

Management Information Systems (MIS)

Definition: A Management Information System is a set of combined procedures that gathers and produces reliable, relevant, and properly organized data that supports the decision making process of an organization.

OR

“MIS' is a planned system of collecting, storing and disseminating data in the form of information needed to carry out the functions of management.”

Characteristics of MIS

- 1. Systems Approach:** The information system follows a systems approach. Systems approach means taking a comprehensive view or a complete look at the interlocking sub-systems that operate within an organization.
- 2. Management Oriented:** Management oriented characteristic of MIS implies that the management actively directs the system development efforts. For planning of MIS, top-down approach should be followed. Top down approach suggests that the system development starts from the determination of management's needs and overall business objective. To ensure that the implementation of system's policies meet the specification of the system, continued review and participation of the manager is necessary.
- 3. Need Based:** MIS design should be as per the information needs of managers at different levels.
- 4. Exception Based:** MIS should be developed on the exception based also, which means that in an abnormal situation, there should be immediate reporting about the exceptional situation to the decision –makers at the required level.
- 5. Future Oriented:** MIS should not merely provide past of historical information; rather it should provide information, on the basis of future projections on the actions to be initiated.
- 6. Integrated:** Integration is significant because of its ability to produce more meaningful information. Integration means taking a comprehensive view or looking at the complete picture of the interlocking subsystems that operate within the company.
- 7. Common Data Flow:** Common data flow includes avoiding duplication, combining similar functions and simplifying operations wherever possible. The development of common data flow is an economically sound and logical concept, but it must be viewed from a practical angle.
- 8. Long Term Planning:** MIS is developed over relatively long periods. A heavy element of planning should be involved.

9. Sub System Concept: The MIS should be viewed as a single entity, but it must be broken down into digestible sub-systems which are more meaningful.

10. Central database: In the MIS there should be common data base for whole system.

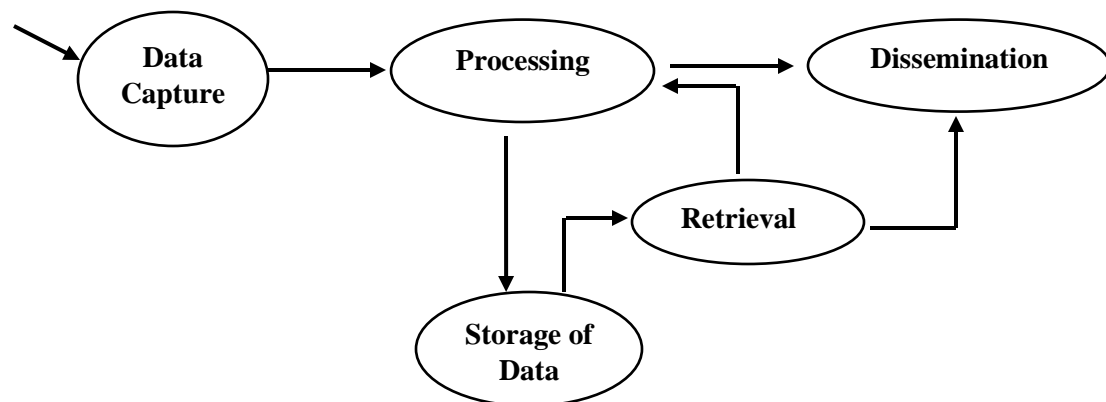
Components of MIS

The major components of a typical management information system are:

1. **People-** people who use the information system.
2. **Data-** the data that the information system records.
3. **Business Procedures-** procedures put in place on how to record, store and analyze data.
4. **Hardware-** these include servers, workstations, networking equipment, printers, etc.
5. **Software-** these are programs used to handle the data. These include programs such as spreadsheet programs, database software, etc.

Objectives of MIS

1. **Data Capturing:** MIS capture data from various internal and external sources of organization. Data capturing may be manual or through computer terminals.
2. **Processing of Data:** The captured data is processed to convert into required information. Processing of data is done by such activities as calculating, sorting, classifying, and summarizing.
3. **Storage of Information:** MIS stores the processed or unprocessed data for future use. If any information is not immediately required, it is saved as an organization record, for later use.
4. **Retrieval of Information:** MIS retrieves information from its stores as and when required by various users.
5. **Dissemination of Information:** Information, which is a finished product of MIS, is disseminated to the users in the organization. It is periodic or online through computer terminal.



Objective of MIS

Information requirements for MIS

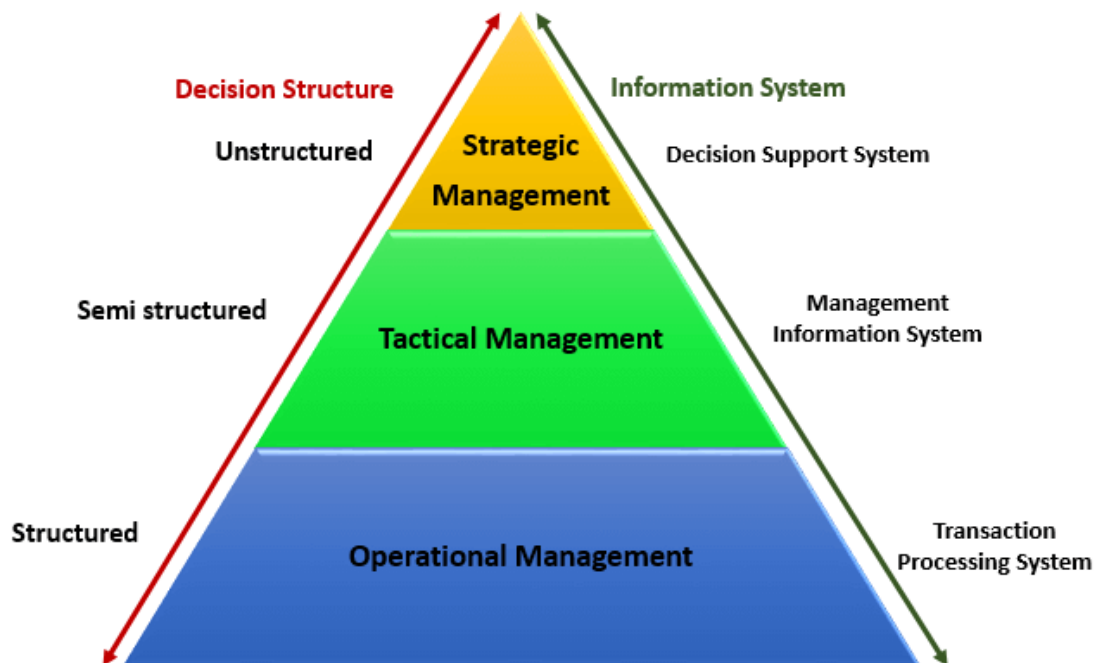
1. Assessing information needs
2. Levels of information requirements
 - Organizational level
 - Application level
 - User level
3. Strategies for determining information requirements

The common thread of activity in all the management functions is information management.

Information Needs for the Different Levels of Management

Understanding the various levels of an organization is essential to understand the information required by the users who operate at their respective levels.

The following diagram illustrates the various levels of a typical organization.



Information Needs of Different Levels of Management

Levels of Management	Problems handled/ decisions made	Type of information required
Top level (Strategic Management)	<ul style="list-style-type: none"> • Unstructured problems. 	<ul style="list-style-type: none"> • Strategic information from within the organization and outside.
Middle level (Tactical Management)	<ul style="list-style-type: none"> • Decisions are based on situations not/rarely handled in the past. • Decision-making variable not clearly defined. • Semi structured/structured problems. • Decisions on regular issues. 	<ul style="list-style-type: none"> • Information about likely scenarios. Information that can be analyzed in different ways. • Exception reports. • Regular summarized reports.
Lower Level (Operational Management)	<ul style="list-style-type: none"> • Decisions on tactical issues. • Structured problems. • Structured decision-making. • Decision-making on the basis of set rules. 	<ul style="list-style-type: none"> • Information that can be drilled deeper for insight. • Information to help find out exceptions so that they can be reported to top management • Operational information. • Rule based information, guidelines, handbook level information.

Decision Support System (DSS)

- A decision support system (DSS) is a computerized information system used to support decision-making in an organization or a business.
- A DSS is a collection of integrated software applications and hardware that form the backbone of an organization's decision making process and help to make decisions, which may be rapidly changing and not easily specified in advance.

Characteristics of Decision Support System

The following are the list of the characteristics of a DSS.

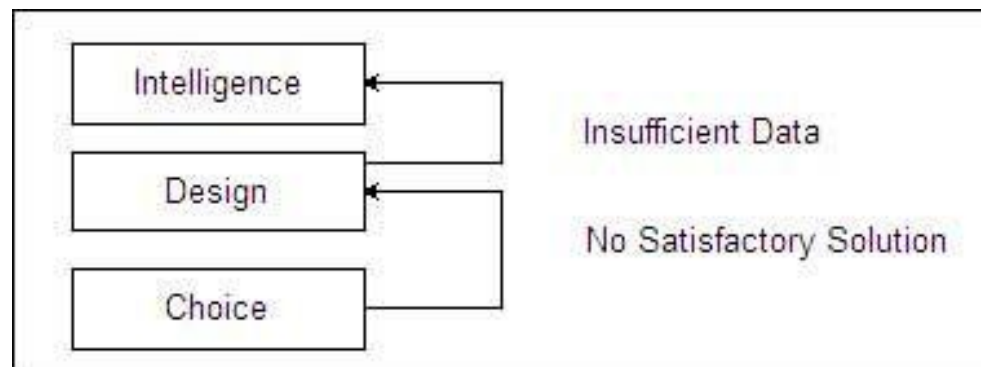
1. **Facilitation.** DSS facilitate and support specific decision-making activities and/or decision processes.
2. **Interaction.** DSS are computer-based systems designed for interactive use by decision makers or staff users who control the sequence of interaction and the operations performed.
3. **Ancillary.** DSS can support decision makers at any level in an organization. They are NOT intended to replace decision makers.
4. **Repeated Use.** DSS are intended for repeated use. A specific DSS may be used routinely or used as needed for ad hoc decision support tasks.
5. **Task-oriented.** DSS provide specific capabilities that support one or more tasks related to decision-making, including: intelligence and data analysis; identification and design of alternatives; choice among alternatives; and decision implementation.
6. **Identifiable.** DSS may be independent systems that collect or replicate data from other information systems OR subsystems of a larger, more integrated information system.
7. **Decision Impact.** DSS are intended to improve the accuracy, timeliness, quality and overall effectiveness of a specific decision or a set of related decisions.

Hebert A. Simon ‘Decision Support System Model’

Herbert Simon made key contributions to enhance our understanding of the decision-making process. In fact, he pioneered the field of decision support systems. According to (Simon 1960) and his later work with (Newell 1972), decision-making is a process with distinct stages. He suggested for the first time the decision-making model of human beings. His model of decision-making has three stages:

- Intelligence which deals with the problem identification and the data collection on the problem.
- Design which deals with the generation of alternative solutions to the problem at hand.
- Choice which is selecting the 'best' solution from amongst the alternative solutions using some criterion.

The figure given below depicts Simon's decision-making model clearly.



Simon's Model of Decision Support System

1. Intelligence Phase

This is the first step towards the decision-making process. In this step the decision-maker identifies/detects the problem or opportunity. A problem in the managerial context is detecting anything that is not according to the plan, rule or standard.

Intelligence phase of decision-making process involves-

Problem Searching: For searching the problem, the reality or actual is compared to some standards. Differences are measured & the differences are evaluated to determine whether there is any problem or not.

Problem Formulation: When the problem is identified, there is always a risk of solving the wrong problem. In problem formulation, establishing relations with some problem solved earlier or an analogy proves quite useful.

2. Design Phase

Design is the process of designing solution outlines for the problem. Alternative solutions are designed to solve the same problem. Each alternative solution is evaluated after gathering data about the solution. The evaluation is done on the basis of criteria to identify the positive and negative aspects of each solution. Quantitative tools and models are used to arrive at these solutions. At this stage the solutions are only outlines of actual solutions and are meant for analysis of their suitability alone. A lot of creativity and innovation is required to design solutions.

3. Choice Phase

It is the stage in which the possible solutions are compared against one another to find out the most suitable solution. The 'best' solution may be identified using quantitative tools like decision tree analysis or qualitative tools like the six thinking hats technique, force field analysis, etc.

In these three phases if the manager fails to reach a decision, he starts the process all over again from intelligence phase where additional data and information is collected, the decision making process is refined, the selection criteria is changed and a decision is arrived at.

Structured VS Un-structured Decisions

- A structured decision is one in which the phases of the decision-making process (intelligence, design, and choice) have standardized procedures, clear objectives, and clearly specified input and output. There exists a procedure for arriving at the best solution.
- An unstructured decision is one where not all of the decision-making phases are structured and human intuition plays an important role.

Difference between Structured and Un-structured Decisions-

Sr.	Structured Decisions	Unstructured Decisions
1.	These decisions are made under the established situations.	These decisions are made under the emergent situation.
2.	They are programmable decisions and preplanned.	They are creative and they are not preplanned.
3.	These decisions are made in the situations which are fully understood	These decisions are made in the situations which are uncertain and unclear.
4.	These decisions are generally made for routine tasks.	These decisions are made for a sudden one-shot kind of situations.
5.	These decisions are made for specified processes like specialized manufacturing processes.	These decisions are made for general processes.

Formal VS Informal Systems

Formal Information System:

A formal information system is based on the organization represented by the organization chart. The chart is a map of position and their authority relationship, indicated by boxes and connected by straight lines. It is concerned with the pattern of authority, communication and work flow.

Informal Information System:

The informal information system is employee based system design to meet personnel and vocational needs and to help in the solution of work-related problems. It also funnels information upward through indirect channels. In this way, it is considered to be a useful system because it works within the framework of the business and its stated policies.

Comparison Chart

Basis for Comparison	Formal Organization	Informal Organization
Meaning	An organization type in which the job of each member is clearly defined, whose authority, responsibility and accountability are fixed is formal organization.	An organization formed within the formal organization as a network of interpersonal relationship, when people interact with each other, is known as informal communication.
Creation	Deliberately by top management.	Spontaneously by members.
Purpose	To fulfill, the ultimate objective of the organization.	To satisfy their social and psychological needs.
Nature	Stable, it continues for a long time.	Not stable
Communication	Official communication	Grapevine
Control mechanism	Rules and Regulations	Norms, values and beliefs
Focus on	Work performance	Interpersonal relationship
Authority	Members are bound by hierarchical structure.	All members are equal.
Size	Large	Small