

The importance of management information systems

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Introduction

Every aspect of management in the modern age relies heavily on information to thrive. Nothing moves without information and it is generally believed that information is power and that he who has it has power. It is an important resource needed to develop other resources. Changing circumstances and environments have necessitated the need for the proper dissemination of information at various levels of management. The development and use of information management systems (MIS) is a modern phenomenon concerned with the use of appropriate information that will lead to better planning, better decision making and better results.

In discussing this topic, certain fundamental concepts need to be understood and appreciated. Some of these are: the information concept; the information management concept; the information system concept and the management information concept. These concepts must be fully grasped before the importance of MIS can be appreciated.

In this essay, an attempt will be made to examine these concepts and relate them to organizational processes and structures. In addition, management functions and the different levels of management will also be highlighted. Finally, an attempt will be made to relate the MIS to those functions and levels in organizational settings. This approach will help in explaining the importance and effect of MIS in management.

The information concept

The concept of information in an organizational sense is more complex and difficult than the frequent use of this common word would suggest. Every society, no doubt, is an information society and every organization is an information organization. Therefore, information is a basic resource like materials, money and personnel. Information can be considered either as an abstract concept (ideas) or as a commodity, usually in the form of letters and reports.

Essentially, therefore, information has become a critical resource, just like energy, both of which are vital to the wellbeing of individuals and organizations in the modern world.

Like energy and politics, technology is changing the ways in which information is captured, processed, stored, disseminated and used. Information, therefore, like any other resource in an organization, should be properly

managed to ensure its cost-effective use. It is an ingredient that is vital to good management and if properly managed, should rank in importance with the organization's personnel, material and financial resources. In an organizational context, it is increasingly being recognized as a resource independent of the technology used in manipulating it.

The implication of this realization is the further recognition that information is the cohesive element that holds an organization together. Information is an unusual commodity, quite unlike most physical goods or consumer durables. Since it is intangible, it is often hard to enforce custody. For this simple reason, it is often crucial to highlight the significant differences between this resource and others when developing a management framework. Its content can be distinguished either by source (internal or external) or by form (numeric or non-numeric). Non-numeric can either be structured or unstructured. Internal information is that generated within an organization and generally is of interest and value only to decision makers within that organization. External information can be regarded as that created by others, that is, outside the four walls of the organization, generally by publishers in the form of books or journals, or by Governments, external contacts and the like. Information professionals have a surprising range of ideas on what information is. They have not been able to produce a widely acceptable definition.

Zorkoczy (1981) defines information "as the meaning that a human expresses by, or extracts from, representations of facts and ideas, by means of the known conventions of the representations used". This definition includes the word "meaning" which is just as intangible and elusive as "information". Stonecash (1981) also defines information by stating that "information is simply symbols (data, text, images, voices, etc.) that convey meaning through their relative ordering, timing, shape, context, etc. ... information is the raw material for making decisions for creating knowledge and fuelling the modern organization". As a concept, information has always connoted different meanings to various information professionals, depending on what side of the information profession they belong.

Elliss (1986) rightly observes that "the data processing manager might conceive it in terms of data, the records manager in terms of records and reports, the librarian or information scientist in terms of documents or other materials".

There are three major information worlds which have traditionally been divided and separated. The first is the literature world of libraries and archives, where information has been put into recorded form. The second is the document world of information centres and record centres, where information has been collected and organized but perhaps not seriously evaluated in the same sense as in the literature world.

The third information world is the data world of computers, telecommunications and automated information systems where the information is often numerical or structured (David, 1982). Two key variables distinguish the three categories: "time frame" and "storage medium". Information professionals can no longer claim ignorance of generic information. The perception of a generic

similarity in terms of roles and perceptions of information has been summed up as “records, words, data ... whatever you call it, it’s still information”(Mass, 1982).

In fact, the increasing recognition of information as a generic concept in recent times, coupled with the continued proliferation of computer-based information systems and the integration of formerly discrete information systems led Getz (1982) to suggest coalescence as an inevitable fate. He sees the manager of an organization that results from the coalescence as a generalist, with a solid understanding of technology but with a better understanding of business conditions and needs.

However, he is not without his bias for management information system (MIS) managers. He feels they are the right professionals to play the role of information managers in the organization, as he concludes that either the MIS manager will take the initiative to lead this merger of the firm’s data resources activities and make some sense of their management, or a manager outside of the MIS organization will do it for him. It is in the context of this coalescence that the employment of the term “information management” can best be understood as a method of describing the activity or work role created by any such coalescence in an organization. Management information is information produced for decision making. It can either be structured or unstructured.

The information management concept

Information management has been defined as the organization-wide capability of creating, maintaining, retrieving and making immediately available the right information, in the right place, at the right time, in hands of the right people, at the lowest cost, in the best media, for use in decision making (Langemo, 1980). In the same vein, Best (1988) defines information management as the economic, efficient and effective co-ordination of the production, control, storage and retrieval and dissemination of information from external and internal sources, in order to improve the performance of the organization. This definition is narrow in perspective in that it does not take care of managing the characteristics of information itself (content, ownership, representation and equality), irrespective of the storage medium, equipment that processes it and the system that employs it. In summary, therefore, the key issue involved in information management is managing information in an organization using modern information technologies.

The information systems concept

The rapid evolution of computer technology is expanding man’s desire to obtain computer assistance in solving more and more complex problems: problems which were considered solely in the domain of man’s intuitive and judgemental processes, particularly in organizations, a few years ago. Information systems are becoming of ever greater interest in progressive and dynamic organizations. The need to obtain access conveniently, quickly and economically makes it imperative to devise procedures for the creation, management and utilization of databases in organizations. Management information and information systems, in particular those related to effective decision-making processes in an

organization, i.e. MIS, are regarded as valuable organizational resources. Simply put, an information system is a system for accepting data/information as a raw material and through one or more transmutation processes, generating information as a product. It comprises the following functional elements which relate to the organization and its environments:

- *perception* – initial entry of data whether captured or generated, into the organization;
- *recording* – physical capture of data;
- *processing* – transformation according to the “specific” needs of the organization;
- *transmission* – the flows which occur in an information system;
- *storage* – presupposes some expected future use;
- *retrieval* – search for recorded data;
- *presentation* – reporting, communication; and
- *decision making* – a controversial inclusion, except to the extent that the information system engages in decision making that concerns itself.

Although critics may be right to object to the inclusion of the last item, it has to be noted that relationships between the processes of the information system and decision making are close enough to raise the question of including decision making as part of the information function elements specifically designed for an organization. Whatever way one looks at an information system, it is generally expected to provide not only a confrontation between the user and information, but also, the interaction required for relevant and timely decision making. Its main purpose is to satisfy users' information needs.

Approaching information systems in an organizational content shows that it is a sub-system within an organizational system which is a “living and open” system. Academics interested in information works and information practitioners alike have defined information systems in various ways but with basic ideas of people, information technology and procedures which enable the facilitation of the generation, use and transfer of information.

Although information systems are considered to belong to an applied discipline, there is need for an understanding of their underlying basic concepts by information practitioners. The definition of information systems by Duff and Assad (1980) is considered to be adequate:

a collection of people, procedures, a base of data and (sometimes) hardware and software that collects, processes, stores and communicates data for transaction processing at operational level and information to support Management decision making.

Certain deductions can be made from the above definition that:

- the definition covers the what, how and why of information systems;
- an information system can be manual or computer-based;

- that information systems have existed in organizations and always will;
- that an information system is supposed to support both the basic operations of an organization and its management;
- a distinction seems to be made between data for transaction processing purposes and information for decision-making purposes; and
- the definition has provided what can be considered as basic concepts underlying information systems, namely: people, management, information, systems and organizations.

The attributes indicated above can be considered as major attributes or essential elements for developing an information system concept in an organizational context. In order to understand the information system concept further, Salton (1975) highlighted the most important computer-based information systems as follows:

- information retrieval system (IR);
- question-answering system;
- database system (DBS);
- management information system (MIS);
- decision support system (DSS).

The focus in this essay is the management information system (MIS). It therefore must be emphasized that MIS is a sub-system of information systems.

Management information systems (MIS)

One approach by which organizations can utilize computing capability is through the development of MIS. There is no universally accepted definition of MIS and those that exist reflect the emphasis and perhaps prejudices of their authors. However, the term “management information system” can be seen as a database management system tailored to the needs of managers or decision makers in an organization. MIS is

a system using formalized procedures to provide management at all levels in all functions with appropriate information based on data from both internal and external sources, to enable them to make timely and effective decisions for planning, directing and controlling the activities for which they are responsible (Argyris, 1991).

It will be noted from the above definition that the emphasis is on the uses to which the information is put. Planning, directing and controlling are the essential ingredients for “management”.

In essence, the processing of data into information and communicating the resulting information to the user is the key function of MIS. It should, therefore, be noted that MIS exist in organizations in order to help them achieve objectives, to plan and control their processes and operations, to help deal with uncertainty, and to help in adapting to change or, indeed, initiating change. The question one may then ask is: What are the management functions that MIS facilitates and what are

the various decision levels at which management information can be put into use? It is through a thorough answer to this question that the importance of MIS in management can be realized. However, before we can examine management functions, it is essential we discuss organization processes and structures.

Organization processes and structures

It is pertinent to mention at this juncture that the activities of the information system take place within the organizational structure and that the MIS seeks to serve the organization's objectives. Therefore, it is important for information specialists to have a working knowledge of what organizations are, their structures and factors which influence their methods and operations. There is no universally-accepted definition of an organization, but Kempner's (1976) is quite an interesting one. He states that an

organization is a pattern of ways in which large numbers of people engage in a complexity of tasks, relate themselves to each other in the conscious, systematic establishment and accomplishment of mutually agreed purposes (Kempner, 1976).

The formal organization is represented by the organizational chart and by official standards and procedures, while the informal organization is the social interaction between the members of the organization, their behaviour and relationships and all the non-standard ways of conducting operations.

The development of effective MIS is dependent on recognition of the organization within an organization because the relationships depicted in formal organizational charts are not always the key relationships, and people have a way of altering standardized, official procedures: "cutting through the red tape" and "beating the bureaucracy" are phrases commonly used to describe this process. It is therefore important for information systems designers to be aware of various influences on organizational design.

Management functions and levels

It should be noted that the value of any information is derived from the actions that management takes as a result of using that information. It follows that information specialists need to know what type of tasks and functions management have to perform so that they are able to produce relevant and usable information. The functions of management can be grouped into five areas: planning; decision making; organization and co-ordinating; leadership and motivation and control. Obviously, the emphasis given to each area varies from manager to manager and is especially dependent on the level of the manager in the organization. There are clear differences in information requirements between a manager at the operational or transactional level, such as transport supervisor, and a manager at the tactical level, such as accounts or sales manager, or at the strategic level, such as managing director/board of directors. At the highest (strategic) level, structured, formal MIS may actually be counter-productive, for at these levels informal MIS and external influences become increasingly important.

Another factor which affects the tasks a manager has to perform, and hence his or her information requirements, is the extent of functional authority within an organization. Functional authority is that which is exercised by specialists, managers and staff throughout the various departments and units of the organization. Possibly, the most common example of this is the personnel department which has functional responsibilities for many personnel and industrial relations activities throughout the whole organization. While each of the five functional areas which constitute the task of management needs relevant information, three particular areas – planning, decision making and control – make heavy demands on the organization's MIS.

The nature of planning and decision making and the available techniques

Planning and decision making have rightly been called the primary management tasks and these tasks occur at every level of management, although naturally the type of planning and decision making will vary between the levels. Planning is the process of deciding in advance what is to be done and how it is to be done. The planning process results in plans which are predetermined courses of action that reflect organizational objectives and these plans are implemented by decisions and actions. Thus, effective planning and decision making are inextricably linked, for without decisions and actions, the planning process is a sterile exercise.

In order to provide appropriate information, MIS designers must be aware of the types of decisions at the various levels of the organization. A useful classification is that given by H.A. Simon who classified decision making into programmed and non-programmed. Programmed decisions are those that are routine and repetitive and where decision rules are known. Conversely, non-programmed decisions are novel and unstructured and the nature of the problem and decision rules are complex and little understood. It follows from these brief descriptions that radically different information and procedures are required for the different decision types, which have obvious implication for MIS design.

To create value from information, changes in decision behaviour must result and consequently there must be a decision focus to the MIS. This means that MIS must be designed with due regard to the types of decisions, how decisions are taken, how the decision makers relate to the organization, the nature of the organization, its environment and so on. Acceptance and understanding of this emphasis by both managers and information professionals is the primary requisite to effective MIS design.

The importance of MIS to management

In all but the smallest organizations management rarely observe operations directly. They attempt to make decisions, prepare plans and control activities by using information which they obtain from formal sources – for example, the organization's MIS – and also by informal means such as face-to-face conversations, telephone calls, through social contacts and so on.

A management information system is generally thought of as an integrated, user-machine system providing information to support operations, management and decision-making functions in an organization. As a matter of fact, an MIS is a special-purpose system useful for management in an organization. MIS is an accessible and rapid conveyor belt for appropriate high quality information from its generation to its users. The heart of an effective MIS, therefore, is a carefully conceived, designed and executed database. Its level corresponds to adaptive decisions. The characteristics of MIS in practice include:

- an information focus, designed for managers in an organization;
- structured information flow;
- an integration of data processing jobs by business function, such as production of MIS, personnel MIS and so on; and
- inquiry and report generation, usually with a database.

The MIS era has eventually contributed a new level of needed management information. The increasing interest in MIS had led to much activity in developing techniques and software for data management. However, it should be noted that the new thrust in MIS is on the uses to which the information is put and not how it is processed. The emphasis is on managing the information as a resource, which is important, and not on the intermediate processing stage. Managements are faced with an accelerating rate of change and an ever more complex environment.

Managers need relevant information, which is information that increases their knowledge and reduces their uncertainty. Thus it is usable by the manager for its intended purpose. Without relevant information, no manager can function effectively. A worthwhile extension to the well-known adage that “management get things done through people,” would be that management get things done through people, by using relevant information retrieved from MIS. It is not an exaggeration to state that MIS is the lifeblood of management. Let us look at what management information systems can do to management in two different settings – in an organization and in a library.

The efficient performance of an organization is dependent very much on the internal performance of the organization’s resources. To illustrate the use of a management information system in monitoring the performance of resources, the following examples from the human resource aspect of a management information system will suffice. An organization’s output performance is directly related to the motivation and performance of its human resources. A high staff turnover rate which is monitored by the management information system and identified as occurring in a particular department or in a particular category of staff can indicate poor performance on the part of the employer. Also, a high turnover rate of clerical staff may indicate that management practices do not assist in providing for career progression, personal development or training opportunities. Through the identification of poor human resource management, corrective measures may be taken which will in turn improve the organization’s output performance.

In a library setting, MIS is the cement that binds together the various elements of a library's organization with one another and with the library's objective of serving its clientele. It provides data necessary for the daily operations of a library as well as for the information, validation and implementation of models. Ideally, it provides information about the effectiveness of library services and operations; about the population of users and the population of non-users; about the library-user interaction and about other relevant factors. Thus, the role of MIS in the library is not too different from what it is in any other organization. It specifically helps in the provision of information that will enable library management to have an overview of their performance and to set in motion, when necessary, machinery for improved and efficient services to users.

Problems with MIS

There is abundant evidence from numerous surveys conducted in developed countries, particularly in the UK and USA, that existing MIS, often using advanced computer equipment, have had relatively little success in providing management with the information it needs. Reasons discovered include the following:

- lack of management involvement with the design of the MIS;
- narrow or inappropriate emphasis of the computer system;
- undue concentration on low-level data processing applications particularly in the accounting area;
- poor appreciation by information specialists of management's true information requirements and of organizational problems; and
- lack of top management support.

To be successful, an MIS must be designed and operated with due regard to organizational and behavioural principles as well as technical factors. Management must be informed enough to make an effective contribution to system design, and information specialists (including systems analysts, accountants and operations researchers) must become more aware of managerial functions and needs so that, jointly, more effective MIS are developed. Management do not always know what information they need and information professionals often do not know enough about management in order to produce relevant information for the managers they serve. There is no doubt that better communication between management and information professionals and a wider knowledge by both groups of MIS principles would greatly facilitate the task of developing relevant and appropriate information systems. It should be noted, however, that there is no simple checklist of essential features which, if followed, will automatically produce the perfect MIS. What is required is an awareness and understanding of key principles and functions so that the design, implementation and operation of the MIS is the result of informed decisions and judgement rather than haphazard development without regard to real organizational requirements.

However, one question which needs to be answered is: are computers essential for MIS? The answer to this question is that the computer is not essential but can be very useful. The study of MIS is not about the use of computers, it is about the provision and use of information relevant to the user. Undoubtedly, there is an important and growing role for computers and IT in MIS but the technology must be used with discretion. Computers are good at rapid and accurate calculations, manipulation, storage and retrieval but less good at unexpected demands or qualitative analysis or where genuine judgement is required. Computers, certainly, can be used to the best advantage for processing information.

Conclusion

In this essay, attempts have been made to examine the MIS, its problems and importance in an organizational setting. One may conclude that MIS is the lifeblood of any organization. Both public and private sectors must be committed to seeking formal or organized information before taking decisions. Management problems will be provided with specific answers through computer simulations and gaming techniques. Today's managers must be careful, as they can become inundated with only marginally relevant facts rather than be presented with concrete and absolutely useful information. This situation can be avoided where a virile and functional MIS unit is put in place.

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