UNIT 6 DECISION MAKING MODELS

Objectives

After studying this Unit, you should be able to:

- Appreciate the three steps of the process through which you make any decision
- Classify the kinds of decisions you make
- Identify the varying degrees of knowledge under which you make decisions
- Recognize the assumptions of different models which either describe how decisions are made or prescribe how decisions should be made.

Structure

6.1 INTRODUCTION

You will possibly agree that decision making is a part of everyday life. The fact that you have taken up a course in management or the fact that you are reading this Unit are both products of your decisions to do them against other alternatives which were available to your. Whether you are at a board meeting or in the playground, you are almost constantly making decisions, sometimes working on several at the same time. These may be major or minor, but some of these might have proved to be effective decisions, viz. appropriate, timely and acceptable. Some of your decisions might have been wrong, but you knew that there was something worse than a few wrong decisions and that was indecision!

Making decisions has been identified as one of the primary responsibilities of any manager. Decisions may involve allocating resources, appointing people, investing capital or introducing new products. If resources like men, money, machines, materials, time and. space were abundant, clearly any planning would be unnecessary. But, typically, resources are scarce and so there is a need for planning. Decision making is at the core of all planned activities. We can ill afford to waste scarce resources by making too many wrong decisions or by remaining indecisive for too long a time.

6.2 THREE PHASES IN DECISION MAKING PROCESS

You can define decision making as the process of choosing between alternatives to achieve a goal. But if you closely look into this process of selecting among available alternatives, you will be able to identify three relatively distinct stages. Put into a time framework, you will find:

1. **The past,** in which problems developed, information accumulated, and the need for a decision was perceived;

2. **The present,** in which alternatives are found and the choice is made; and
3. **The future,** in which decisions will be carried out and evaluated.

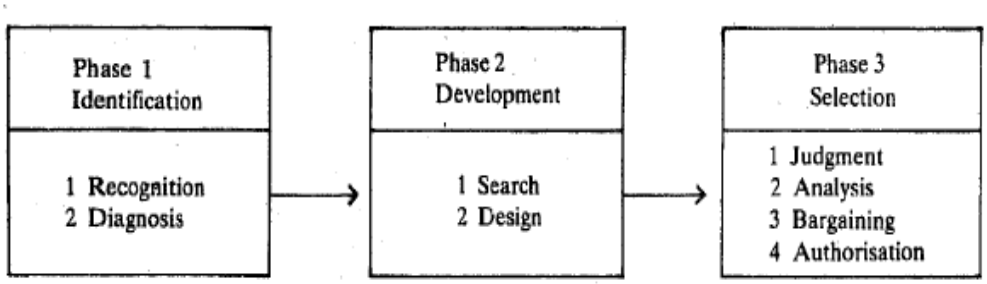
Herbert Simon, the well-known Nobel laureate decision theorist, described the activities associated with three major stages in the following way:

1. **Intelligence Activity:** Borrowing from the military meaning of intelligence Simon describes this initial phase as an attempt to recognise and understand the nature of the problem, as well as search for the possible causes;
2. **Design Activity:** During the second phase, alternative courses of action are developed and analyzed in the light of known constraints; and
3. **Choice Activity:** The actual choice among available and assessed alternatives is made at this stage.

If you have followed the nature of activities of these three phases, you should be able to see why the quality of any decision is largely influenced by the thoroughness of the intelligence and design phases.

Henry Mintzberg and some of his colleagues (1976) have traced the phases of some decisions actually taken in organisations. They have also come up with a three-phase model as shown in Figure I.

Figure I: Mintzberg's empirically based phases of decision making in organizations



Source: Mintzberg, Raisinghani and Theoret, 1976.

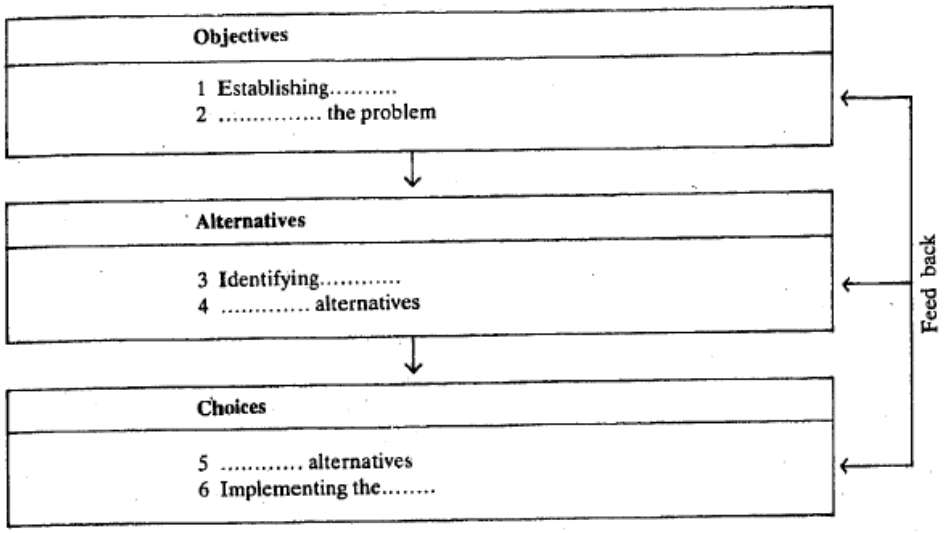
1. **The identification phase,** during which **recognition** of a problem or opportunity arises and a **diagnosis** is made. It was found that severe immediate problems did not have a very systematic, extensive diagnosis but that milder problems did have.
2. **The development phase,** during which there may be a **search** for existing standard procedures, ready-made solutions or the **design** of a new, tailor-made solution. It was found that the design process was a grouping, trial and error process in which the decision-makers had only a vague idea of the ideal solution.
3. The selection phase, during which the choice of a solution is made. There are three ways of making this selection: by the **judgment** of the decision maker, on the basis of experience or intuition rather than logical analysis; by **analysis** of the alternatives on a logical, systematic basis; and by **bargaining** when the selection involves a group of decision makers. Once the decision is formally accepted, an **authorization** is made.

Note that the decision making is a dynamic process and there are many feedback loops in each of the phases. These feedback loops can be caused by problems of timing, politics, disagreement among decision-makers, inability to identify an appropriate alternative or to implement the solution or the sudden appearance of a new alternative etc. So, though on the surface, any decision-making appears to be a fairly simple three-stage process, it could actually be a highly complex dynamic process.

,Activity A

Before we move on to the next topic on types of decisions that you and other managers make, let us pause to check whether we have understood the general nature of any decision making situation. You will recall that decision making is a process by which we make a choice among various alternatives to achieve our goals. Based on this definition and earlier discussion, complete the missing entries in . Figure II of the Managerial Decision Process.

Figure II: Managerial Decision Process



Answers:

1. Objectives/ Goals
2. Identifying/ Defining
3. Alternatives
4. Evaluating/ Assessing
5. Selecting/ Choosing
6. Decision/ Choice

6.3 TYPES OF MANAGERIAL DECISIONS

There are many types of decisions which you would be required to make as a manager. Three most widely recognised classifications are:

1. Personal and Organisational Decisions
2. Basic and Routine Decisions
3. Programmed and Non-programmed Decisions.

The first classification of **Personal** and **Organisational** decisions was suggested by Chester Barnard, nearly fifty years ago in his classic book: "The Functions of the Executive". In his opinion, the basic difference between the two decisions is that "personal decisions cannot ordinarily be delegated to others, whereas organisational decisions can often if not always be delegated" **(Barnard, 1937).** Thus, the manager makes organisational decisions that attempt to achieve organisational goals and personal decisions that attempt to achieve personal goals. Note that personal decisions can affect the organisation, as in the case of a senior manager deciding to resign. However, if you analyse a decision, you may find that the distinctions between personal and organisational decisions are a matter of degree. You are, to some extent, personally involved in any organisational decision that you make and you need to resolve the conflicts that might arise between organisational and personal goals.

Another common way of classifying types of decisions is according to whether they are **basic** or **routine.** Basic decisions are those which are unique, one-time decisions involving long-range commitments of relative permanence or duration, or those involving large investments. Examples of basic decisions in a business firm include plant location, organisation structure, wage negotiations, product line, etc. In other words, most top management policy decisions can be considered as basic decisions.

Routine decisions are at the opposite extreme from basic decisions. They are the everyday, highly repetitive, management decisions which by themselves have little impact on the overall organisation. However, taken together, routine decisions play a tremendously important role in the success of an organisation. Examples of, routine' decisions are an accountant's decision on a new entry, a production supervisor's

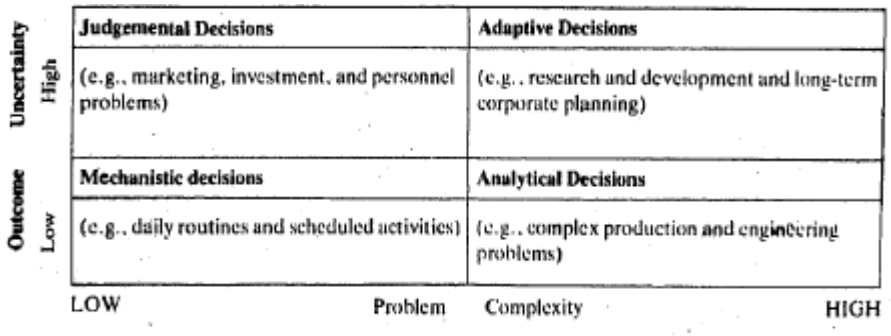
decision to appoint a new worker, and a salesperson's decision on what territory to cover. Obviously, a very large proportion (most experts estimate about 90 per cent) of the decisions made in an organisation are of the routine variety. However, the exact proportion of basic to routine types depends on the level of the organisation a which the decisions are made. For example, a first-line supervisor makes practically all the routine decisions whereas the chairperson of the board makes very few routine decisions but many basic decisions.

Simon (1977) distinguishes between **Programmed** (routine, repetitive) decisions and **Non-programmed** (unique, one-shot) decisions. While programmed decisions are typically handled through structured or bureaucratic techniques (standard operating procedures), non-programmed decisions must be made by managers using available information and their own judgement. As is often the case with managers, however, decisions are made under the pressure of time.

An important principle of organisation design that relates to managerial decision making is Gresham's Law of Planning. This law states that there is a general tendency for programmed activities to overshadow non-programmed activities. Hence, if you have a series of decisions to make, those that are more routine and repetitive will tend to be made before the ones that are unique and require considerable thought. This happens presumably because you attempt to clear your desk so that you can get down to the really serious decisions. Unfortunately, the desks very often never get cleared.

After going through the three types of classification of managerial decisions, you could see that there is no single and satisfactory way of classifying decision situations. Moreover, the foregoing classifications have ignored two important problem-related dimensions: (1) How **Complex** is the **Problem** in terms of number of factors associated with it; and (2) how much **certainty** can be placed with the **outcome** of a decision. Based on these two dimensions, four kinds of decision modes can be identified: Mechanistic, Analytical, Judgmental, and Adaptive (See Figure Ill).

Figure III: Types of Managerial Decisions



1. **Mechanistic Decisions:** A mechanistic decision is one that is routine and repetitive in nature. It usually occurs in a situation involving a limited number of decision variables where the outcomes of each alternative are known. For example, the manager of a bicycle shop may know from experience when and how many bicycles are to be ordered; or the decision may have been reached already, so the delivery is made routinely. Most mechanistic decision problems are solved by habitual responses, standard operating procedures, or clerical routines. In order to further simplify these mechanistic decisions, managers often develop charts, lists, matrices, decision trees, etc.

2. **Analytical Decisions:** An analytical decision involves a problem with a large number of decision variables, where the outcomes of each decision alternative can be computed. Many complex production and engineering problems are like this. They may be complex, but solutions can be found. Management science 'and operations research provide a variety of computational techniques that can be used to find optimal solutions. These techniques include linear programming, network analysis, inventory reorder model, queuing theory, statistical analysis, and so forth.

3. **Judgemental Decisions:** A judgemental decision involves a problem with a limited number of decision variables, but the outcomes of decision -alternatives are

unknown. Many marketing, investment, and resource allocation problems come under this category. For example, the marketing manager may have several alternative ways of promoting a product, but he or she may not be sure of their outcomes. Good judgement is needed to increase the possibility of desired outcomes and minimise the possibility of undesired outcomes.

4. **Adaptive Decisions:** An adaptive decision involves a problem with a large number of decision variables, where outcomes are not predictable. Because of the complexity and uncertainty of such problems, decision makers are not able to agree on their nature or. on decision strategies. Such ill-structured problems usually require the contributions of many people with diverse technical backgrounds. In such a case, decision and implementation strategies have to be frequently modified to accommodate new developments in technology and the environment.

Activity B

Refer to Figure III and subsequent discussions on four types of managerial decisions. Answer the following questions.

1 Which types of managerial decisions correspond to "Programmed" decision?

.....

2 Which types of managerial decisions correspond to "Non-programmed" decision?

.....

3 Which types of managerial decisions correspond to "Basic" decision?

.....

Answers:

1 Mechanistic Decisions and Analytic Decisions.

2 Judgemental Decisions and Adaptive Decisions.

3 Judgemental Decisions, Adaptive Decisions and Analytic Decisions.

6.4 DECISION MAKING UNDER DIFFERENT STATES OF NATURE

In the previous topic on types of decisions you have seen that a decision-maker may not have complete knowledge about decision alternatives (i.e., High Problem Complexity) or about the outcome of a chosen, alternative (i.e., High Outcome Uncertainty). These conditions of knowledge are often referred to as states of nature and have been labelled:

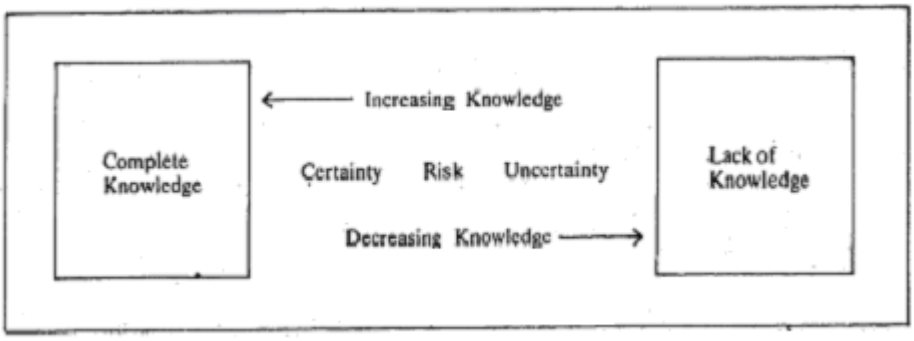
1 Decisions under Certainty.

2 Decisions under Risk

3 Decisions under Uncertainty

Figure IV depicts these three conditions on a continuum showing the relationship between knowledge and predictability of decision states.

Figure IV Decision Making Conditions Continuum



Decision making under certainty: A decision is made under conditions of certainty when a manager knows the precise outcome associated with each possible alternative or course of action. In such situations, there is perfect knowledge about alternatives and their consequences. Exact results are known in advance with complete (100 per cent) certainty. The probability of specific outcomes is assumed to be equal to one. A manager is simply faced with identifying the consequences of available alternatives and selecting the outcome with the highest benefit or payoff.

As you can probably imagine, managers rarely operate under conditions of certainty. The future is only barely known. Indeed, it is difficult to think of examples of all but the most trivial business decisions that are made under such conditions. One frequent illustration that is often cited as a decision under at least near certainty is the purchase of government bonds or certificates of deposit. For example, as per the assurance provided by Government of India, Rs. 1,000 invested in a 6-year National Savings Certificate will bring a fixed sum of Rs. 2,015 after six complete years of investment. It should still be realised, however, that the Government defaulting on its obligations is an unlikely probability, but the possibility still exists. This reinforces the point that very few decisions outcome can be considered a sure thing.

Decision making under risk: A decision is made under conditions of risk when a single action may result in more than one potential outcome, but the relative probability of each outcome is known. Decisions under conditions of risk are perhaps the most common. In such situations, alternatives are recognised, but their resulting consequences are probabilistic and doubtful. As an illustration, if you bet on number 6 for a single roll of a dice, you have a 1/6 probability of winning in that there is only one chance in six of rolling a 6. While the alternatives are clear, the consequence is probabilistic and doubtful. Thus, a condition of risk may be said to exist. In practice, managers assess the likelihood of various outcomes occurring based on past experience, research, and other information. A quality control inspector, for example, might determine the probability of number of `rejects' per production run. Likewise, a safety engineer might determine the probability of number of accidents occurring, or a personnel manager might determine the probability of a certain turnover or absenteeism rate.

Decision making under uncertainty: A decision is made under conditions of uncertainty when a single action may result in more than one potential outcome, but the relative probability of each outcome is unknown. Decisions under. conditions of uncertainty are unquestionably the most difficult. In such situations a manager has no knowledge whatsoever on which to estimate the likely occurrence of various alternatives. Decisions under uncertainty generally occur in cases where no historical data are available from which to infer probabilities or in instances which are so novel and complex that it is impossible to make comparative judgements.

Examples of decisions under complete uncertainty are as difficult to cite as example of decisions under absolute certainty. Given even limited experience and the ability to generalise from past situations, most managers should be able to make at least some estimate of the probability of occurrence of various outcome. Nevertheless, there are undoubtedly times when managers feel they are dealing with complete uncertainty.

Selection of a new advertising programme from among several alternatives might be one such example. The number of factors to be considered and the large number of uncontrollable variables vital to the success of such a venture can be mind-boggling. On a personal level, the selection of a job from among alternatives is a career decision that incorporates a great deal of uncertainty. The number of factors to be weighed and evaluated, often without comparable standards, can be overwhelming.

Activity C

Identify six decisions that you have taken during last one year. Check which decisions were made under Certainty, under Risk and under Uncertainty.

	Decisions	Certainty	Risk	Uncertainty
1	.....	( )	( )	( )
2	.....	( )	( )	( )
3	.....	( )	( )	( )
4	.....	( )	( )	( )
5	.....	( )	( )	( )
6	.....	( )	( )	( )

6.5 MODELS OF DECISION MAKING PROCESS

By now, you have learnt what the different phases of a decision making process are, what types of decisions you are likely to make in an organisation and under what states of nature these decisions are made. Now, you are going to examine three suggested models of the decision making process which will help you to understand how decisions are made and should be .made. These three models are: (I) the econologic model, or the economic man, (2) the bounded rationality model or the administrative man; and (3) the implicit favourite model or the gameman. You will notice that each model differs on the assumptions it makes about the person or persons making the decision.

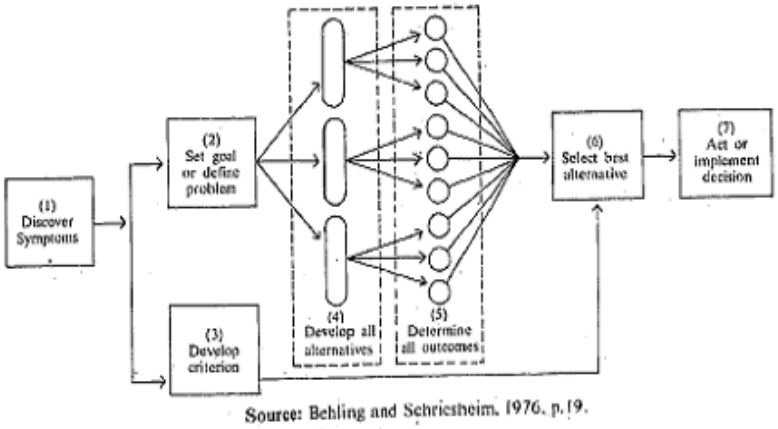
i) Econologic Model or Economic Man Model

The econologic model represents the earliest attempt to model decision process. Briefly, this model rests on two assumptions: (1) It assumes people' are economiccally rational; and (2) that 'people attempt to maximise outcomes in an orderly and sequential process. Economic **rationality,** a basic concept in many models of decision making, exists when people attempt to maximise objectively measured advantage, such as money or units of goods produced. That is, it is assumed that people will select the decision or course of action that has the **greatest** advantage or payoff from among the many alternatives. It is also assumed that they go about this search in a planned, orderly, and logical fashion.

A basic econologic decision model is shown in Figure V. The figure suggests the following orderly steps in the decision process:

1 Discover the symptoms of the problem or difficulty ;
2 Determine the goal to be achieved or define the problem to be solved;
3 Develop a criterion against which alternative solutions can be evaluated;
4 Identify all alternative courses of action;
5 Consider the consequences of each alternatives as well as the likelihood of occurrence of each;

Figure V: An Econologic Model of Decision-making



Source: Behling and Schriesheim, 1976, p.19.

6 Choose the best alternative by, comparing the consequences of each alternative (step 5) with the decision criterion (step 3); and

7 Act or implement the decision.

The economic man model represents a useful **prescription** of how decisions **should** be made, but it does not adequately portray how decisions are actually made. If you look closely in this prescriptive model you shall be able to recognise some of the assumptions it makes about the capabilities of human beings:

First, people have the capability to gather all necessary information for a decision, i.e., people can have **complete** information;

Second, people can mentally store this information in some stable form, i.e., they can accurately recall any information any time they like;

Third, people can manipulate all this information in a series of complex calculations design to provide expected values; and

Fourth, people can rank the consequences in a consistent fashion for the purposes of identifying the preferred alternative.

As you can possibly imagine, the human mind is simply incapable of executing such transactions at the level and magnitude required for complex decisions. To that extent, this model is unrealistic. However, due to the advent of sophisticated data storage, retrieval and processing machines, it is now possible to achieve economic rationality to some extent.

ii) **Bounded Rationality Model or Administrative Man Model**

An alternative model, one not bound by the above assumptions, has been presented by Simon. This is the bounded rationality model, also known as the administrative man model.

As the name implies, this model does not assume individual rationality in the decision,' process. Instead, it assumes that people, while they may seek the best solution, usually settle for much less because the decisions they confront typically demand greater information processing capabilities than they possess. They seek a kind of bounded (for limited) rationality in decisions.

The concept of bounded rationality attempts to describe decision processes in terms of three mechanisms:

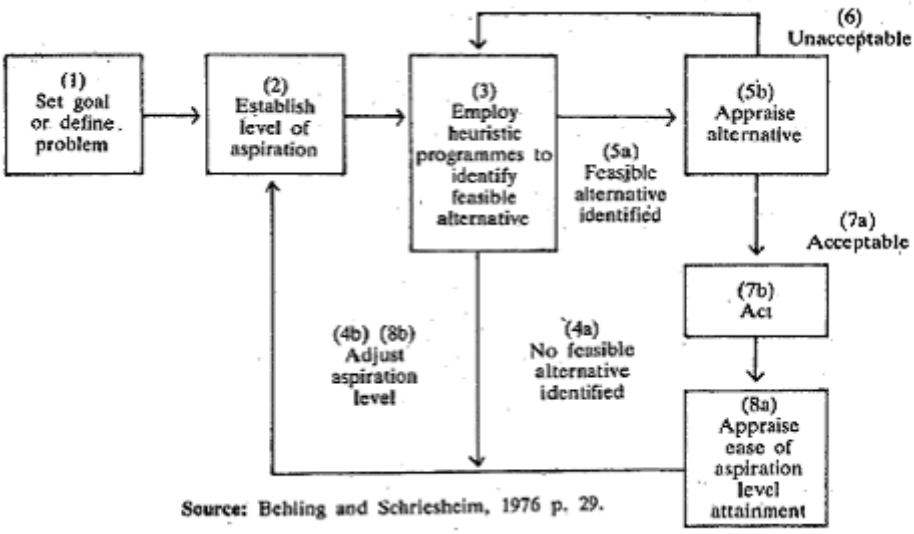
Sequential attention to alternative solutions: People examine possible solutions to a problem sequentially. Instead of identifying all possible solutions and selecting the best (as suggested in the econologic model), the various alternatives are identified and evaluated one at a time. If the first solution fails to work it is discarded and the next solution is considered. When an acceptable (that is, `Good enough' and not necessarily the best') solution is found, the search is discontinued.

Use of heuristics: A heuristic is a rule which guides the search for alternatives into areas that have a high probability for yielding satisfactory solutions. For instance, some companies continually select Management graduates from certain institutions because in the past such graduates have performed well for the company. According to the bounded rationality model, decision makers use heuristics to reduce large problems to manageable proportions so that decisions can be made rapidly. They look for obvious solutions or previous solutions that worked in similar situations.

Satisfying: Whereas the econologic model focuses on the decision maker as an optimiser, this model sees him or her as a satisficer. An alternative is optimal if: (1) there exists a set' of criteria that permits all alternatives to be compared; and (2) the alternative in question is preferred, by these criteria, to all other alternatives. An alternative is satisfactory if: (I) there exists a set of criteria that describes minimally satisfactory . alternatives; and (2) the alternative in question meets or exceeds all these criteria.

Based on these three assumptions about decision makers, it is possible to outline the decision process as seen from the standpoint of the bounded rationality model. As shown Figure VI, the model consists of eight steps:

Figure VI: A Bounded Rationality Model of Decision Making



1 Set the goal to be pursued or define the problem to be solved.

2 Establish an appropriate level of aspiration or criterion level (that is, when do you know that a solution is sufficiently positive to be acceptable even if it is not perfect'?)

3 Employ heuristics to narrow problem space to a single promising alternative.

4 If no feasible alternative is identified (a) lower the aspiration level, and (b) begin the search for a new alternative solution (repeat steps 2 and 3).

5 After identifying a feasible alternative (a), evaluate it to determine its acceptability (b).

6 If the identified alternative is unacceptable, initiate search for a new alternative solution (repeat steps 3-5).

7 If the identified alternative is acceptable (a) implement the solution (b).

8 Following implementation, evaluate the ease with which goal was (or was not) attained (a), and raise or lower level of aspiration accordingly on future decisions of this type.

As can be seen, this decision process is quite different from the econologic model. In it we do riot seek the best solution; instead, we look for a solution that is acceptable. The search behaviour is sequential in nature(evaluating one or two solutions at a time). Finally, in contrast to the. prescriptive econologic model, it is claimed that the bounded rationality model is **descriptive;** that is it describes how decision makers actually arrive at the identification of solutions to organisational problems.

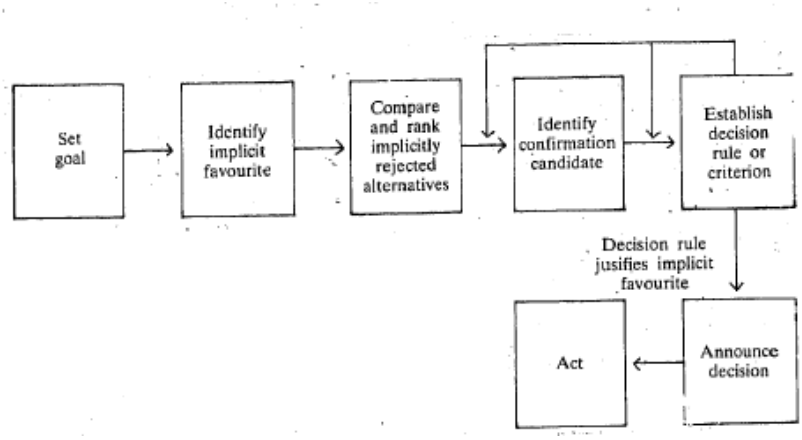
iii) Implicit Favourite Model or Gamesman Model

This model deals primarily with non-programmed. decisions. You will recall that non-programmed decisions are decisions that are novel or unstructured, like seeking one's first job. Programmed decisions, in contrast, are more routine or repetitious in nature, like the procedures for admitting students to a secondary school.

The implicit favourite model developed by Soelberg (1967) emerged when he observed the job choice process of graduating business students and noted that, in many cases, the students identified implicit; favourites very early in the recruiting and choice process. However, they continued their search for additional alternatives and quickly selected the best alternative candidate, known as the confirmation candidate. Next, the students attempted to develop decision rules the demonstrated unequivocally that the implicit favourite was superior to the alternative confirmation candidate. This was done through perceptual distortion of information about the two alternatives and through weighing systems designed to highlight the positive features of the implicit favourite. Finally, after a decision rule was derived that clearly favoured the implicit favourite, the decision was announced. ironically, Soelberg noted that the implicit favourite was typically superior to the confirmation candidate on only or or two dimensions. Even so, the decision makers generally characterised their decision rules as being multi-dimensional in nature.

The process is shown in Figure VII. As noted, the entire process is designed to justify to the individual, through the guise of scientific rigour, a non-programmed decision that has already been made in intuitive fashion. By doing so, the individual becomes convinced that he or she is acting in a rational fashion and making a logical, reasoned decision on an important topic.

Figure VII: An Implicit Favourite Model of Decision Making



Source: Behling and Schriesheim, 1976, p. 32.

Activity D

Read the following assumptions about the nature of human beings as decision makers. Identify which assumptions are made under which models of decision making.

	Assumptions	Economic Man	Administrative Man	Gamesman
1	In choosing between alternatives, people look for the one which is satisfactory or good enough	( )	( )	( )
2	Decisions are made after examining all possible alternatives	( )	( )	( )
3	People usually arrive at a decision in an intuitive manner much before they find logical support for the same decision	( )	( )	( )

Answers:

1 Administrative Man Model.

2 Economic Man Model.

3 Gamesman Model.

Activity E

Recall the process through which you decided to apply for joining the course in management. Which model best characterizes your decision process? Would you claim that as a rational decision? Why or why not? Prepare a short note.

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6.6 SUMMARY

In this Unit, you have made yourself familiar with the three phases of any decision making situation. You have seen that these phases deal with identification, evaluation and selection of alternatives to a problem. It is possible to follow a logical process of taking decisions, as the Economic Man Model suggests, particularly when your problem is routine, mechanistic and programmed or when you are taking decisions under conditions of certainty or risk.

Self-assessment Question

Go back to the four learning objectives listed at the beginning of the Unit. Check for yourself, without referring to the main text, whether you have achieved each of these objectives. After a self-assessment, in case you feel you have not attained an objective satisfactorily, refer to the main text. Proceed to the next U nit only when you feel you have attained all the learning objectives of this Unit.

6.7 KEY WORDS

Adaptive Decision: An adaptive decision involves a. problem with a large number of decision variables where outcomes are not predictable.

Mechanistic Decision: A routine and repetitive decision.

Heuristics: Heuristic is a rule which guides the search for alternatives into areas that have a high probability for yielding satisfactory solutions.

6.8 FURTHER READINGS

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