

## MIS AND DECISION MAKING CONCEPTS HERBERT SIMON MODEL OF DECISION MAKING

### 10.1 DECISION-MAKING CONCEPT:

A decision is choice out of several alternatives (options) made by the decision maker to achieve some objective s in a given situation. Business decisions are those, which are made in the process of conducting business to achieve its objective in a given environment. Managerial decision-making is a control point for every managerial activity may be planning, organizing, staffing, directing, controlling and communicating. Decision-making is the art of reasoned and judicious choice out of many alternatives. Once decision is taken, it implies commitment of resources.

The business managers have to take variety of decision. Some are routine and others are long-term implementation decision. Thus managerial decisions are grouped as:

(a) **Strategic decision**

(b) **Tactical decision**

(c) **Operation decision**

1. **Strategic Decision:** these are known as major decision influence whole or major part of the organization. Such decisions contribute directly to the achievement of common goals of the organization; have long range effect upon the organization.

Generally, strategic decision is unstructured and thus, a manager has to apply his business judgment, evaluation and intuition into the definition of the problem. These decisions are based on partial knowledge of the environmental factors which are uncertain and dynamic, therefore such decision are taken at the higher level of management.

2. **Tactical Decision:** tactical decision relate to the implementation of strategic decisions, directed towards developing divisional plans, structuring workflows, establishing distribution channels, acquisition of resources such as men, materials and money. These decisions are taken at the middle level of management.
3. **Operational Decision:** operational decisions relate to day-to-day operations of the enterprise having a short-term horizon and are always repeated. These decisions are based on facts regarding the events and do not require much of business judgments. Operational decisions are taken at lower level of management.

The business decision-making is sequential in nature. In business, the decisions are not isolated events. Each of them has a relation to some other decision or situation. The decision may appear as a ‘snap’ decision but it is made only after long chain of developments and a series of related earlier decisions.

The decision-making process is a complex process in the higher hierarchy of management. The complexity is the result of many factors such as inter-relationship among the experts of decision-makers, a job responsibility, and a question of feasibility, the codes of morals and ethics and a probable impact on business.

The personal values of the decision-maker play a major role in decision-making. A decision otherwise being very sound on the business principle and economically rationality may be rejected on the basis of the personal values, which are defeated if such a decision is implemented. The culture, the discipline and the individual commitment to goals will decide the process and success of the decision.

The decision-making process requires creativity, imagination and a deep understanding of human behavior. The process covers over a number of tangible and intangible factors affecting the decision process. It also requires a foresight to predict the post-decision implication and a willingness to face those implications. All decisions solve a 'problem' but over a period of time they give rise to a number of other 'problems'.

The need of information system in organization is to support the decision-making process. The managers must be aware of problems before decision can be made. A problem exists when the real situation is different than the expected one. After the problem has been identified, the cause of existence of the problem must be identified and then the solution to the problem has to be found. The decision-making process can be divided into three main phases:

- (a) Intelligence: searching the environment for condition calling for decisions. The phase consists of determining that a problem exists.
- (b) Design: during this phase a set of alternative solution is generated and tested for feasibility.
- (c) Choice: in this phase, the decision-maker select one of the solution identified in the design phase.

Thus, the decision process follows the sequence from intelligence to design and from design to choice. It is possible to get back from one phase to another and whole process may be repeated. It is very important to distinguish between programmed and non-programmed decision. If a decision can be based on a rule, method or even guidelines, it is said to be programmed decision. The effectiveness of rule can be analyzed and then rule can be reviewed and modified from time to time for an improvement. The programmed decision-making can be delegated to the lower level in management.

A decision which cannot be made by using a rule or a model is the non-programmed decision. Such decisions are infrequent but the stakes are usually larger. Therefore, they cannot be delegated to the lower level. The MIS in the non-programmed decision situation can help to some extent, in identifying the problem, giving the relevant information to handle the specific decision-making situation. The MIS, in other words, can develop support system in the non-programmed decision-making situation. Advertising budgets, new product decisions and similar problems illustrate the non-programmed type of decision that cannot be automated. The major reason for distinguishing these two types of decisions is to arrive at some classification of decision-making methods in order to improve decision-making.

## **10.2 TYPES OF DECISIONS**

The types of decisions are based on the degree of knowledge about the outcomes or the events yet to take place. If the manager has full and precise knowledge of the event or outcomes which is to occur, then the decision-making is not a problem. If the manager has full knowledge, then it is a situation of certainty. If he has partial knowledge or a probabilistic knowledge then it is decision-making under risk. If the manager does not have any knowledge, whatsoever then it is decision-making under uncertainty.

A good MIS tries to convert a decision-making situation under uncertainty to the situation under risk and further to certainty. Decision-making in the operational management is a situation of certainty. This is mainly because the manager in this field, has full knowledge of environment, and has a predetermined decision alternative for choice or for selection.

Decision-making at the middle management level is of the risk type. This is because of the difficulty in forecasting an event with 100 percent accuracy and the limited scope of generating the decision alternatives. At the top management level, it is a situation of total uncertainty on account of insufficient knowledge of the external environment and the difficulty in forecasting business growth on a long-term basis. A good MIS design gives adequate support to all the three levels of management

## **10.3 TYPES OF DECISION-MAKING SYSTEMS**

The decision-making systems can be classified in a number of ways. There are two types of systems based on the manager's knowledge about the environment. If the manager operates in a known environment then it is a closed decision-making system. The conditions of the closed-decision making systems are:

I. The manager has a known set of decisions alternatives and knows their outcomes fully in terms of value, if implemented.

II. The manager has a model, a method or a rule whereby the decision alternatives can be generated, tested and ranked for selection.

III. The manager can choose one of them, based on some goal or objective criteria.

Few examples are; a product mix problem, an examination system to declare pass or fail, or acceptance of the fixed deposits. If the manager operates in an environment not known to him, then the decision-making system is termed as an open decision-making system. The conditions of this contrast closed decision-making system are:

- I. The manager does not know all the decision alternatives
- II. The outcome of the decision is also not known fully. The knowledge of the outcome may be a probabilistic one.
- III. No method, rule or model is available to study and finalize one decision among the set of decision alternatives.
- IV. It is difficult to decide an objective or a goal and therefore, the manager resorts to that decision, where his aspirations or desires are met best.

Deciding on the possible product diversification lines, the pricing of a new product, and the plant location, are some decision-making situations which fall in the category of the open decision-making system.

The MIS tries to convert every open system to a closed decision-making system by providing information support for the best decision. The MIS gives the information support, whereby the managers know more and more about environment and the outcomes, he is able to generate the decision alternatives, test them and select one of the alternatives. A good MIS achieves this.

#### **10.4 HERBERT SIMON MODEL**

Decision-making is a process in which the decision-maker uses to arrive at a decision. The core of this process is described by Herbert Simon in a model. He describes the model in three phases as shown in the figure below:

I. Intelligence: raw data collected, processed and examined, Identifies a problem calling for a decision.

II. Design: inventing, developing and analyzing the different decision alternatives and testing the feasibility of implementation. Assess the value of the decision outcome.

III. Choice: select one alternative as a decision, based on the selection criteria.

In the intelligence phase, the MIS collects the data. The data is scanned, examined, checked and edited. Further, the data is sorted and merged with other data and computations are made, summarized and presented. In this process, the attention of the manager is drawn to all problem situations by highlighting the significant differences between the actual and the expected, the budgeted or the targeted.

In the design phase, the manager develops a model of the problem situation on which he can generate and test the different decision alternatives, he then further moves into phase of selection called as choice.

In the phase of choice, the manager evolves selection criteria such as maximum profit, least cost, minimum wastage, least time taken and highest utility. The criterion is applied to the various decision alternatives and the one which satisfies the most is selected. In these phases, if the manager fails to reach a decision, he starts the process all over again and again. An ideal MIS is supposed to make a decision for the manager.

An example of the Simon model would illustrate further its use in the MIS. For example, a manager finds on collection and through the analysis of the data that the manufacturing plant is underutilized and the products which are being sold are not contributing to the profits as desired. The problem identified, therefore, is to find a product mix for the plant, whereby the plant is fully utilized within the raw material and the market constraints, and the profit is maximized. The manager having identified this as the problem of optimization, now examines the use of **linear programming (LP) model**. The model is used to evolve various decision alternatives. However, selection is made first on the basis of feasibility and then on the basis of maximum profit.

The product mix so given is examined by the management committee. It is observed that the market constraints were not realistic in some cases and the present plant capacity can be enhanced to improve the profit. The same model is used again to tool the revised position. Therefore, additional data is collected and an analysis is made to find out whether the average 20 percent utilization of the capacity can be increased. A market research for some products is made and it is found that some constraints need to be removed and reduced. Based on the revised data **linear programming model** is used and a better optimum solution is obtained.

## 10.5 MIS AND DECISION-MAKING

It is necessary to understand the concept of decision-making as they are relevant to the design of the MIS. The Simon model provides a conceptual design of the MIS and decision-making wherein the designer has to design the system in such a way that the problem is identified in precise terms. That means the data gathered for data analysis should be such that it provides diagnostics and also provide a path to bring the problem to surface.

In the design phase of the model, the designer is to ensure that the system provides models for decision-making. These models should provide for the generation of decision alternatives, test them and pave way for the selection of one of them. In a choice phase, the designer must help to select the criteria to select one alternative amongst the many.

The concept of programmed decision-making is the finest tool available to the MIS designer, whereby he can transfer decision-making from a decision-maker to the MIS and still retain the responsibility and accountability with the decision maker or the manager. In case of non-programmed decisions, the MIS should provide the **decision support systems** provide a generalized model of decision-making.

The concept of decision-making system, such as the closed and the open system, such as the closed and the open systems, helps the designer in providing design feasibility. The closed systems are deterministic and rule based, therefore, the design needs to have limited flexibility, while in an open system, the design should be flexible to cope up with the changes required from time to time.

The methods of decision-making can be used directly in the MIS provided the method to be applied has been decided. A number of decision-making problem calls for optimization, and operational models are available which can be made a part of the system, the optimization models are static and dynamic, and both can be used in the MIS. Some of the problems call for a competitive analysis, such as payoff analysis. In these problems, the MIS can provide the analysis based on the gains, the regrets and the utility.

The concept of the organizational and behavioral aspects of decision-making provides an insight to the designer to handle the organizational culture and the constraints in the MIS. The concepts of the rationality of a business decision, the risk awareness of the managers and the tendency to avoid an uncertainty, makes the designer conscious about the human limitations and prompts him to provide a support in the MIS to handle these limitations. The reliance on organizational

learning makes the designer aware of the MIS and makes him provide the channels in the MIS to make the learning process more efficient.

The relevance of the decision-making concepts is significant in the MIS design. The significance arises out of the complexity of decision-making, the human factors is the decision-making, the organizational and behavior aspects, and the uncertain environments. The MIS design addressing these significant factors turns out to be the best design.