

Data - Data is defined as the collection of facts and details like text, figures, observations, symbols or simply description of things, event or entity gathered from environment around us. It is the raw fact, which should be processed to gain information. It is the unprocessed data, that contains numbers, statements and characters before it is refined by the Programmer / Developer. Data is raw facts. Data is like raw material. Data does not interrelate and also it does not help in decision making. Data is defined as groups of non-random symbols in the form of text, images, voice representing quantities, action and objects.

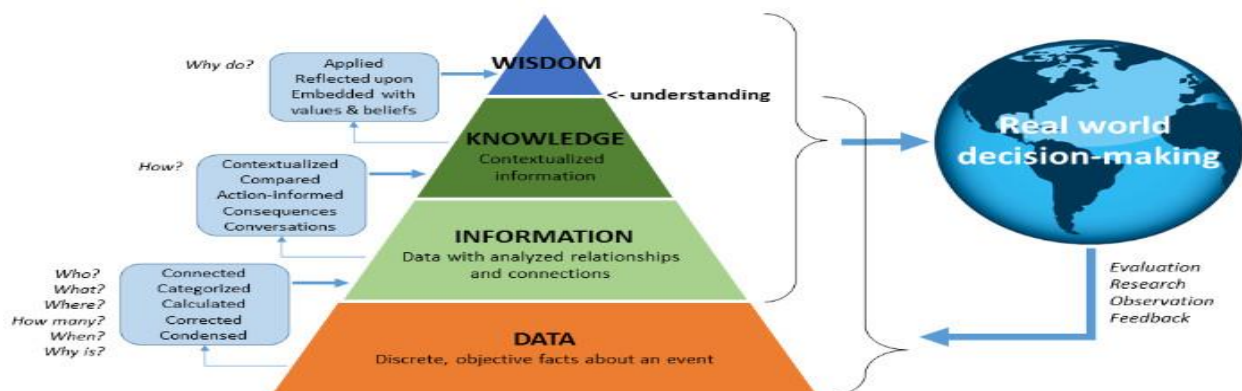
It is the basic of any type of processing or computer processing. It may be defined in different levels as per the requirement of the application area and application.

For example, student data, customer data , marketing and financial data, Transaction data etc. All type of data are defined with the help of fundamental data type – text, numbers, image/ graphics, voice, animation ,movement , multimedia.

Information - Information is described as that form of data which is processed, organised, specific and structured, which is presented in the given setting/ format. It assigns meaning and improves the reliability of the data, thus ensuring understandability and reduces uncertainty. When the data is transformed into information, it is free from unnecessary details or immaterial things, which has some value to the user

Information is the product of data processing. It is interrelated data and equivalent to finished goods produced after processing the raw material. The **information** has a value in decision making. It brings clarity and creates an intelligent human response in the mind.

Data Processing and information



All information are not data but data is the means of information because information is always carry certain content or meaning where data is only source of content and meaning.

Charecteristics of Information

Following are the essential characteristic features :

- i. **Timeliness** : Timeliness means that information must reach the recipients within the prescribed timeframes. For effective decision making, information must reach the decision-maker at the right time, i.e. recipients must get information when they need it. Delays destroys the value of information. The characteristic of timeliness, to be effective, should also include up-to-date, i.e. current information.
- ii. **Accuracy** : Information should be accurate. It means that information should be free from mistakes, errors &, clear. Accuracy also means that the information is free from bias. Wrong information given to management would result in wrong decisions. As managers decisions are based on the information supplied in MIS reports, all managers need accurate information.
- iii. **Relevance** : Information is said to be relevant if it answers especially for the recipient what, why, where, when, who and why? In other words, the MIS should serve reports to managers which is useful and the information helps them to make decisions.
- iv. **Adequacy** : Adequacy means information must be sufficient in quantity, i.e. MIS must provide reports containing information which is required in the deciding processes of decision-making. The report should not give inadequate or for that matter, more than adequate information, which may create a difficult situation for the decision-maker. Whereas inadequacy of information leads to crises, information overload results in chaos.
- v. **Completeness** : The information which is given to a manager must be complete and should meet all his needs. Incomplete information may result in wrong decisions and thus may prove costly to the organization.
- vi. **Explicitness** : A report is said to be of good quality if it does not require further analysis by the recipients for decision making.
- vii. **Impartiality** : Impartial information contains no bias and has been collected without any distorted view of the situation.

Questions : on the basis of above discussion, define the differences between Data and Information.

System and Sub System

A system is “an orderly grouping of interdependent components linked together according to a plan to achieve a specific goal.”

System is defined by its components (entities/subsystems) and processes (interrelationships between its components). A system is a collection of interrelated entities and/or subsystems which can be analyzed. It is possible to understand the specific structure of a system. However, in some systems complete knowledge may not be available but in most cases the fundamental entities and their interrelations are known. A system is an abstraction of reality. It is created to comprehend the nuances of a real-world condition and understand the interrelationships of subsystems in such real-world conditions in greater clarity. It has a reason for its existence. The purpose in most cases is the output of the system and in a way the output defines the purpose of the system.

Subsystem is defined in terms of the component of the system. it is a set of elements, which is a system itself, and a component of a larger system. A subsystem description is a system object that contains information defining the characteristics of an operating environment controlled by the system. The Data tests are performed to verify the correctness of the individual subsystem configuration data and they are related to a single subsystem in order to test its Specific Application..

Condition for the System

A system must have three basic Conditions and check points –

- A system must have some **structure and behavior** which is designed to achieve a predefined objective.
- **Interconnectivity** and **interdependence** must exist among the system components.
- The **objectives of the organization** have a **higher priority** than the objectives of its subsystems.

For example, traffic management system, payroll system, automatic library system, human resources information system.

Properties of a System

A system has the following properties –

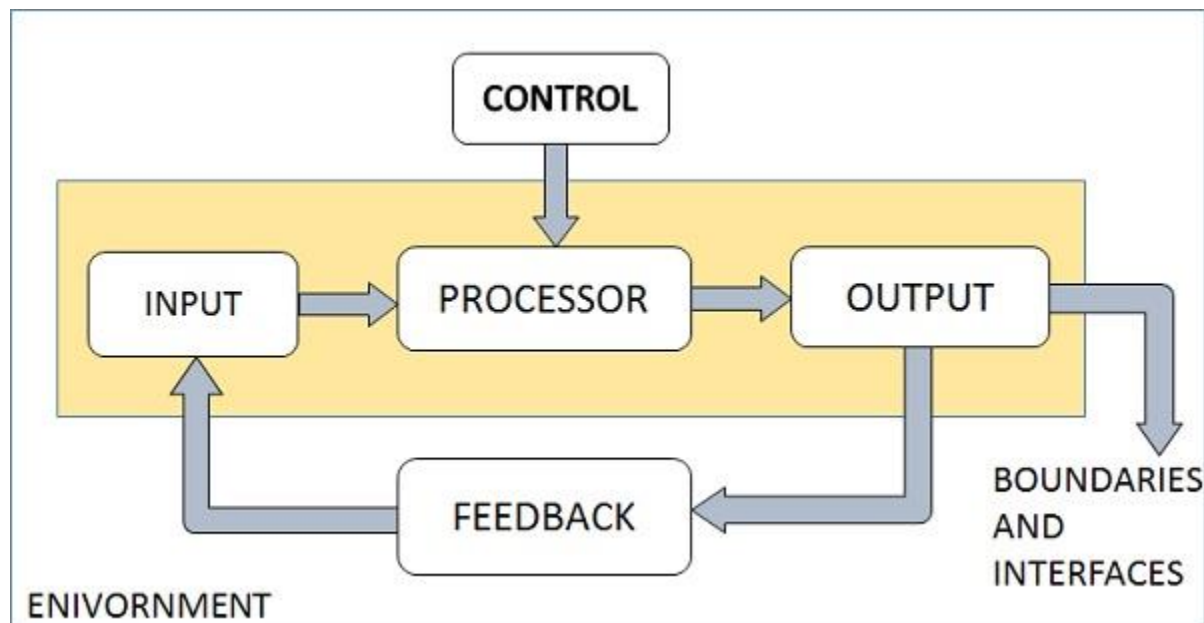
1. **Organization** : Organization implies structure and order. It is the arrangement of components that helps to achieve predetermined objectives.

2. Interaction : It is defined by the manner in which the components operate with each other. For example, in an organization, purchasing department must interact with production department and payroll with personnel department.
3. Interdependence :Interdependence means how the components of a system depend on one another. For proper functioning, the components are coordinated and linked together according to a specified plan. The output of one subsystem is the required by other subsystem as input.
4. Integration :Integration is concerned with how a system components are connected together. It means that the parts of the system work together within the system even if each part performs a unique function.
5. Central Objective :The objective of system must be central. It may be real or stated. It is not uncommon for an organization to state an objective and operate to achieve another.

The users must know the main objective of a computer application early in the analysis for a successful design and conversion.

Elements of a System

The following diagram shows the elements of a system –



Outputs and Inputs

1. The main aim of a system is to produce an output which is useful for its user.
2. Inputs are the information that enters into the system for processing.
3. Output is the outcome of processing.

Processor(s)

1. The processor is the element of a system that involves the actual transformation of input into output.
2. It is the operational component of a system. Processors may modify the input either totally or partially, depending on the output specification.
3. As the output specifications change, so does the processing. In some cases, input is also modified to enable the processor for handling the transformation.

Control

1. The control element guides the system.
2. It is the decision-making subsystem that controls the pattern of activities governing input, processing, and output.
3. The behavior of a computer System is controlled by the Operating System and software. In order to keep system in balance, what and how much input is needed is determined by Output Specifications.

Feedback

1. Feedback provides the control in a dynamic system.
2. Positive feedback is routine in nature that encourages the performance of the system.
3. Negative feedback is informational in nature that provides the controller with information for action.

Environment

1. The environment is the “supersystem” within which an organization operates.
2. It is the source of external elements that strike on the system.
3. It determines how a system must function. For example, vendors and competitors of organization’s environment, may provide constraints that affect the actual performance of the business.

Boundaries and Interface

1. A system should be defined by its boundaries. Boundaries are the limits that identify its components, processes, and interrelationship when it interfaces with another system.
2. Each system has boundaries that determine its sphere of influence and control.
3. The knowledge of the boundaries of a given system is crucial in determining the nature of its interface with other systems for successful design.

Types of Systems

The systems can be divided into the following types –

Physical or Abstract Systems

- Physical systems are tangible entities. We can touch and feel them.
- Physical System may be static or dynamic in nature. For example, desks and chairs are the physical parts of computer center which are static. A programmed computer is a dynamic system in which programs, data, and applications can change according to the user's needs.
- Abstract systems are non-physical entities or conceptual that may be formulas, representation or model of a real system.

Open or Closed Systems

- An open system must interact with its environment. It receives inputs from and delivers outputs to the outside of the system. For example, an information system which must adapt to the changing environmental conditions.
- A closed system does not interact with its environment. It is isolated from environmental influences. A completely closed system is rare in reality.

Adaptive and Non Adaptive System

- Adaptive System responds to the change in the environment in a way to improve their performance and to survive. For example, human beings, animals.
- Non Adaptive System is the system which does not respond to the environment. For example, machines.

Permanent or Temporary System

- Permanent System persists for long time. For example, business policies.
- Temporary System is made for specified time and after that they are demolished. For example, A DJ system is set up for a program and it is dissembled after the program.

Natural and Manufactured System

- Natural systems are created by the nature. For example, Solar system, seasonal system.

- Manufactured System is the man-made system. For example, Rockets, dams, trains.

Deterministic or Probabilistic System

- Deterministic system operates in a predictable manner and the interaction between system components is known with certainty. For example, two molecules of hydrogen and one molecule of oxygen makes water.
- Probabilistic System shows uncertain behavior. The exact output is not known. For example, Weather forecasting, mail delivery.

Social, Human-Machine, Machine System

- Social System is made up of people. For example, social clubs, societies.
- In Human-Machine System, both human and machines are involved to perform a particular task. For example, Computer programming.
- Machine System is where human interference is neglected. All the tasks are performed by the machine. For example, an autonomous robot.

Man-Made Information Systems

- It is an interconnected set of information resources to manage data for particular organization, under Direct Management Control (DMC).
- This system includes hardware, software, communication, data, and application for producing information according to the need of an organization.

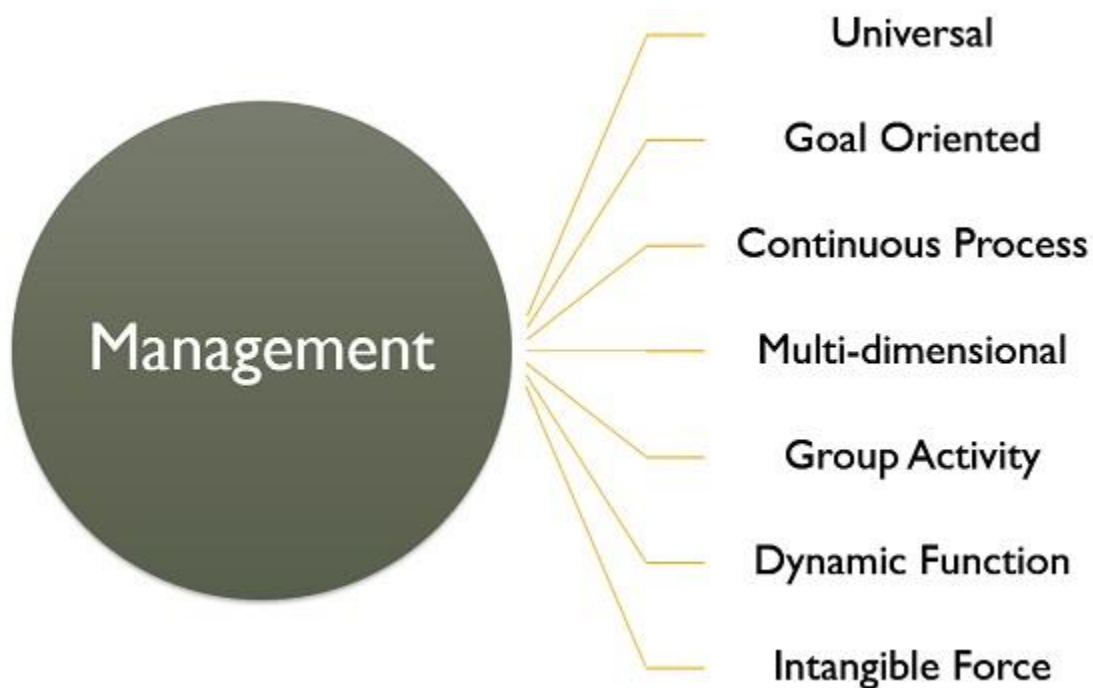
Man-made information systems are divided into three types –

- **Formal Information System** – It is based on the flow of information in the form of memos, instructions, etc., from top level to lower levels of management.
- **Informal Information System** – This is employee based system which solves the day to day work related problems.
- **Computer Based System** – This system is directly dependent on the computer for managing business applications. For example, automatic library system, railway reservation system, banking system, etc.

Management : Management can be defined as the **process of administering and controlling the affairs of the organization**, irrespective of its nature, type, structure and size. It is an act of creating and maintaining such a **business environment** wherein the members of the organization can work together, and achieve business objectives efficiently and effectively. Management acts as a guide to a group of people working in the organization and coordinating their efforts, towards the attainment of the common objective.

In other words, it is concerned with **optimally using 5M's, i.e. men, machine, material, money and methods** and, this is possible only when there proper direction, coordination and integration of the processes and activities, to achieve the desired results.

Characteristics of Management



- **Universal:** All the organizations, whether it is profit-making or not, they require management, for managing their activities. Hence it is universal in nature.
- **Goal Oriented:** Every organization is set up with a predetermined objective and management helps in reaching those goals timely, and smoothly.
- **Continuous Process:** It is an ongoing process which tends to persist as long as the organization exists. It is required in every sphere of the organization whether it is production, human resource, finance or marketing.
- **Multi-dimensional:** Management is not confined to the administration of people only, but it also manages work, processes and operations, which makes it a multi-disciplinary activity.

- **Group activity:** An organization consists of various members who have different needs, expectations and beliefs. Every person joins the organization with a different motive, but after becoming a part of the organization they work for achieving the same goal. It requires supervision, teamwork and coordination, and in this way, management comes into the picture.
- **Dynamic function:** An organization exists in a business environment that has various factors like social, political, legal, technological and economic. A slight change in any of these factors will affect the organization's growth and performance. So, to overcome these changes management formulates strategies and implements them.
- **Intangible force:** Management can neither be seen nor touched but one can feel its existence, in the way the organization functions.

All the functions, activities and processes of the organization are interconnected to one another. And it is the task of the management to bring them together in such a way that they help in reaching the intended result.

Levels of Management

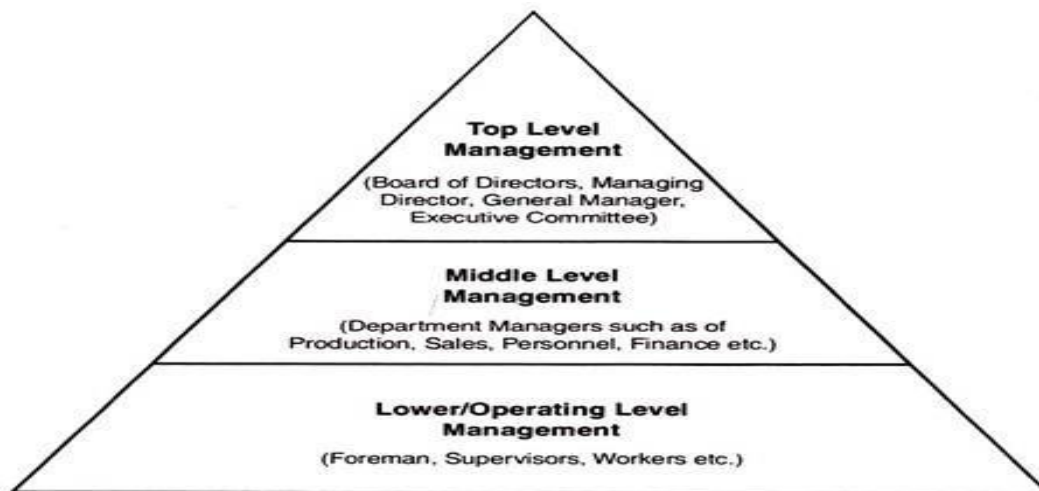
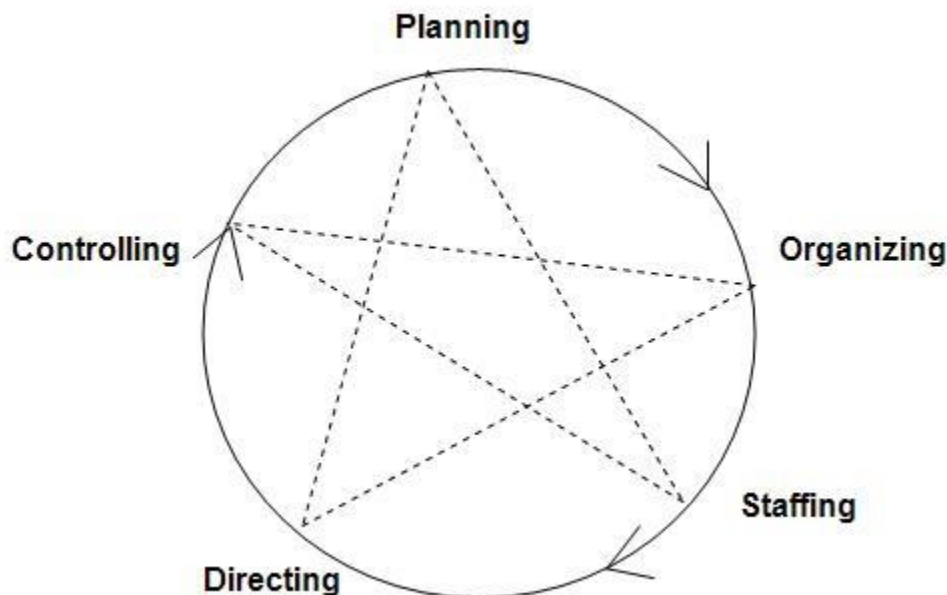


Fig. 1.1. Levels of Management

1. **Top-Level Management:** This is the highest level in the organizational hierarchy, which includes **Board of Directors and Chief Executives**. They are responsible for defining the objectives, formulating plans, strategies and policies.
2. **Middle-Level Management:** It is the second and most important level in the corporate ladder, as it creates a link between the top and lower level management. It includes **departmental and division heads and managers** who are responsible for implementing and controlling plans and strategies which are formulated by the top executives.
3. **Lower Level Management :** This level is known as the Operational or Functional level of the management. It includes first level Manager, Line manager, foreman As lower level manager directly interact with the workers. It play a crucial role in

the organization because it helps in reducing wastage and idle time of the workers, improving the quality and quantity of output.

Functions of Management



- **Planning:** It is the first and foremost function of management, i.e. to decide beforehand what is to be done in future. It encompasses formulating policies, establishing targets, scheduling actions and so forth.
- **Organizing:** Once the plans are formulated, the next step is to organise the activities and resources, as in identifying the tasks, classifying them, assigning duties to subordinates and allocating the resources.
- **Staffing:** It involves hiring personnel for carrying out various activities of the organization. It is to ensure that the right person is appointed to the right job.
- **Directing:** It is the task of the manager to guide, supervise, lead and motivate the subordinates, to ensure that they work in the right direction, so far as the objectives of the organization are concerned.
- **Controlling:** The controlling function of management involves a number of steps to be taken to make sure that the performance of the employees is as per the plans. It involves establishing performance standards and comparing them with the actual performance. In case of any variations, necessary steps are to be taken for its correction.

Coordination is an important feature of management which means the integration of the activities, processes and operations of the organization and synchronization of efforts, to ensure that every element of the organization contributes to its success.

Categories of Information in Management

There are three categories of information related to managerial levels and the decision managers make.

Volume of Information	Type of Information	Information Level	Management Level	System Support
Low Condensed	Unstructured	Strategic Information	Upper	DSS
Medium Moderately Processed	Moderately Structured	Management Control Information	Middle	MIS
Large Detail Reports	Highly Structured	Operational Information	Lower	DPS

Strategic Information

- This information is required by topmost management for long range planning policies for next few years. For example, trends in revenues, financial investment, and human resources, and population growth.
- This type of information is achieved with the aid of Decision Support System (DSS).

Managerial Information

- This type of Information is required by middle management for short and intermediate range planning which is in terms of months. For example, sales analysis, cash flow projection, and annual financial statements.
- It is achieved with the aid of Management Information Systems (MIS).

Operational information

- This type of information is required by low management for daily and short term planning to enforce day-to-day operational activities. For example, keeping employee attendance records, overdue purchase orders, and current stocks available.
- It is achieved with the aid of Data Processing Systems (DPS).

