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The Role of Management Support Systems (MSSs) for Manager's effective Decision Making Process : An Overview

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Abstract

In today's world of ever-increasing complexities of business as well as management, every business organization, in order to survive and grow, must have a properly planned, analyzed, designed and maintained Management Information System (MIS) so that it provides timely, reliable and useful information to enable the management to take speedy, effective and rational decisions. There are varieties of information systems such as TPS, DAS, KMS, MIS, DSS, ES,

CSCWS, GDSS and ESS. Each plays a different role in organizational hierarchy and decision making process. In this article the authors have selected different Management Support Systems (MSSs) , as how they effects decision making process in an organization with their role. After discussing the decision making process based on each concept, its characteristics, relations, connections of each concept to decision-making process have been determined. At the same time, different models and figures are presented to enrich the discussion and to highlight precisely the status of each MIS and MSSs information system in organizational decision making.

Keywords: Management Information System, Transaction Processing System, Decision Support System, Managers, Decision Making Process, Management Support Systems

Introduction

For the last two decades, different kinds of information systems are developed for different purposes, depending on the need of the business. Transaction Process Systems (TPS) function in operational level to process large amount of data for routine business transactions of the organization, Office Automation Systems (OAS) support data workers and Knowledge Work Systems (KWS) support professional workers. Higher-level systems include Management Information Systems (MIS) and Decision Support Systems (DSS). Expert System (ES) applies the expertise of decision makers to solve specific, unstructured problems. At the strategic level of management, there is Executive Support Systems (ESS). Group Decision Support Systems (GDSS) and the more generally described Computer Supported Collaborative Work (CSCW) systems aid group level decision making of a semi structured or unstructured decision. In the present article the authors discuss all kinds of Management Support Systems (MSSs), and then their characteristics, interrelationship and their relations with decision-making process in an organization.

Purpose of Decision-making

On the basis of the purpose of the decision-making activities, Robert B. Anthony (1965) has differentiated organizational decisions into three categories, namely, strategic planning decisions, management control decisions and operational control decisions.

Strategic planning decisions are those decisions in which the decision-maker develops objectives and allocates resources to achieve these objectives. Such decisions are taken by strategic planning level (top level) managers. Examples of such decisions may include introduction of a new product, acquisition on another firm etc.

Management control decisions are taken by management control level (middle level) managers and deal with the use of resources in the organization. Analysis of variance, product mix, planning decisions, fall in this category of decisions.

Operational control decisions deal with the day-to-day problems that affect the operation of organizations. Such type of decisions are normally taken by managers at the operational level (bottom level) of the management hierarchy in the organization. Production scheduling.

decisions, and inventory control decisions are the example of operational control decisions.

Because of the overlapping nature of some decisions, Simon (1965) on the basis of the level of the programmability of decision, proposed two types of decisions: programmed and non-programmed decisions

Programmed decisions are routine and repetitive decisions, and the organization typically develops specific ways to handle them. For this kind of routine repetitive decisions, standard arrangement decisions are typically made according to established management guidelines.

Non-programmed decisions, in contrast, are typically one-shot decisions that are usually less structured than programmed decisions (Certo, 1997). Simon's model of decision-making has three steps.

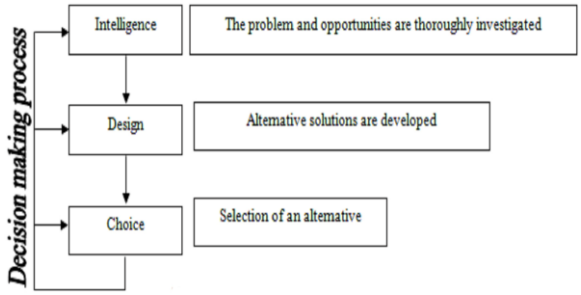


Figure 1. Steps in Simon's Model (Simon, 1965)

After then, Gorry and Scott Morton (1971) classified decisions by its structure into three levels; structured decision, in which the ingredients, or variables, that comprise a decision are known and they can be measured quantitatively. Unstructured decision is one that the ingredients, or variables, that comprise a decision can not be measured quantitatively. Semi structured decision is in between structured and unstructured decisions. Usually most business decisions are semi structured. Then Gory and Morton continued on computer applications in terms of the degree of structure in the decision they are intended to make and the management level that they support (Gorry and Scott Morton, 1971). Figure 3 shows the Gory and Morton grid.

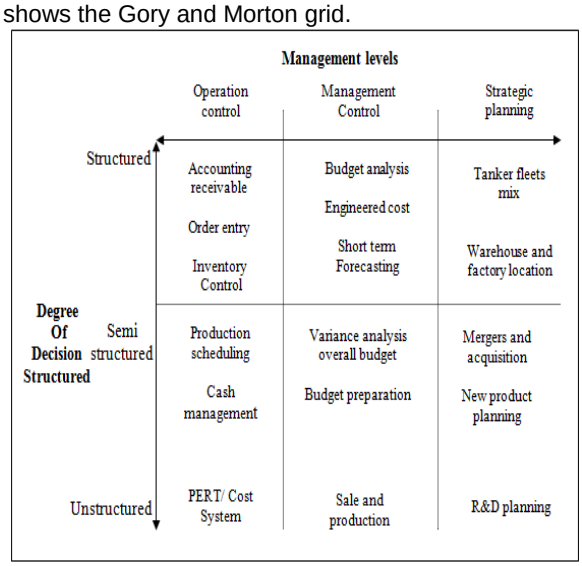


Figure 3. The Gory and Morton grid (Gorry & Scott Michael, 1971)

A review of decision making literature reveals that the core process of decision making process consists of mainly six steps which are shown in Figure 4 .

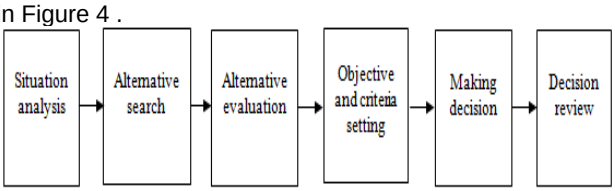


Figure 4. The six-step decision making process (Simon, 1997)

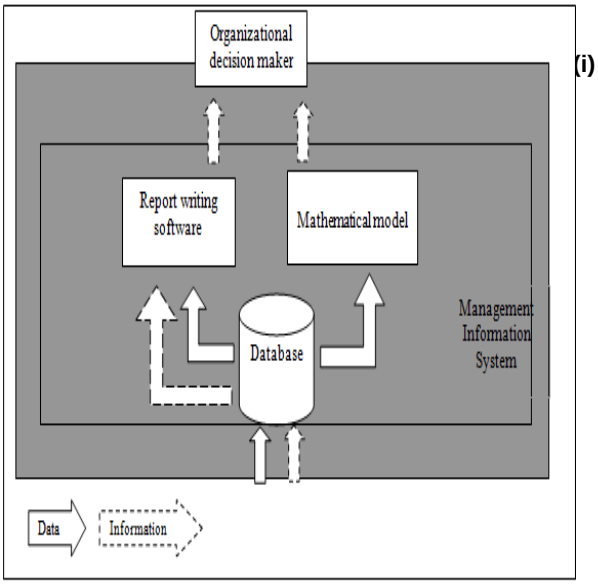
The six-step decision making process increases the likelihood that a high quality, accepted decision will result.

Management Information System (MIS)

The concept of MIS gives high regard to the individual and his ability to use information. An MIS gives information through data analysis. While analyzing the data, it relies on many academic disciplines. These include the theories, principles and concepts from the Management Science, Psychology and Human Behavior, making the MIS more effective and useful. These academic disciplines are used in designing the MIS, evolving the decision support tools for modeling and decision - making.

The foundation of MIS is the principles of management and if its practices. MIS uses the concept of Management Information System can be evolved for a specific objective if it is evolved after systematic planning and design. It calls for an analysis of a business, management views and policies, organization culture and the culture and the management style. The information should be generated in this setting and must be useful in managing the business. This is possible only when it in conceptualized as system with an appropriate design. The MIS, therefore, relies heavily on the systems theory offers solutions to handle the complex situations of the input and output flows. It uses theories of communication which helps to evolve a system design capable of handling data inputs, process, and outputs with the lest possible noise or distortion in transmitting the information form a source to a destination. It uses the principles of system Design, Viz., an ability of continuous adjustment or correction in the system in line with the environmental change in which the MIS operates. Such a design help to keep the MIS tuned with the business managements needs of the organization.

The concept, therefore, is a blend of principle, theories and practices of the Management, Information and System giving rise to single product known as Management Information System (MIS). The conceptual view of the MIS model as given by Raymond, is shown in Fig.5.



(i)

Figure 5. An MIS Model (Raymond, 1990)

MIS Characteristics

In general, Management Information Systems have a number of characteristic, which include the following:

- System Approach
- Management Oriented
- Need Based
- Exception Based
- Future Oriented
- Integrated
- Common Data Flows
- Lon-Term Planning
- Sub-System Concept
- Central Database

The role of MIS in decision making process

The MIS and its organizational subsystems contribute to decision making process in many basic ways. Nowadays, some of the organizations use MIS to assist managers for decision making. For example, to assist decision-makers in extracting synthesized information from a massive database. Power (2002) has stated that making decisions is an important part of working in business environment. Companies often make decisions regarding operational improvements or selecting new business opportunities for maximizing the company's profit. Companies develop a decision-making process based on individuals responsible for making decisions and the scope of the company's business operations. A useful tool for making business decisions is a Management Information System (MIS). Historically, the MIS was a manual process used to gather information and funnel it to individuals responsible for making decisions.

Management Support Systems (MSSs)

Management Support Systems (MSSs) are the information systems' applications that focus on providing information and decision support for effective decision-making by managers. There are various types of information systems that support a variety of decision-making process. For example, Management Information Systems (MIS), Decision Support Systems (DSS), and Executive Support Systems (ESS).

Management Information Systems

Management Information System (MIS) is an information system which processes data and converts it into information. This has been already discussed earlier and depicted diagrammatically in Fig. 5.

Decision Support System

A Decision Support System (DSS) is an information system application that assists decision-making. DSS tends to be used in planning, analyzing alternatives, and trial and error search for solution. Such systems are generally operated through terminal-based interactive dialogues with users. They incorporate a variety of decision-models and thus are capable of performing 'What-if' analysis for managers. DSS differs from most traditional information systems in that usually each decision support system is distinct from the other information system and is tailor-made for every manager. Decision Support Systems, although created and used by managers, are nevertheless a part of the organization's MIS. As decision support system is tailored to a specific managerial task or special problem, its use is limited to that task or problem. Decision support systems tend to be designed primarily to serve at the management control level and strategic planning level managers. The elements of a decision support system include a database, model control and a software providing interactive dialogue facility for the manager. The data in the database typically is a combination of master files(internal corporate data) and data from external sources.

The second components of the DSS is a library of model o manipulate and analyse the data in the desired ways. The model base might include econometric models to forecast demand by industry and simulation models of the corporation.

A user interface is the third component. Through this, the user can communicate with the DSS. The physical interface generally consists of a terminal, hooked up to the mainframe computer, either directly or by telephone. Micro-computers with modems are being used ever more frequently for this interface. These elements are illustrated through Fig. 6.

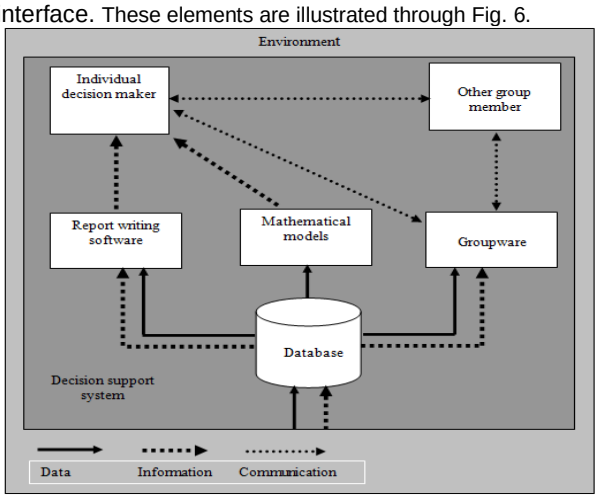


Figure 6. A DSS Model (Raymond, 1998)

In addition, DSS software packages can combine model components to create integrated models that support types of decisions. DSS software typically contains built-in analytical modeling routines and also enables to build own models. Many DSS packages are now available in microcomputer and Web-enabled versions. Of course. Electronic Spreadsheet Packages are provide some of the model building (spreadsheet models) and analytical modeling (what-if and goal-seeking analysis) offered by more powerful latest DSS software. As now-a-days, businesses become aware of the power of decision support systems, they are using them in ever-increasing areas of business.

Many businesses are turning to decision support systems and their underlying models to improve a wide variety of business functions. Examples are given through Figure 7.

Analytical competitors make expert use of statistics and modeling to improve a wide variety of functions. Here are some common applications:		
Function	**Description**	**Exemplars**
Supply chain	**Simulate & optimize supply chain flows; reduce**	**Dell, Wall- Mart, Amazon**
	Inventory and stock-outs.	
Customer selection,	**Identifying customers with the greatest profit**	**Harrah's, Capital One, Barclays**
Loyalty and service	**potential; increase likelihood that they will want**	
	the product or service offering; retain their loyalty.	
Pricing	**Identifying the price that will maximize yield**	**Progressive, Marriott**
	or profit.	
Human Capita	**Select the best employees for particular tasks or**	**New England Patriots, Oakland A's,**
	Jobs at particular compensation levels.	**Boston Red Sox**
Product & Service	**Detect quality problems early and minimize them.**	**Honda, Intel**
Quality		
Financial Performance	**Better understand the drivers of financial performance**	**MCI, Verizon**
	and the effects of nonfinancial factors.	
Research &	**Improve quality, efficacy, and, where applicable,**	**Novartis, Yahoo**
development	**Safety of products and services.**	**Amazon,**

Figure: 7; Source: Adapted from Thomas H. Davenport, "Competing on Analytics", Harvard Business Review, January, 2006.

(iii) Executive Support System

Executive Support System (ESS) is an extension of the management information system, which is a special kind of DSS and provides critical information from various inter-and intra-sources in easy to use displays. An ESS is specially tailored for the use of the chief executive of an organization to support his decision-making. Thus, ESS is a comprehensive information system which includes various types of decision-support systems, but it is more specific and person-oriented. An ESS is designed to cater to the information needs of a chief executive keeping in view not only his requirement but also taking into account his personality and style of functioning etc.

(iv) Enterprise Systems

Enterprise Systems integrates all facets of the organization including its planning, manufacturing, sales, human resource management, customer relationship management, inventory control, customer order tracking, financial management and marketing – i.e. all aspects of business organization.

General Support Systems

The above mentioned categories of information systems have been discussed on the basis of their role in operations and management of a business. However, there are many other applications of information systems which fall in both categories, as they provide support in operations as well as managing of the business. Such information systems may be categorized under general support systems. For example –

(i) Business Expert Systems (BES)
(ii) Knowledge Management Systems
(iii) Strategic Information Systems
(iv) Functional Based Systems .

Business Expert Systems are advanced information systems based on artificial intelligence, which may be referred to as the capability that makes computer display intelligent, human like behavior.

Knowledge Management Systems support the creation, organization and dissemination of business knowledge to managers and other employees of the organisation.

Strategic Information Systems apply information technology to products, services or business processes of an organization to help the organization gain a strategic advantage over its competitor. Functional Business systems are generally developed around the functional areas of a business organization.

Functional Based Systems are based on the different aspects of functions of an organization. Business activities are grouped around functions such as production, marketing, finance, and personnel etc. , resulting in the respective department or an area of the business organization. These departments or functional areas are commonly known as the functional areas of business.

Summary

MIS is in an evolutionary stage. Over the years, it has evolved from an elementary concept to a much advanced discipline of today. It is classified in six classes, namely, transaction processing system, management information system, decision support system, executive support system, office automation systems and business expert systems. As the name indicates, transaction processing system processes transactions and produces reports, whereas MIS processes data and converts it into information. Decision support system is an extension of MIS, which tends to be used in planning, analyzing alternatives and searching for solutions by trial and errors. Such system is interactive in nature and incorporates a variety of decision-models. Executive Support System is a special kind of decision support system which is specially designed and developed for the chief executive. Office automation systems include a wide range of support facilities, which include word processing, electronic filing, electronic mail, data storage, etc. Business expert systems are knowledge – based information systems

Conclusion

Apart from variety of information system in business world, MIS and DSS were given the main concern . It was found that MIS is best suited to identify problems and help management to understand them to make suitable decisions. At the same time, MIS is not aimed to help particular and specific need of the individual and group decision making. On the other hand DSS are tailored to the specific need of individual and group managers. Therefore, it could be concluded, that DSS can extend its support to the same steps of decision making process and has more roles in decision-making and problem solving than MIS. Due to some practical limitations, may be some of steps of decision making process to be chosen and the others to be removed. It is important to consider which ones are preferred to the other ones. In future works can study on the role of other information systems for managers' decision making and comparative it to DSS and MIS.

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