

## Chapter One

# MIS Concepts and Definitions

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### Introduction:

Information is the basis for every decision taken in an organization. The efficiency of management decision depends upon the availability of regular and relevant information. The main object of management information is to obtain the required information about the operating results of an organization regularly in order to use them for future planning and control.

The old techniques like intuition, rule of thumb, personal whim and status, etc. are now considered as useless in the process of decision taking. Modern management is constantly on lookout for such quality information, which can help in analyzing the proposed alternative actions and choosing one as its decision.

Thus, modern management functions are information-oriented and are more popularly known as “**management by information**”; and the system through which information is communicated to the management is known as “**Management Information System (MIS)**”. The management needs full information before taking any decision. Good decisions can minimize costs and optimize results. Management information system is helpful to the management in undertaking management decisions smoothly and effectively.

### Definition of MIS

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MIS is the combination of three different words i.e. Management, Information and System. To better understand the concept of MIS, it is mandatory to look at each of them separately.

## Management

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Various scholars have described 'Management' in various ways, but Koontz's definition would be considered as a universal definition: "Management is the art of getting things done through and with the efforts of other people."

However, a manager gets things done by performing basic managerial functions. These functions are Planning, Organizing, Staffing, Directing and Controlling which can be seen in Henry Fayol's definition of management.

It can be observed that Henry Fayol defines what a manager does, but it is probably more appropriate to define what management is in this concept (which is clearly seen in Koontz's definition) rather than what management does.

Management is the process of allocating an organization's inputs (all financial and non-financial resources) by planning, organizing, directing, and controlling for the purpose of producing goods or services desired by customers so that organizational objectives are accomplished. If management has knowledge of the planning, organizing, directing, and controlling of the business, its decisions can be made on the basis of facts, and decisions are more accurate and timely as a result.

## Information

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It is the second component of 'MIS'. Information is a data which is processed and presented to decision makers and helps them in making decisions. By **information** we mean data that have been shaped into a form that is meaningful and useful to human beings (managers) to make sound business decision. **Data**, in contrast, are streams of raw facts representing

events occurring in organizations or the physical environment before they have been organized and arranged into a form that people can understand and use.

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.

## **Attributes of a Qualified Information**

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Information can be said to have a number of different characteristics that can be used to describe its quality. The differences between 'good' and 'bad' information can be identified by considering whether or not it has some or all of the attributes of quality information. According to O'Brien (2001) information quality can be described as being divided into three basic categories: **time**, **content** and **form**.

### **The Time Dimension:**

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The time dimension describes the time period that the information deals with and the frequency at which the information is received.

- ✚ **Timeliness.** The information should be available when needed. If information is provided too early, it may no longer be current when used. If the information is supplied too late, it will be of no use.
- ✚ **Currency.** The information should reflect current circumstances when provided. One can go further and suggest that as well as being up-to-date the information should also indicate those areas or circumstances liable to change by the time the information is used.
- ✚ **Frequency.** In addition to being available when needed, information should also be available as often as needed. This normally means that information should be supplied at regular intervals, for example some

organizations may require weekly sales reports whilst others need only monthly reports.

- ✚ **Time period.** The information should cover the correct time period. A sales forecast, for example, might include information concerning past performance, current performance and predicted performance so that the recipient has a view of past, present and future circumstances.

## Content Dimension:

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The content dimension describes the scope and contents of the information.

- ❖ **Accuracy.** Information that contains errors has only limited value to an organization.
- ❖ **Relevance.** The information supplied should be relevant to a particular situation and should meet the information needs of the recipient. Extraneous detail can compromise other attributes of information quality, such as conciseness.
- ❖ **Completeness.** All of the information required to meet the information needs of the recipient should be provided. Incomplete information can compromise other attributes of information quality, such as scope and accuracy.
- ❖ **Conciseness.** Only information relevant to the information needs of the recipient should be supplied. In addition, the information should be provided in the most compact form possible. As an example, sales figures are normally provided in the form of a graph or table – it would be unusual for them to be supplied as a descriptive passage of text.
- ❖ **Scope.** The scope of the information supplied should be appropriate to the information needs of the recipient. The recipient's information needs will determine whether the information should concern organizational or external situations

and whether it should focus on a specific area or provide a more general overview

## Form Dimension:

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The form dimension describes how the information is presented to the recipient.

- **Clarity.** The information should be presented in a form that is appropriate to the intended recipient. The recipient should be able to locate specific items quickly and should be able to understand the information easily.
- **Detail.** The information should contain the correct level of detail in order to meet the recipient's information needs. For example, in some cases highly detailed information will be required whilst in others only a summary will be necessary.
- **Ordered.** Information should be provided in the correct order. As an example, management reports normally contain a brief summary at the beginning. This allows a manager to locate and understand the most important aspects of the report before examining it at a higher level of detail.
- **Presentation.** The information should be presented in a form that is appropriate to the intended recipient. Different methods can be used to make information clearer and more accessible to the recipient, for example it is common to present numerical information in the form of a graph or table.
- **Media.** Information should be presented using the correct medium. Formal information, for example, is often presented in the form of a printed report, whereas a presentation might make use of a slide projector.

## System

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The word 'System' is a set of elements that are inter-related and interdependent to achieve a common goal. From the system point of view, each element is fully dependent over the other in order to accomplish its role. If one of the components of the system is failed to function, the whole system activity will be down (stopped).

## **Definition of Management Information System (MIS)**

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After discussing the three components of MIS, now we shall try to understand its definition. While discussing the components of MIS, it has been cleared that decision making is an important part of managerial functions. For taking adequate decisions, Management Information (MI) is necessary as it works as a vital input.

A system which consists of people, procedures, machines, data, and communication network as its components is known as Management Information System. This system collects data from external and internal sources of an organization, analyzes it and supplies management information to managers and helps them in making decisions.

## **Nature and Scope of MIS**

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MIS is neither a pure science nor an art; it is recognized as a combination of both. It has been much analyzed on the issue whether MIS is management-oriented or computer-oriented. Applications in MIS are found in computers and because of this MIS may be described as Computer-Based MIS (CBMIS).

## **Functions of MIS**

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According to **Milind Gandhi** MIS is set up by an organization with the prime objective to obtain management information to be used by its managers in decision making. Thus, MIS must perform the following functions in order to meet its objectives.

- ✚ **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 a paper form, or enter it directly into a computer system.
- ✚ **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. These activities organize, analyze, and manipulate data using various statistical, mathematical, operations research and other business models.
- ✚ **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.
- ✚ **Retrieval of Information:** MIS retrieves information for its stores as and when required by various users. As per the requirements of management users, the retrieved information is either disseminated as such or it is processed again to meet the exact MI demands.
- ✚ **Dissemination of MI:** Management Information, which is a finished product of MIS, is disseminated to the users in the organization.

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## Subsystems of MIS

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A system is defined as a set of interrelated components, with a clearly defined boundary, working together to achieve a common set of objectives by accepting inputs and producing outputs in an organized transformation process.

Systems have three basic functions:

- **Input** involves capturing and assembling elements that enter the system to be processed. For example, raw materials, energy, data, and human effort must be secured and organized for processing.
- **Processing** involves transformation processes that convert input into output. Examples are manufacturing processes, the human breathing 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.

The system concept becomes even more useful by including two additional elements: feedback and control. A system with feedback and control functions 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 are feedback to a sales manager. Data about the speed, altitude, attitude, and direction of an aircraft are feedback to the aircraft's pilot or autopilot.
- **Control** involves monitoring and evaluating feedback to determine whether a system is moving toward the achievement of its goal. The control function then makes the necessary adjustments to a system's input and processing components to ensure that it produces proper output.

A typical firm also has different systems supporting the decision-making needs of each of the main management groups. Operational management, middle management, and senior management each use systems to support the decisions they must make to run the company. Let's look at these systems and the types of decisions they support.

Conceptually, information systems in the real world can be classified in several different ways. But from the MIS point of view information systems can be classified conceptually into operations support and management support information systems. Several sub systems are there within these two broader classifications of information systems.

### Operations support systems:

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Information systems have always been needed to process data generated by, and used in, business operations. Such operations support systems produce a variety of information products for internal use. However, they do not emphasize producing the specific information products that can best be used by managers. Further processing by management information systems is usually required.

### **Transaction Processing Systems:**

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Transaction processing systems today generally work in on-line mode by immediately processing a firm's business transactions. A Transaction is an elementary activity conducted during business operations.

TPS may work either in batch mode, processing accumulated transactions at a single time later on, or in on-line mode, processing incoming transactions immediately. Today, most TPS work in the on-line mode.

### **Office Automation Systems:**

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The main objective of OAS is to facilitate communication between the members of an organization and between the organization and its environment. OAS are used to:

1. Help manage documents represented in an electronic format
2. Handle messages, such as electronic mail, facsimile, and voice mail
3. Facilitate teleconferencing and electronic meetings
4. Facilitate the use of the Internet for communication and access to information
5. Facilitate the use of task-oriented teams through the use of groupware

### **Professional Support Systems:**

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Professional support systems help in tasks specific to various professions. As both organizational and individual experience with information systems grow, more and more specialized categories of professional support systems emerge.

### **Management Support Systems:**

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When information system focuses on providing information and support for effective decision making by managers, they are called Management Support systems. These systems began when the concept of MIS originated in 1960s. MIS became the byword (and the buzzword) of almost all attempts to relate computer technology and systems theory to data processing in organizations. The concept of MIS was to counteract such inefficient development and ineffective use of computers. MIS concept is recognized as

vital to efficient and effective information systems in organizations for two major reasons:

1. It emphasizes the management orientation of information technology in business. A major goal of computer based information system should be the support of *management decision making*, not merely the processing of data generated by business operations.
2. It emphasizes that the system framework should be used for organizing information systems applications. Business applications of information technology should be viewed as interrelated and integrated computer-based information systems and not as independent data processing jobs.

### **Management Reporting Systems:**

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The objective of management reporting systems is to provide routine information to managers. Managers receive performance reports within their specific areas of responsibility. Generally, these reports provide internal information rather than spanning corporate boundaries. They report on the past and the present, rather than projecting the future.

In order to prevent information overloads, managers may resort to using demand or exception reports.

- ☉ Demand reports are requested when needed.
- ☉ Exception reports are produced only when pre-established out-of-bounds conditions occur and contain only the information regarding these conditions.

### **Decision Support Systems:**

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The decision support systems directly support a decision-making session. These systems facilitate a dialog between the user, who is considering alternative problem solutions, and the system that provides built-in models and access to databases. The DSS databases are often extracts from the general databases of the enterprise or from external databases.

### **Executive Information Systems:**

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Executive information systems support top managers with conveniently displayed summarized information, customized for them. They make a variety of internal and external information readily available in a highly summarized and convenient form. EIS are used to:

1. Monitor the performance of the organization
2. Assess the business environment

3. Develop strategic directions for the company's future

### **Expert Systems in Information Systems:**

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Expert systems are system that employs knowledge about its application domain and uses an inference (reason) procedure to solve problems that would otherwise require human competence or expertise. The essential component of the knowledge base is heuristics - informal, judgmental elements of knowledge within the expert system's domain, such as oil exploration or stock valuation. The knowledge base is developed by working with domain specialists. It is further enhanced as the system is used.

## **Contemporary Approaches (Characteristics) of MIS**

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**System Approach:** The information system follows a System's approach. The system's approach implies a holistic approach to the study of system and its performance in light of the objective for which it has been constituted.

**Management Oriented:** This is an important characteristic of MIS. For designing of MIS, top-down approach should be followed. Top-down approach suggests that the system development starts from the determination of management needs and overall business objectives.

- ✚ The MIS development plan should be derived from the overall business plan.

- ✚ Management oriented characteristic of MIS also implies that the management actively directs the system development efforts.

**Need Based:** MIS design and development should be as per the information needs of managers at different levels (strategic planning level, management control level and operational control level). In other words, MIS should supply information to the specific needs of managers in an organization's hierarchy.

**Exception Based:** MIS should be developed on the exception based reporting principle, which means an abnormal situation, i.e. the maximum; minimum or expected values vary beyond tolerance limits. In such situations, there should be exception reporting to the decision maker at the required level.

**Future Oriented:** Besides exception based reporting, MIS should also look at the future. In other words MIS should not only provide past or historical information; rather it should provide information, on the basis of projections based on which actions may be initiated.

**Integrated:** Integration is a necessary characteristic of a management information system. Integration is significant because of its ability to produce more meaningful information. For example, in order to develop an effective production scheduling system, it is necessary to balance such factors as:

- ✓ Set-up costs,
- ✓ Work force
- ✓ Overtime rates
- ✓ Production capacity

**Long Term Planning:** MIS is developed over relatively long periods. Such system does not develop overnight. A heavy element of planning is involved. The MIS designer must have the future objectives and needs of the company in mind.

**Sub-System Concept:** The process of MIS development is quite complex and one is likely to lose insight frequently. Thus, the system, though viewed as a single entity, must be broken down into digestible sub-systems which are more meaningful at the planning stage.

**Central Database:** A central database is the mortar that holds the functional systems together. Each system requires access to the master file of data covering inventory, personnel, vendors, customers, etc. If the data is stored efficiently and common usage in mind, one master file can provide the data needed by any of the functional systems. It seems logical to gather data once, to properly validate it and to place it on a central storage medium, that Can BE accessed by any other sub system.

## What Is Information Technology?

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Information technology is one of the many tools managers use to cope with change. It consists of computer hardware, computer software, data management technology, and networking and telecommunication technology.

- ✚ **Computer hardware** is the physical equipment used for input, processing, and output activities in an information system. It consists of the following: computers of various sizes and shapes (including mobile handheld devices); various input, output, and storage devices; and telecommunications devices that link computers together.

- ✚ **Computer software** consists of the detailed, preprogrammed instructions that control and coordinate the computer hardware components in an information system.
- ✚ **Data management technology** consists of the software governing the organization of data on physical storage media. We can manage data from different point of views; for example if the data on hand is very valuable, we can then held and make secured from getting lost using different technologies such as by duplicating, encrypting, by using complex password, and the like.
- ✚ **Networking and telecommunications technology**, consisting of both physical devices and software, links the various pieces of hardware and transfers data from one physical location to another. Computers and communications equipment can be connected in networks for sharing voice, data, images, sound, and video. A **network** links two or more computers to share data or resources, such as a printer.

The world's largest and most widely used network is the **Internet**. The Internet is a global "network of networks" that uses universal standards to connect millions of different networks with more than 4.4 billion users in over 230 countries around the world.

Internal corporate networks based on Internet technology are called **intranets**. Private intranets extended to authorized users outside the organization are called **extranets**, and firms use such networks to coordinate their activities with other firms for making purchases, collaborating on design, and other inter-organizational work. For most business firms today, using Internet technology is both a business necessity and a competitive advantage.

All of these technologies, along with the people required to run and manage them, represent resources that can be shared throughout the organization and constitute the firm's **information technology (IT) infrastructure**.

The IT infrastructure provides the foundation, or *platform*, on which the firm can build its specific information systems. Each organization must carefully design and manage its IT infrastructure so that it has the set of technology services it needs for the work it wants to accomplish with information systems.