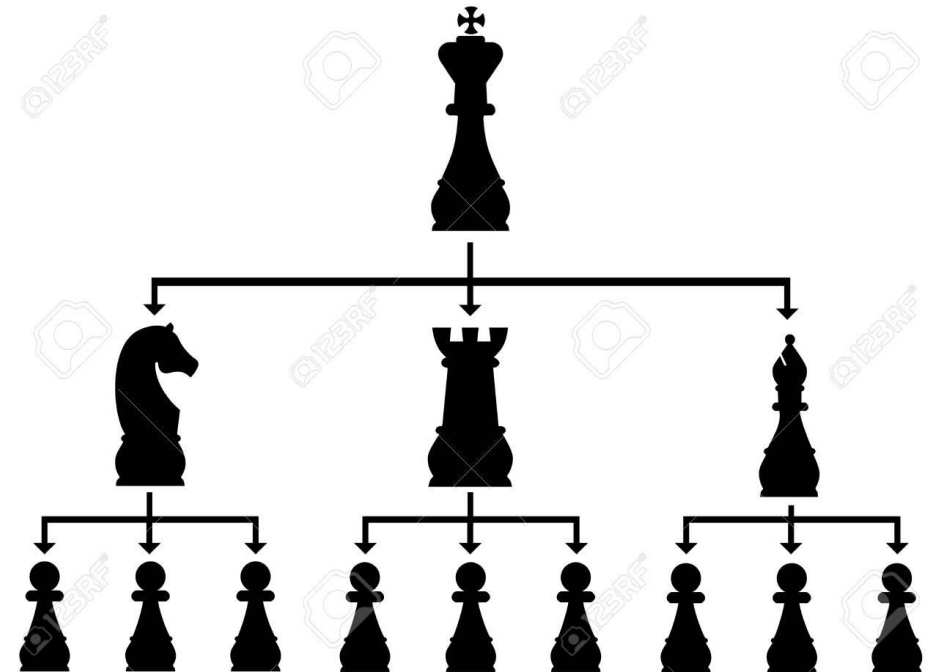
- **Planning:** According to Terry and Franklin, “planning is selecting information and making assumptions concerning the future to put together the activities necessary to achieve organizational objectives.”
- Planning includes both the broadest view of the organization, e.g., its mission, and the narrowest, e.g., a tactic for accomplishing a specific goal.
- **Organizing:** Organizing is the classification and categorization of requisite objectives, the grouping of activities needed to accomplish objectives, the assignment of each grouping to a manager with the authority necessary to supervise it, and the provisions for coordination horizontally and vertically in the organization structure.
- The focus is on separation, coordination, and control of tasks and the flow of information inside the organization. It is in this function that managers allocate authority to job holders.

Functions of Management

- **Directing:** Direction is telling people what to accomplish and seeing that they do it to the finest of their capability. It includes making assignments, corresponding procedures, seeing that mistakes are corrected, providing on the job instruction and, of course, issuing orders.”
- The purpose of directing is to control the behaviour of all personnel to accomplish the organization's mission and objectives while simultaneously helping them accomplish their own career objectives.
- **Staffing:** Staffing function requires recognition of human resource needs, filling the organizational structure and keeping it filled with competent people.
- This function includes recruiting, training; evaluating and compensating are the specific activities.
- **Controlling:** “Control is the course of action that measures present performance and guides it towards some predetermined goal.
- The quintessence of control lies in checking existing actions against some desired results determined in the planning process.”

Levels of Management

- According to the expert there are three types of level of management:
 - Top Level Management
 - Middle Level Management
 - Low Level or Operative Management



Top Level Management

- Top level management consists of board of directors, managing directors or executive committee members.
- Objectives of Top Level Management include the following.
 - Setting key objectives, policies and identifying factors essential for the development of the organization.
 - Making appointments to the top position of the organization such as managers department heads etc.
 - Reviewing the work of different personnel in various levels

Middle Level Management

- Middle level management consists of managers of various departments such as productions, sales, marketing, resource, finance etc.
- Objectives of Middle Level Management include the following.
 - Follow the rules and policies formulated by the top level management.
 - Motivating personnel for higher productivity.
 - Collecting detail analysis reports from the various departments.
 - Mutual understanding with other departments in the organization.
 - Recommendations to the top level management.

Low Level Management

- Low level management consist of supervisors, daily workers etc. Follow the rules and guidelines made out by the top level authentic of the organization.
- Some of the functions of Lower Level Management include the following.
 - To issue orders and instructions to the workers and to supervise and control their work
 - To classify and assign jobs to the workers
 - To direct and guide the workers about work procedure
 - To arrange for the necessary tools, equipment, materials etc., for the worker
 - To solve the problems of workers
 - To inform the management about the problems of workers which are not solved at this level?
 - To maintain discipline among the workers and to develop in them the right approach to work.
 - To maintain good human relations.
 - To build a high group morale among the workers.

Concept of a System

- 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.
- **System Concepts**
- The concepts of a system are Technology, Application, Development and Management.
- a. Technology.**
 - Computer networks are systems of information processing components that are a variety of hardware, software and telecommunication technology.
- b. Application.**
 - That electronic business and commerce application involves interconnected business information system
- c. Development.**
 - That developing way to use IT in business includes designing the basic component of information system.
- d. Management.**
 - Managing IT emphasize the quality, strategic business value and security of an organization in information system

Components of a System

- There are three basic components of a system, they are
 - a) Input,
 - b) Processing and
 - c) Output.

a. Input.

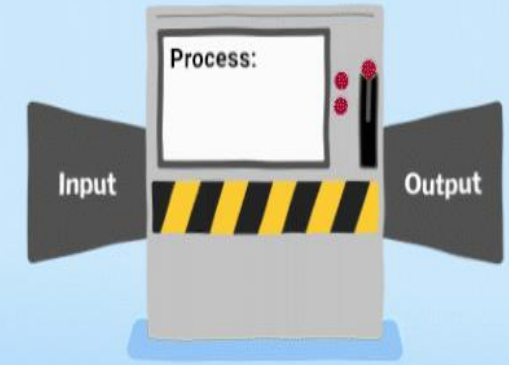
- Input involves capturing and assembling elements that enter to the system to be processed. Some of the inputs are raw materials, energy, data etc.

b. Processing.

- It involves transformation process that converts input to output.

c. Output.

- It involves transforming element that has been produced by a transformation process to their ultimate destination.



Types of System

a. Dynamic System

- When the interrelated component of the system interacts with each other and this controlled by management then it is known as Dynamic System.

b. Cybernative System

- Dynamic System implementing the concept of feedback and control is known as Cyber native System.

c. Open System

- A system got interacts with other system in its environment by exchanging input and output with its environment

d. Adoptive System

- A System having the ability to change itself and its environment in order to survive is called an Adoptive System.

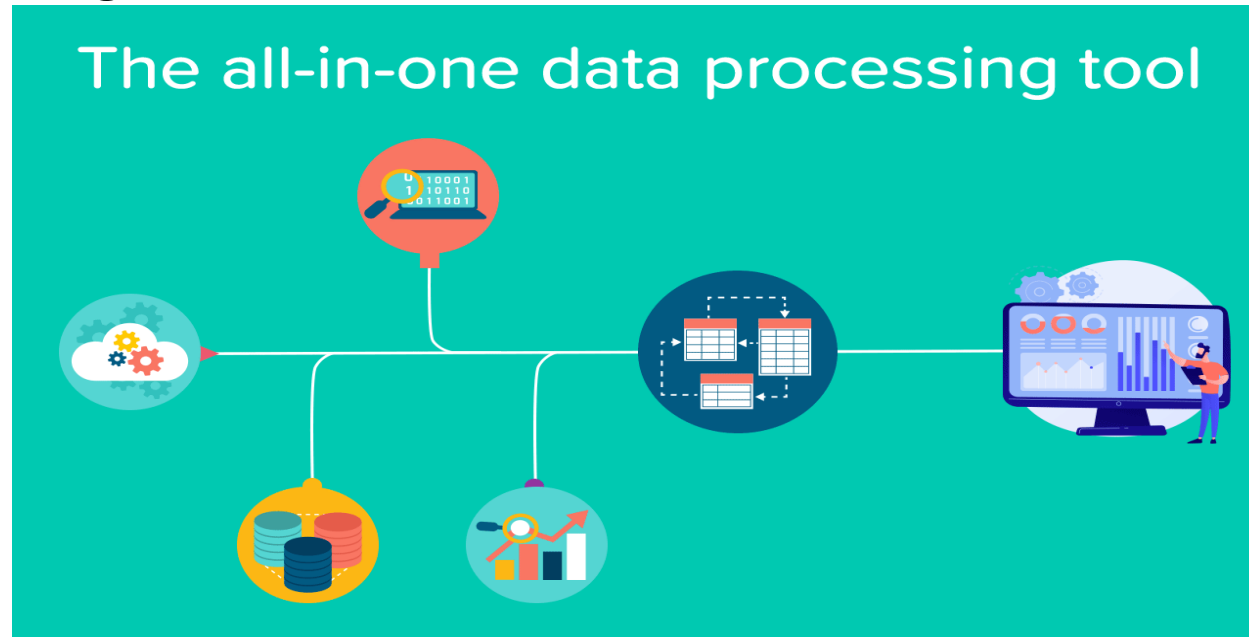
Data and information

- By data we mean the facts or figures representing an object, place or the events occurring in the organization.
- It is not enough to have data (such as statistics on the economy).
- Data themselves are fairly useless, but when these data are interpreted and processed to determine its true meaning, they become useful.
- **Characteristics of Data**
 - They are facts obtained by reading, observation, counting, measuring and weighing etc. which are then recorded
 - Data are derived from external and internal sources (activities with firm).
 - Data may be produced as an automatic by-product of some routine but essential operation such as the production of an invoice or alternative a special counting or measuring procedure must be introduced and the result recorded.
 - The source of data need be given considerable attention because if the sources of the data flawed, any resulting information will be worthless.



Data Processing

- Data processing systems perform the essential role of collecting and processing the daily transactions of the organizations.
- Data processing is necessary to ensure that the day-to-day activities of the organization are processed, recorded and acted upon.
- Files are maintained which provide both the current data for transaction, for example the amount invoiced and cash received during the month for statement preparation, and which also serve as a basis for operational and tactical control and for answering enquiries.
- By information, we mean that the data have been shaped into a meaningful form, which may be useful for human beings.



Data Processing

- So, when **data** are processed, interpreted, organized, structured or presented so as to make them meaningful or useful, they are called **information**.
- Information provides context for data.
- Information is created from organized structured and processed data in a particular context, “information can be recorded as signs, or transmitted as signals.
- Information is any kind of event that affects the state of a dynamic system that can interpret the information.
- Conceptually, information is the message (utterance or expression) being conveyed.
- Therefore, in a general sense, information is ‘knowledge communicated or received concerning a particular factor circumstance’.

Characteristics of Good Information

- Good information is that which is used and which create value.
- Experience and research shows that good information has numerous qualities which are:
 - Relevance
 - Accuracy
 - Completeness
 - Confidence in the source
 - Communication to the right person

Characteristics of Good Information

- 1. Relevance:** Information must be relevant to the problem being considered. Too often reports, messages, tabulations etc. contain irrelevant parts which most prevent the user of the information to get the actual meaning of what the sender wants.
- 2. Accuracy:** Information should be sufficiently accurate for it to be relied upon by the manager and for the purpose for which it is intended.
- 3. Completeness:** Ideally, all the information required for a decision should be available. However, in practice, this is not often obtainable. What is required is that the information is complete in respect of the key elements of the problem. This suggests that there should be interaction between information provides and users to ensure that the key factors are identified

Characteristics of Good Information

4. Confidence in the source: For information to have value it must be used. For it to be used managers must have confidence in the source.

Confidence is enhanced:

Data Processes Output

- a. The source has been reliable in the past
- b. There is good communication between the information producer and the manager.

5. Communication to the right person: All persons have a defined sphere of activity and responsibility and should receive information to help them carry out their designated tasks.

In practice this is not always as easy as it sounds. It is quite common for information to be supplied to the wrong level in the organization.

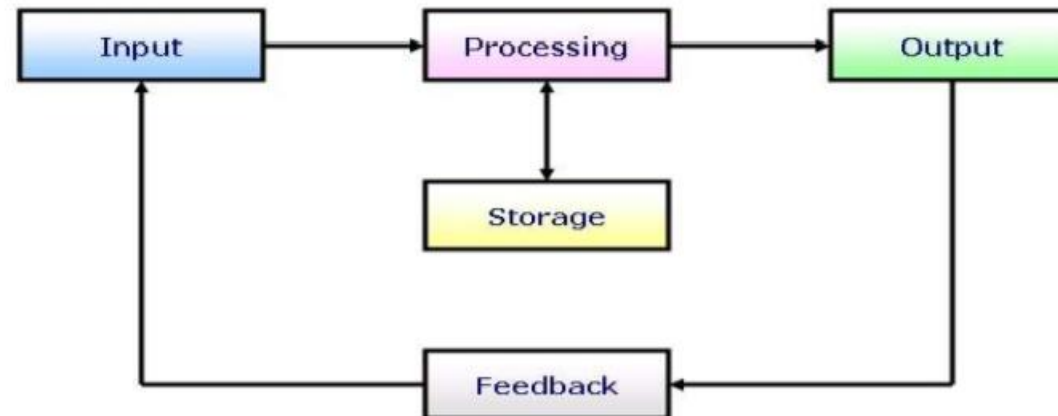
A superior may not pass it on to the person who needs it while subordinates may hold onto information in an attempt to make themselves seem indispensable.

Functions of Information

- a) **Reduction of Uncertainty:** Uncertainty exist where there is less than perfect knowledge. Rarely, if ever is there perfect knowledge but relevant information help to reduce the unknown.
- b) **An aid to monitoring and control:** By providing information about performance and the extent of deviations from planned level of performance, management are better able to control operation.
- c) **As a means of communication:** Managers need to know about developments, plans, forecasts, impending changes and so on.
- d) **As a memory supplement:** By having historical information about performance, transactions, results of past actions and decisions available for reference, personal memories are supplemented.
- e) **As aid to simplification:** By reducing uncertainty and enhancing understanding, problems and situations are simplified and become more manageable.

Information System

- Meaning: An information system can be any organized combination of people, hardware, software, communication software and data resource that collects transformation or screening the information in an organization.
- Definition: *An information system can be defined as a set of interrelated components that collect (or retrieve), process, store and distribute information to support decision making, coordination and control in an organization.*



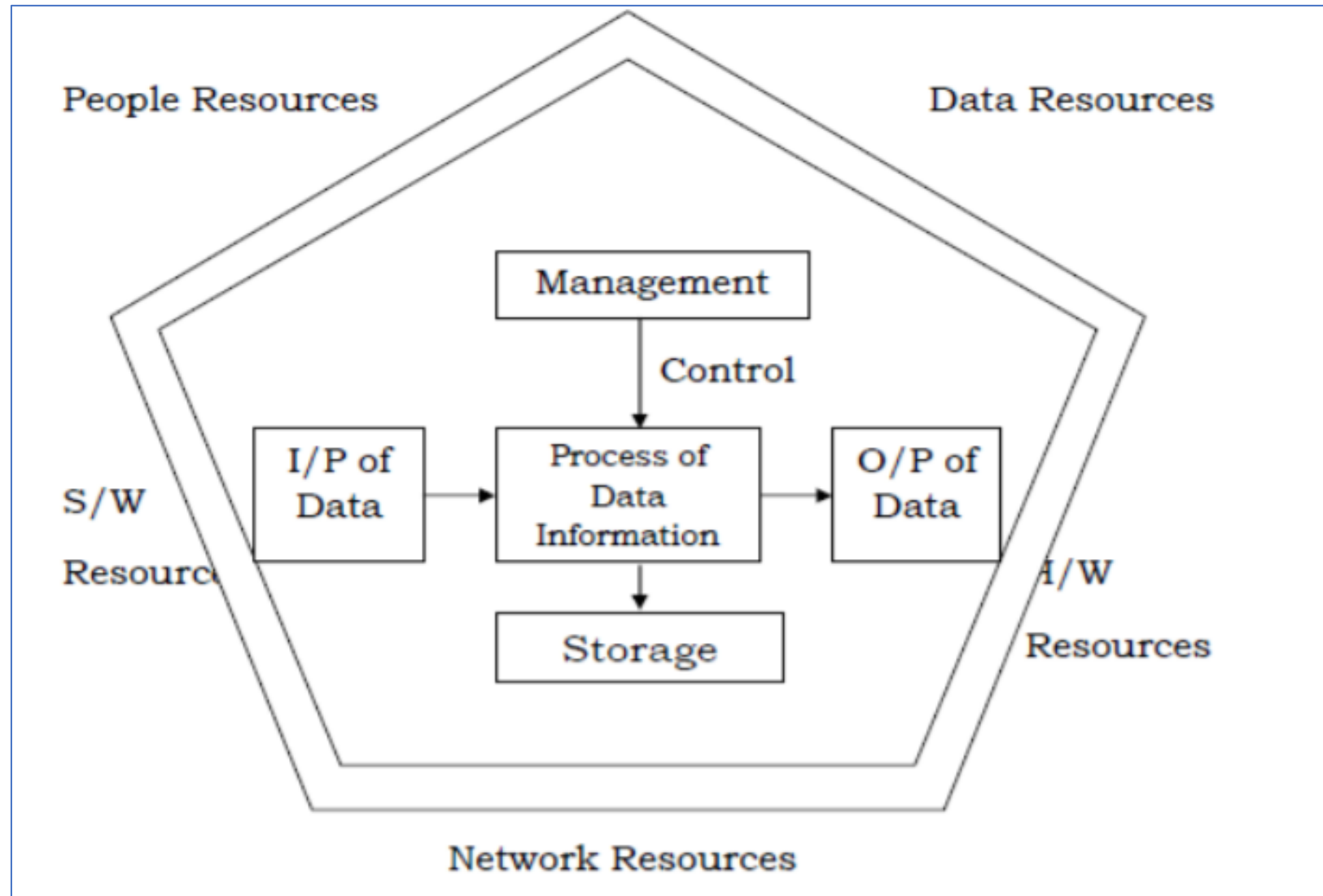
Examples of Information System

- A business is an example of an organizational system to an economic resource (input) is transformed by various business processes into goods and services (output).
- Information system provides information on the operation of the system to management for the direction and maintenance of the system as it exchanges inputs and output with its environment.
- Some examples of information systems include the following.
 - Airline reservations (seat, booking, payment, schedules, boarding list, special needs, etc.).
 - Bank operations (deposit, transfer, withdrawal) electronically with a distinguish payment gateways.
 - Integration of department with the help of contemporary software's like ERP.
 - Logistics management application to streamline the transportation system

Feedback and control

- A system with feedback and control components is sometimes known as cybernetic system that is a self monitoring or self regulating system.
- **Feedback.** Feedback is a data about the performance of a system.
- **Control.** Control involves monitoring and evolving feedback determines whether a system is moving towards the achievement of its goals.
- The control function makes necessary adjustments to a system input and possessing components to ensure that to produce proper output

Components of Information System



People Resources

- People are required for the operation of all information system.
- People Resources divided into two types
- **i) End-Users:** These are the people who use an information system or the information it produce. Ex: Accounts, Sales Persons, Customers and Managers.
- **ii) Information system specialist:** These are the people who develop and also operate Information system. Ex: System Managers, Programmers, Computer Operation.



Data Resources

- Data resources of an Information system are typically organized in two parts:

i) **Database**

Database holds processed and organized data.

ii) **Knowledge Base**

It holds knowledge in a variety of forms such as facts, rules, and case examples.



Software Resources

- It includes all sets of information processing instruction. It is also two types:

i) Program:

Set of operating instructions the direct and computer hardware.

ii) Procedure:

Set of Information processing instructions needed by people. Ex: Operating System, Spreadsheet Programs, and Word processor Programs.

Hardware Resources

- Include all physical devices and materials used in information processing.
- It has also two types

i) **Machines**

Ex: Computer, Video Monitor, Scanner.

ii) **Media**

Hardware in computer based Information system. Ex: Floppy Disk, Magnetic Tape and Optical Disk

- **Computer System** Ex: Microcomputers, Midrange Computers System, Large Mainframe
- **Computer Peripheral:** Ex: Mouse, Key Board.

Network Resources

- These are the fundamental resource components of all information Systems.
- It has also two types:
 - i) Communication Media:**
 - Ex: Co-axial Cable, Twisted Paired Wire, Fibre Optics Cable, Microwave System and Communication Satellite System.
 - ii) Network Support:** Generally used for the operation and use of a communication network.
 - Ex: Modems, Internet Browser and Communication Control Software.

Need for Information Systems

- The information system is very important for the internet technology and the traditional business concerns and is really the latest phase in the ongoing evolution of business.
- All the companies need to update their business, infrastructure and change way they work to respond more immediately to customer need.
- A first step in designing and developing an MIS is to assess the information needs for decision making of management at different hierarchical levels, so that the requisite information can be made available in both timely and usable form to the people who need it.
- Such assessment of information needs is usually based on personality, positions, levels and functions of management.

Uses of Information System

- Information system and technology including E-business and E-commerce technology and application has become vital component of successful business and organization.
- It is a study of business administration and management.
- For a manager or a business professional it is just as important to have basic understanding of information system and any other functional area in business.

Roles of Information Systems in business

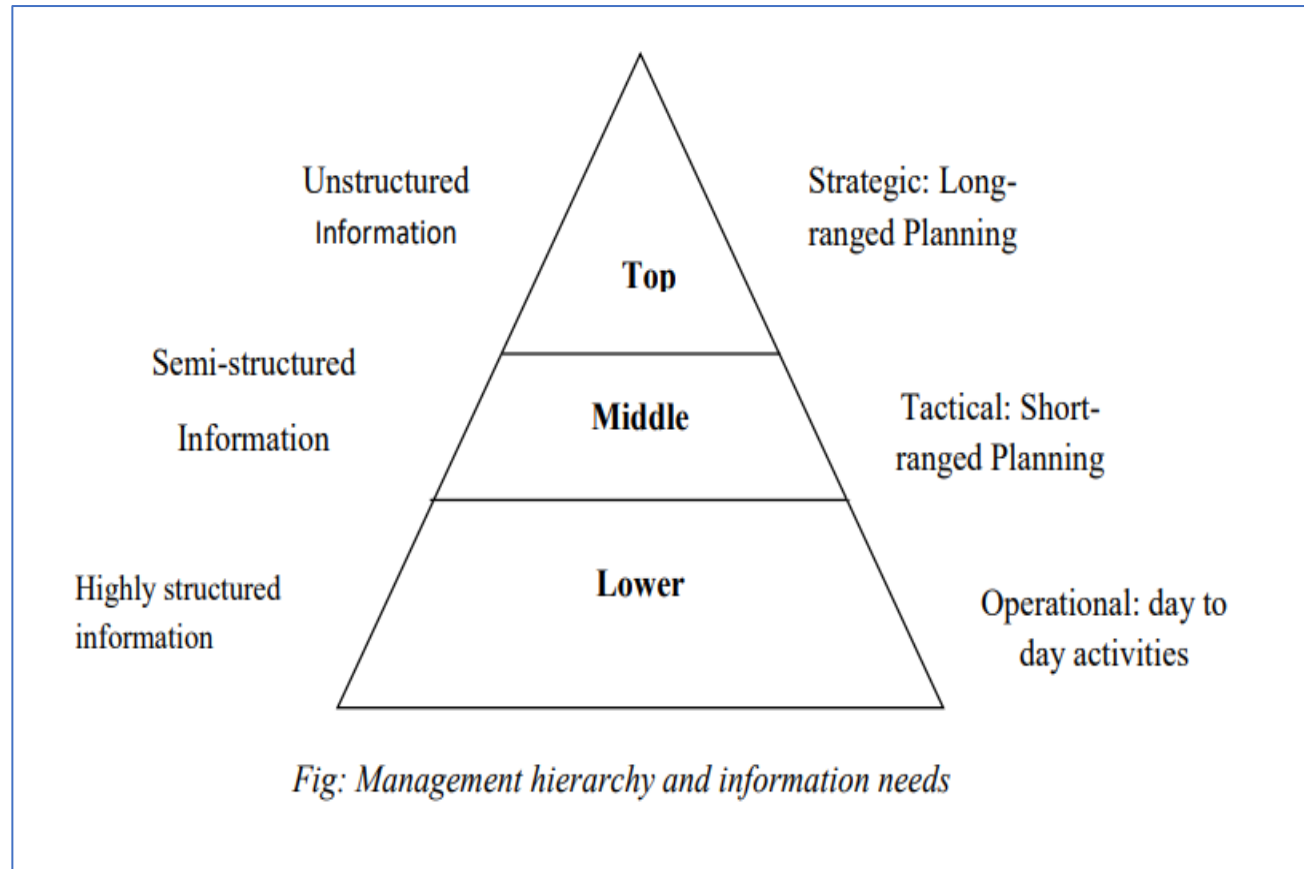
- An Information system supports the business Organizations in the following ways
 - a) **Support the Business Process:** Treats inputs as a request from the customer and outputs as services to customer. Supports current operations and use the system to influence further way of working.
 - b) **Support Operation of a Business Organization:** An IS supports operations of a business organization by giving timely information, maintenance and enhancement which provides flexibility in the operation of organizations.
 - c) **Support Decision Making:** An IS supports the decision making by employee in their daily operations. It also supports managers in decision making to meet the goals and objectives of the organization. Different mathematical models and IT tools are used for the purpose evolving strategies to meet competitive needs.
 - d) **Strategies for an Organization:** Today each business is running in a competitive market. An IS supports the organization to evolve appropriate strategies for the business to assent in a competitive environment

Information Concepts

- Data is a raw material for information systems. Collecting data costs money and hence one must collect necessary and sufficient data.
- Data is generally input to the information systems for processing. Data size is also growing but is useless unless it is processed to create information.
- Information is processed data, used by managers to initiate actions and to run the organization efficiently.
- The data processed by machines gives information
- **Types of Information**
 - **Strategic:** Needed for long range planning and directions. This is less structured.
 - **Tactical:** Needed to take short range decisions to improve profitability and performance.
 - **Operational:** Needed for day to day operations of the organization. Eg: Daily Sales, Billing.
 - **Statutory:** Needed by law to send to government authorities. Eg: Sales tax return.

Need for Information Systems

- Information systems are needed when timely processing for fast action is needed; same data has to be processed in different ways and when organizations require innovative processing.



Functional areas of management

- Functional areas of management are as follows
 - Production
 - Marketing
 - Materials – purchase, stores
 - Finance –accounts
 - Human Resource Development (HRD)
 - Research and Development (R&D)

Information for Management

- Different types of information required for various departments of an enterprise can be categorized as follows
- **Production Management**
- The following type of information is needed in production management:
- **Strategic Information:**
 - Yearly and monthly production quotas and alternate schedules
 - Policies on machine replacement, augmentation and modernization.
 - Identifying best product mix.
- **Tactical Information:**
 - Identifying and controlling areas of high cost.
 - Identifying critical bottlenecks in production.
 - Identifying alternate production schedules based on tools, machines etc.
 - Performance measures of machines to decide replacement.
- **Operational Information:**
 - Monitoring up to date production information by examining assemblies, detecting likely shortages and giving early warning.
 - Scheduling better production dynamically.
 - Preventive maintenance schedules.
 - Monitoring tool, machine and personnel availability

Marketing Management

- The following type of information is needed in Marketing Management:
- **Strategic Information:**
 - Search for new markets and marketing strategies.
 - Analysis of competitor's strategy
 - Technology and demographic forecasts and product changes
- **Tactical Information:**
 - Advertising techniques and analysis of their impact.
 - Customer preference surveys.
 - Correlation of prices and sales.
 - Sales force deployment and targets.
 - Exploring alternate marketing channels.
 - Timing of special sales campaigns.
- **Operational Information:**
 - Sales analysis by regions, customer class, sales person.
 - Sales target versus achievement.
 - Market share and trends.
 - Seasonal variations.
 - Effect of model changes.
 - Performance of sales outlets
 - Costs of campaigns and benefit.

Material Management

- The following type of information is needed in Materials Management:
- **Strategic Information:**
 - Developing vendors for critical items
 - Determining optimal levels of inventory
 - Determining proportion of material needed
 - Reducing varieties of inventory
- **Tactical Information:**
 - Developing vendor performance measures.
 - Determining optimal reorder levels.
 - Determining issues of items to shops versus Standard needs.
 - Controlling high value of inventory.
 - Determining impact on material cost and Procurement with design changes and new Product introduction.
- **Operational Information:**
 - List of excess & deficient items received.
 - List of items rejected.
 - Critical items received.
 - Stores in transit and in inspection.
 - Value of inventory in hand.
 - Goods received, rejected and issued.

Finance Management

- The following type of information is needed in Finance Management:
- **Strategic Information:**
 - Methods of financing.
 - Pricing policies
 - Tax planning.
- **Tactical Information:**
 - Variations between budget and expenses.
 - Large outstanding payments/Receipts.
 - Credit and payment status.
 - Cost increases and pricing.
 - Impact of taxation on pricing
- **Operational Information:**
 - Periodic financial report.
 - Budget status to all functional managers.
 - Tax returns.
 - Share transfers.
 - Profit and loss account.
 - Payments and receipts.
 - Payroll, provident fund accounts

Human Resource Management

- The following type of information is needed in Human Resources Management:
- **Strategic Information:**
 - Long range human resource requirements at different levels.
 - Policies on human resource development and training
 - Policies on personnel welfare and facilities
- **Tactical Information:**
 - Performance appraisal.
 - Demographic make-up of personnel and its impact on retirement.
 - Production incentives.
 - Morale of personnel.
 - Absentee reduction.
 - Leave and overtime policies.
 - Personnel deployment policies.
- **Operational Information:**
 - Routine assessment.
 - Skills inventory.
 - Loan/advances and recoveries.
 - Leave record

Functions of a Management Information System

- The management information system is an integrated, computerized and machine user system providing the required information to support the operation and decision making.
- The main functions of a management system are the following.
- **1. Data Capturing:**
 - MIS captures data from various internal and external sources of an organization.
 - Data capturing may be manual or through computer terminals.
 - End users, typically record data about transactions on some physical medium such as paper form or enter it directly into a computer system.
- **2. Processing of data:**
 - The captured data is processed to convert it into the required management information.
 - Processing of data is done by such activities as calculating, comparing, sorting, classifying and summarizing.

Functions of a Management Information System

- **3. Storage of information:**

- MIS stores processed or unprocessed data for future use.
- If any information is not immediately required, it is saved as an organizational record. In this activity, data and information are retained in an organized manner for later use.
- Stored data is commonly organized into fields, records, files and databases.

- **4. Retrieval of information:**

- MIS retrieves information from its stores as and when required by various users.
- As per the requirements of the management users, the retrieved information is either disseminated as such or it is processed again to meet the exact demands.

- **5. Dissemination of MI:**

- Management information, which is a finished product of MIS, is disseminated to the users in the organization.
- It could be periodic, through reports or on-line through computer terminals

The challenges of management information systems

- If all the existing barriers are divided into humanistic, organizational and environmental factors, the major drawbacks and the reasons of failure and using MIS in public organizations are as following:
- **Humanistic factors**
 - The lack of information of the managers and users as they don't know exactly what they want and what their information needs are.
 - The lack of understanding of the needs of the users by designers (the lack of correct definition of the needs and their analysis)
 - The lack of information of the managers and users about the collaboration method with the designer team.
 - The lack of participation of the managers and users in system design.
 - The lack of understanding of the managers of software and information systems.
 - The lack of information of most of the analysts and programmers (designers) with new system work environment.
 - The lack of acceptance of the system executers and resistance against the change.
 - The lack of accuracy in the data collected

The challenges of management information systems

- **Organizational factors**

- The lack of good conditions for participation and collaboration of the managers, users and system directors
- The lack of consistency and complexity of the existing manual systems.
- The lack of existing systems and methods analysis before the system design
- The lack of evaluation of the existing power
- Bad condition of educating the specialized forces
- The lack of human resources with management and computer fields and other required specializations (the problems of absorbing human resources)
- Inadequate education of the users
- Inadequate and incomplete documentation
- Unsuitable implementation of the system

The challenges of management information systems

- **Environmental factors**

- The lack of suitable consultants for designing the system and software
- The lack of procedures and methodology and stages of creating the system
- The lack of evaluation of environmental aspects in management information systems
- The lack of suitable use of mass media to develop the culture of using computer and information systems.
- The lack of holding suitable MA training courses in the universities and the lack of suitable education of human resources in this regard.
- The lack of serious consideration and adequate investment in this regard