

Chapter 7 : Decision Making in Management: Definition and Features

Introduction:

Every action of a manager is generally an outcome of a decision.

Owing to this fact, P.P. Drucker in his book “Practice of Management,” observes “Whatever a manager does, he does through making decision.” True, the job of management involves the making of innumerable decisions. That is why many persons think that management is decision-making.

The word ‘decides’ means to come to a conclusion or resolution as to what one is expected to do at some later time. According to Manely H. Jones, “It is a solution selected after examining several alternatives chosen because the decider foresees that the course of action he selects will do more than the others to further his goals and will be accompanied by the fewest possible objectionable consequences”“.

Decision is a choice whereby a person comes to a conclusion about given circumstances/ situation. It represents a course of behaviour or action about what one is expected to do or not to do. Decision- making may, therefore, be defined as a selection of one course of action from two or more alternative courses of action. Thus, it involves a choice-making activity and the choice determines our action or inaction.

Decision-making is an indispensable part of life. Innumerable decisions are taken by human beings in day-to-day life. In business undertakings, decisions are taken at every step. All managerial functions viz., planning, organizing, staffing, directing, co-ordinating and controlling are carried through decisions. Decision-making is thus the core of managerial activities in an organisation.

Definition of Decision-Making:

Some of the important definitions of decision-making are given as under.

Decision-making is the selection based on some criteria from two or more possible alternatives. “—George R.Terry

A decision can be defined as a course of action consciously chosen from available alternatives for the purpose of desired result —J.L. Massie

A decision is an act of choice, wherein an executive forms a conclusion about what must be done in a given situation. A decision represents a course of behaviour chosen from a number of possible alternatives. —D.E. Mc. Farland

From these definitions, it is clear that decision-making is concerned with selecting a course of action from among alternatives to achieve a predetermined objective.

Following elements can be derived from the above mentioned definitions:

1. Decision-making is a selection process and is concerned with selecting the best type of alternative.
2. The decision taken is aimed at achieving the organisational goals.
3. It is concerned with the detailed study of the available alternatives for finding the best possible alternative.
4. Decision making is a mental process. It is the outline of constant thoughtful consideration.
5. It leads to commitment. The commitment depends upon the nature of the decision whether short term or long term.

Features or Characteristics of Decision-Making:

From definitions and elements we can draw the following important features of managerial decisions:

1. Rational Thinking:

It is invariably based on rational thinking. Since the human brain with its ability to learn, remember and relate many complex factors, makes the rationality possible.

2. Process:

It is the process followed by deliberations and reasoning.

3. Selective:

It is selective, i.e. it is the choice of the best course among alternatives. In other words, decision involves selection of the best course from among the available alternative courses that are identified by the decision-maker.

4. Purposive:

It is usually purposive i.e. it relates to the end. The solution to a problem provides an effective means to the desired goal or end.

5. Positive:

Although every decision is usually positive sometimes certain decisions may be negative and may just be a decision not to decide. For instance, the manufacturers of VOX Wagan car once decided not to change the model (body style) and size of the car although the other rival enterprise (i.e. the Ford Corporation) was planning to introduce a new model every year, in the USA.

That a negative decision and is equally important was stressed by Chester I. Bernard-one of the pioneers in Management Thought-who observed, "The fine art of executive decision consists in not deciding questions that are not now pertinent, in not deciding prematurely, in not making decisions that cannot be made effective, and in not making decisions that other should make."

6. Commitment:

Every decision is based on the concept of commitment. In other words, the Management is committed to every decision it takes for two reasons- viz., (i) it promotes the stability of the concern and (ii) every decision taken becomes a part of the expectations of the people involved in the organisation.

Decisions are usually so much inter-related to the organisational life of an enterprise that any change in one area of activity may change the other areas too. As such, the Manager is committed to decisions not only from the time that they are taken but upto their successfully implementation.

7. Evaluation:

Decision-making involves evaluation of alternatives.

Environment of Decision Making

It is said that every manager's primary responsibility is decision-making. [Managers](#) follow a sequential set of steps to make good decisions that are in the interest of the firm. This process is known as decision making process. However, the decision making environment is also an important factor in the process. Let us learn some important aspects of the Decision making environment.

The quality of the decisions made in an [organization](#) will dictate the success or failure of the said business.

So all the available information and alternatives must be studied before arriving at an important decision. The process of decision making will help a great deal.

Another factor that affects these decisions is the environment in which they are taken. There are a few different types of [environments](#) in which these decisions are made.

And the type of decision making environment has an impact on the way the decision is taken. Broadly there are three basic types of decision making environment. Let us take a brief look at each of them.

1] Certainty

Such type of environment is very sure and certain by its nature. This means that all the information is available and at hand. Such data is also easy to attain and not very expensive to gather.

So the manager has all the information he may need to make an informed and well thought out decision. All the alternatives and their outcomes can also be analyzed and then the manager chooses the best alternative.

Another way to ensure an environment of certainty is for the manager to create a closed [system](#). This means he will choose to only focus on some of the alternatives.

He will get all the available information with respect to such alternatives he is analyzing. He will ignore the other factors for which the information is not available. Such [factors](#) become irrelevant to him altogether.

Learn more about [Quantitative Techniques of Decision Making here in detail](#)

2] Uncertainty

In the decision making environment of uncertainty, the information available to the manager is incomplete, insufficient and often unreliable.

In an uncertain environment, everything is in a state of flux. Several external and random forces mean that the environment is most unpredictable.

In these times of chaos, all the variables change fast. But the manager has to make sense of this mayhem to the best of his ability. He must create some order, obtain some reliable data and make the best decision as per his [judgment](#).

3] Risk

Under the condition of risk, there is the possibility of more than one event taking place. Which means the manager has to first ascertain the possibility and [probability](#) of the occurrence or non-occurrence of the event.

The manager will generally rely on past experiences to make this deduction.

In this scenario too, the manager has some information available to him. But the availability and the reliability of the information is not guaranteed. He has to chart a few alternative courses of actions from the data he has.

Types of Decisions

Decision-making is one of the core [functions of management](#). And it is actually a very scientific function with a well-defined decision-making process. There are various types of decisions the managers have to take in the day to day functioning of the firm. Let us take a look at some of the types of decisions.

Strategic Decisions and Routine Decisions

As the name suggests, routine decisions are those that the [manager](#) makes in the daily functioning of the organization, i.e. they are routine.

Such decisions do not require a lot of evaluation, analysis or in-depth study. In fact, high-level managers usually delegate these decisions to their subordinates.

On the other hand, strategic decisions are the important decisions of the firm. These are usually taken by upper and middle-level management. They usually relate to the **policies** of the firm or the strategic plan for the future.

Hence such decisions require analysis and careful study. Because strategic decisions taken at this level will affect the routine decisions taken daily.

Programmed Decisions and Non-Programmed Decisions

Programmed decisions relate to those functions that are repetitive in nature. These decisions are dealt with by following a specific standard procedure. These decisions are usually taken by lower management.

For example, granting leave to employees, **purchasing** spare parts etc are programmed decisions where a specific procedure is followed.

Non-programmed decisions arise out of unstructured problems, i.e. these are not routine or daily occurrences. So there is no standard procedure or process to deal with such issues.

Usually, these decisions are important to the organization. Such decisions are left to upper management. For example, opening a new branch office will be a non-programmed decision.

Policy Decisions and Operating Decisions

Tactical decisions pertaining to the policy and planning of the firm are known as policy decisions. Such decisions are usually reserved for the firm's top **management** officials. They have a long term impact on the firm and require a great deal of analysis.

Operating decisions are the decisions necessary to put the policy decisions into action. These decisions help implement the plans and policies taken by the high-level managers.

Such decisions are usually taken by middle and lower management. Say the **company** announces a bonus issue. This is a policy decision. However, the calculation and implementation of such bonus issue is an operating decision.

Organizational Decisions and Personal Decisions

When an executive takes a decision in an official capacity, on behalf of the organization, this is an **organizational** decision. Such decisions can be delegated to subordinates.

However, if the executive takes a decision in a personal capacity, that does not relate to the organization in any way this is a personal decision. Obviously, these decisions cannot be delegated.

Individual Decisions and Group Decisions

When talking about types of decisions, let us see individual and group decisions. Any decision taken by an individual in an official capacity it is an individual decision. Organizations that are smaller and have an autocratic style of management rely on such decisions.

Group decisions are taken by a group or a collective of the firm's employees and management. For example, decisions taken by the [board of directors](#) are a group decision.

Steps of Decision Making Process



Decision making is one of the most basic yet significant management skills for all of us to have. And it can differ from person to person. Making decisions that are based on careful analysis of numerous circumstances especially in a timely manner is critical. Therefore, it shouldn't be procrastinated or taken in haste.

Making decisions can be hard, especially when the odds are not in your favor.

Step 1: Identification of the purpose of the decision

In this step, the problem is thoroughly analysed. There are a couple of questions one should ask when it comes to identifying the purpose of the decision.

- What exactly is the problem?
- Why the problem should be solved?
- Who are the affected parties of the problem?
- Does the problem have a deadline or a specific time-line?

Step 2: Information gathering

A problem of an organization will have many stakeholders. In addition, there can be dozens of factors involved and affected by the problem.

In the process of solving the problem, you will have to gather as much as information related to the factors and stakeholders involved in the problem. For the process of information gathering, tools such as 'Check Sheets' can be effectively used.

Step 3: Principles for judging the alternatives

In this step, the baseline criteria for judging the alternatives should be set up. When it comes to defining the criteria, organizational goals as well as the corporate culture should be taken into consideration.

As an example, profit is one of the main concerns in every decision making process. Companies usually do not make decisions that reduce profits, unless it is an exceptional case. Likewise, baseline principles should be identified related to the problem in hand.

Step 4: Brainstorm and analyse the different choices

For this step, brainstorming to list down all the ideas is the best option. Before the idea generation step, it is vital to understand the causes of the problem and prioritization of causes.

For this, you can make use of Cause-and-Effect diagrams and Pareto Chart tool. Cause-and-Effect diagram helps you to identify all possible causes of the problem and Pareto chart helps you to prioritize and identify the causes with highest effect.

Then, you can move on generating all possible solutions (alternatives) for the problem in hand.

Step 5: Evaluation of alternatives

Use your judgement principles and decision-making criteria to evaluate each alternative. In this step, experience and effectiveness of the judgement principles come into play. You need to compare each alternative for their positives and negatives.

Step 6: Select the best alternative

Once you go through from Step 1 to Step 5, this step is easy. In addition, the selection of the best alternative is an informed decision since you have already followed a methodology to derive and select the best alternative.

Step 7: Execute the decision

Convert your decision into a plan or a sequence of activities. Execute your plan by yourself or with the help of subordinates.

Step 8: Evaluate the results

Evaluate the outcome of your decision. See whether there is anything you should learn and then correct in future decision making. This is one of the best practices that will improve your decision-making skills.

Conclusion

When it comes to making decisions, one should always weigh the positive and negative business consequences and should favour the positive outcomes.

This avoids the possible losses to the organization and keeps the company running with a sustained growth. Sometimes, avoiding decision making seems easier; especially, when you get into a lot of confrontation after making the tough decision.

But, making the decisions and accepting its consequences is the only way to stay in control of your corporate life and time.

Managers Making Decisions

1. Rationality in decision making

Rational decision making is a multi-step process for making choices between alternatives. The process of rational decision making favors logic, objectivity, and analysis over subjectivity and insight. The word “rational” in this context does not mean sane or clear-headed as it does in the colloquial sense.

The approach follows a sequential and formal path of activities. This path includes:

1. Formulating a goal(s)
2. Identifying the criteria for making the decision
3. Identifying alternatives
4. Performing analysis
5. Making a final decision.

Assumptions of the Rational Decision-Making Model

The rational model of decision making assumes that people will make choices that maximize benefits and minimize any costs. The idea of rational choice is easy to see in economic theory. For example, most people want to get the most useful products at the lowest price; because of this, they will judge the benefits of a certain object (for example, how useful is it or how attractive is it) compared to those of similar objects. They will then compare prices (or costs). In general, people will choose the object that provides the greatest reward at the lowest cost.

The rational model also assumes:

- An individual has full and perfect information on which to base a choice.
- Measurable criteria exist for which data can be collected and analyzed.
- An individual has the cognitive ability, time, and resources to evaluate each alternative against the others.

The rational-decision-making model does not consider factors that cannot be quantified, such as ethical concerns or the value of altruism. It leaves out consideration of personal feelings, loyalties, or sense of obligation. Its objectivity creates a bias toward the preference for facts, data and analysis over intuition or desires.

Critiques of the Rational Model

Critics of rational choice theory—or the rational model of decision-making—claim that this model makes unrealistic and over-simplified assumptions. Their objections to the rational model include:

- People rarely have full (or perfect) information. For example, the information might not be available, the person might not be able to access it, or it might take too much time or too many resources to acquire. More complex models rely on probability in order to describe outcomes rather than the assumption that a person will always know all outcomes.
- Individual rationality is limited by their ability to conduct analysis and think through competing alternatives. The more complex a decision, the greater the limits are to making completely rational choices.
- Rather than always seeking to optimize benefits while minimizing costs, people are often willing to choose an acceptable option rather than the optimal one. This is especially true when it is difficult to precisely measure and assess factors among the selection criteria.

Alternative Theories of Decision-Making

Prospect Theory

Alternative theories of how people make decisions include Amos Tversky's and Daniel Kahneman's prospect theory. *Prospect theory* reflects the empirical finding that, contrary to rational choice theory, people fear losses more than they value gains, so they weigh the probabilities of negative outcomes more heavily than their actual potential cost. For instance, Tversky's and Kahneman's studies suggest that people would rather accept a deal that offers a 50% probability of gaining \$2 over one that has a 50% probability of losing \$1.

Bounded Rationality

Other researchers in the field of behavioral economics have also tried to explain why human behavior often goes against pure economic rationality. The theory of *bounded rationality* holds that an individual's rationality is limited by the information they have, the cognitive limitations of their minds, and the finite amount of time they have to make a decision. This theory was proposed by Herbert A. Simon as a more holistic way of understanding decision-making. Bounded rationality shares the view that decision-making is a fully rational process; however, it adds the condition that people act on the basis of limited information. Because decision-makers lack the ability and resources to arrive at the optimal solution, they instead apply their rationality to a set of choices that have already been narrowed down by the absence of complete information and resources.

Non-Rational Decision Making

People frequently employ alternative, non-rational techniques in their decision making processes.

INDIVIDUAL AND GROUP DECISIONS

Individual decisions are taken by a single individual. The one-manager decision-making set up is still prevalent in India as many business units are owned by a single individual. But when business grows in size and complexity it may not be possible for one individual to take all the decisions himself. He needs the help of specialized people and also other individual.

Group decisions are taken by individuals who are identified as a Group for making a decisions. Group decisions have plus values such as greater participation of individual and better quality in decisions. They are generally more effective decisions. They, however, suffer from delay in decision making process and difficulty in fixing the responsibility for decisions.

Group decision making Techniques

Brainstorming

Brainstorming technique involves a group of people, usually between five and ten, sitting around a table in a classroom setting generating ideas in the form of free association. The primary focus of the brainstorming technique is more on 'generation of ideas', rather than on 'evaluation of ideas', the idea being that if a large number of ideas can be generated, then it is likely that there will be a unique and creative solution among them.

All these ideas are written on the blackboard with a piece of chalk so that everybody can see every idea and try to improve upon them. The leader of the group defines and explains the nature of the problem to the group members and the rules to be followed.



(a) No judgements are to be made on these ideas when they are generated. No idea is to be criticized or evaluated in any way until all ideas have been considered.

(b) Welcome wild ideas, no matter how absurd they might seem. Some of the wildest ideas have resulted in unique solutions. There should be no inhibition in generating any ideas. The ideas that are too wild and unfeasible can always be discarded later.

(c) Strive for quantity and not quality. Quality can always be judged at the end. The more ideas there are, the better the chances that the best solution will not escape.

(d) Each participant is encouraged to improve or modify other participant's suggestions. The system can make improvements on the ideas, not visualized by the participant who originally suggested them. This process results in free association and unrestricted thinking and may generate some novel idea which may not have been thought of originally.

Brainstorming technique is very effective when the problem is comparatively specific and be simply defined. A complex problem can be broken up into many parts and each part can be taken separately at a time. The process is very time consuming and it is quite possible that none of the ideas generated would be optimal.

But the process itself being democratic in nature creates a lot of interest among subordinates and stimulates their thinking. Also, the wasted time can be minimized if the members of the group are chosen carefully so that they understand the problem and feel that their contribution towards ideas generation will be substantial.

Delphi Technique

Delphi technique is a modification of brainstorming technique that it involves obtaining the opinions of experts physically separated from each other and unknown to each other. Generally, the problems handled by this technique are not specific in nature or related to a particular situation at a given time.

The process is more involved in predicting and assessing the impact on our society of nature events in a given area. For example, the Delphi technique may be used to understand the problems that could be created in the event of a war and after. Typically, a group of experts is assembled whose specialty lies in a given field and they are asked to give their opinions about a problem or situation that might develop.

For example, physicians would be used to get ideas on how to treat a particular disease such as AIDS and medical psychologists will be used to deal with family of a patient of terminal disease or who is in a coma. All these opinions are handled by a central coordinator, who consolidates these opinions and this summarized information is sent back to the experts again for further analysis and opinion refinement. The following sequential steps characterize the technique

(a) The problem is identified and set of questions is built relating to the problem so that the answer to these questions generates solutions to the problem. These questions are consolidated in the form of a questionnaire.

b) Experts in the problem area are identified and contacted. The questionnaire is sent to each member who anonymously and independently answers the questions and sends it back to the central coordinator.

c) Once received, the results of this questionnaire are compiled and analyzed and on the basis of the responses received, a second questionnaire is developed which is mailed back to the participating members.

d) The members are asked again to react to these responses and to comment, suggest, evaluate and answer the new questions, possibly generating some new ideas and solutions.

e) The responses to this second questionnaire are compiled and analyzed by the central coordinator and if a consensus has not been reached, then a third questionnaire is developed, pinpointing the issue and unresolved areas of concern.

f) The above process is repeated until a consensus is obtained. Then final report is prepared and a solution is defined and developed if possible

One of the main advantages of the Delphi technique is that the group members are totally independent and are not influenced by the opinion of other members. It is an efficient method of polling a large number of experts'. Judgements and the members do not have to be present at one location, this means that an expert who is geographically separated can also contribute his thoughts and opinions so that the cost associated with bringing these experts together is avoided. Also, the process avoids the problem of conformity and domination that often occurs in interacting groups.

The main disadvantage of this technique is that it is highly time consuming and is primarily useful in illuminating broad range, long term complex issues such as future effects of energy shortages that might occur. This technique also eliminates the sense of motivation that arises in a face to face interacting group.

Nominal Technique

The Nominal Technique is very similar to Brainstorming but is considered to be more effective. This may be due to highly structured procedures employed for generating and analyzing various ideas and alternatives. It may be physically domination is avoided.

The process is similar-to a traditional committee meeting expect that the members operate independently, generating ideas for solving the problem in silence and in writing. The group leader or the coordinator either collects these written ideas or writes them on a large blackboard as he received it. These are then discussed one by one, in turn, and each participant is encouraged to comment on these ideas for the purpose of clarification.

After all ideas are discussed and clarified, they are evaluated for their merits and drawbacks and each participating member is required to vote on each idea and assign it a rank on the basis of priority of each alternative solution. The idea with the highest aggregate ranking creates an atmosphere of creativity because participants often work hard to generate ideas in the presence of others.

Fishbowling

Fishbowling is another variation of the brainstorming but is more structured and is to the point. In this technique, the decision-making group of experts is seated around a circle with a single chair in the center of the circle. One member of the group or the group leader is invited to sit in the center chair and give his view about the problem and his proposition of a solution.

The other group members can ask him questions but there is no irrelevant discussion or cross talk. Once the member in the center chair has finished talking and his viewpoint is fully understood, he leaves the center and joins the group in the circle. Then the second member is called upon to sit in the center chair and give his views in the light of the views expressed earlier.

The members can ask questions to the center based upon the new ideas presented by the member. In the center as well as the ideas discussed by previous center members continuous until the chair is vacated. All exchanges must be between the center and the group and no two group members are allowed to talk directly.

This technique result in each member favoring a particular course of action, since all members are acting upon the database and also since each idea offered by the central members has been thoroughly questioned and examined. After all experts have expressed their views, the entire groups discuss the various alternatives suggested and pick the one with consensus.

Didactic Interaction

Didactic interaction is applicable only in certain situations, but is an excellent method when such a situation. For example, the decision may be to buy or not to buy, to situation requires an extensive and exhaustive discussion and investigation since a wrong decision can have serious consequences of either of the two alternatives, the group required to make the decision is split into two subgroups, one favoring the 'go' decision and other favoring the 'no go' decision. The first group lists all the 'pros' of the problem solution and the second group lists all the 'cons'.

These two groups meet and discuss their findings and their reason. After the exhaustive discussions, the group switch ideas and try to find weakness in their own original viewpoints. This interchange of ideas and tolerance and understanding of opposite viewpoint results in mutual acceptance of facts as facts as they exist so that a solution can be built around these facts and thus a final decision is reached.

Brainstorming

This technique includes a group of people, mostly between five and ten in number, sitting around a table, producing ideas in the form of free association. The main focus is on generation of ideas and not on evaluation of these ideas.

If more ideas can be originated, then it is likely that there will be a unique and creative idea among them. All these ideas are written on the blackboard with a piece of chalk so that all the team members can see every idea and try to improvise these ideas.

Brainstorming technique is very effective when the problem is comparatively precise and can be simply defined. A complex problem can be divided into parts and each part can be dealt with separately at a time.

Nominal Group Thinking

This technique is similar to brainstorming except that this approach is more structured. It motivates individual creativity. Members form the group for namesake and operate independently, originate ideas for solving the problem on their own, in silence and in writing. Members do not communicate well with each other so that strong personality domination is evaded.

The group coordinator either collects the written ideas or writes them on a large blackboard so that each member of the group can see what the ideas are. These ideas are further discussed one by one in turn and each participant is motivated to comment on these ideas in order to clarify and improve them. After all these ideas have been discussed, they are evaluated for their merits and drawbacks and each actively participating member is needed to vote on each idea and allot it a rank on the basis of priority of each alternative solution.

The idea with the highest cumulative ranking is selected as the final solution to the problem.

Didactic Interaction

This technique is applicable only in certain situations, but is an excellent method when a situation actually demands it. The type of problem should be such that it generates output in the form of yes or no. Say for example, a decision is to be made whether to buy or not to buy a product, to merge or not to merge, to expand or not to expand and so on. These types of decision requires an extensive and exhaustive discussion and investigation since a wrong decision can have serious consequences.

There are many advantages as well as disadvantages of this type of situation. The group that makes the decision is divided into two sub-groups, one in favor of the “go” decision and the opposing in favor of “no go” decision.

The first group enlists all the “pros” of the problem solution and the second group lists all the “cons”. These groups meet and discuss their discoveries and their reasons.

After tiring discussions, the groups switch sides and try to find weaknesses in their own original standpoints. This interchange of ideas and understanding of various viewpoints results in mutual acceptance of the facts as they exist so that a solution can be put together around these facts and ultimately a final decision is reached.

Delphi Technique

This technique is the improvised version of the nominal group technique, except that it involves obtaining the opinions of experts physically distant from each other and unknown to each other.

This isolates group members from the undue influence of others. Basically, the types of problems sorted by this technique are not specific in nature or related to a particular situation at a given time.

For example, the technique could be used to explain the problems that could be created in the event of a war. The Delphi technique includes the following steps –

- The problem is first identified and a panel of experts are selected. These experts are asked to provide potential solutions through a series of thoughtfully designed questionnaires.
- Each expert concludes and returns the initial questionnaire.
- The results of the questionnaire are composed at a central location and the central coordinator prepares a second set of questionnaire based on the previous answers.
- Each member receives a copy of the results accompanied by the second questionnaire.
- Members are required to review the results and respond to the second questionnaire. The results typically trigger new solutions or motivate changes in the original ideas.
- The process is repeated until a general agreement is obtained.

Quality circle and teams

- Quality circle is a people building philosophy based on the premise that an employee doing a particular job is biggest expert of that field and thus is in a better position to identify, analyse and resolve the work related problems through their innovative and unique ideas.
- In fact, it is a practical application of McGregor's Theory 'Y' that if given the right environment and decision making power, people will enjoy and take pride in their work thus leading to enrichment of their work life.
- Quality circle is a small group of employees in the same work area or doing similar type of work who voluntarily meets regularly for about an hour every week to identify, analyse and resolve work related problems. The objective is to improve quality, productivity and the total performance of the organisation and also to enrich the quality of work life of employees.

Self managed teams

A **self-managed team** is responsible and accountable for all or most aspects of making a product and/or delivering a service. They carry out supporting tasks (eg plan and schedule workflow, **manage** annual leave and absence, handle issues among colleagues, train and hire new workers), as well as technical tasks

Individual decision making techniques

1. Linear programming is a mathematical modeling technique used to determine a level of operational activity in order to achieve an objective, subject to restrictions called constraints. Many decisions faced by an operations manager are centered around the best way to achieve the objectives of the firm subject to the constraints of the operating environment. These constraints can be limited resources, such as time, labor, energy, materials, or money, or they can be restrictive guidelines, such as a recipe for making cereal, engineering specifications, or a blend for gasoline. The most frequent objective of business firms is to *maximize profit*—whereas the objective of individual operational units within a firm.

2. Decision Tree

A decision tree is a branched flowchart showing multiple pathways for potential decisions and outcomes. The tree starts with what is called a decision node, which signifies that a decision must be made.

From the decision node, a branch is created for each of the alternative choices under consideration. The initial decision might lead to another decision, in which case a new decision node is created and new branches are added to show each alternative pathway for the new decision. The result is a series of decision pathways. The flowchart might include only one or two decisions with only one or two alternatives, or it can become a complex sequence of many decisions with many alternatives at each node.

Along the decision pathway, there is usually some point at which a decision leads to an uncertain outcome. That is, a decision could result in multiple possible outcomes, so an uncertainty node is added to the tree at that point. Branches come from that uncertainty node showing the different possible outcomes.

Eventually, each pathway reaches a final outcome. The decision tree, then, is a combination of decision nodes, uncertainty nodes, branches coming from each of these nodes, and final outcomes as the result of the pathways.

3. SIMULATION

Simulation Definition

Simulation typically uses statistical and computer modelling to investigate the performance of a business process either for a new situation or to improve an existing set of processes. By modelling different process scenarios and outcomes, companies can minimise the traditional risks associated with change management initiatives without having to make changes in a 'live' business environment where performance could adversely be affected .

Simulation is used to model efficiently a wide variety of systems that are important to managers. A simulation is basically an imitation, a model that imitates a real-world process or system. In business and management, decision makers are often concerned with the operating characteristics of a system. One way to measure or assess the operating characteristics of a system is to observe that system in actual operation. However, in many types of situations the cost of direct observation can be very high. Furthermore, changing some of the relationships or parameters within a system on an experimental basis may mean waiting a considerable amount of time to collect results on all the combinations that are of concern to the decision maker.

In business and management, a simulation is a mathematical imitation of a real-world system. The use of computers to conduct simulations is not essential from a theoretical standpoint. However, most simulations are sufficiently complex from a practical standpoint to require the use of computers in running them. A simulation can also be considered to be an experimental process. In a set of experimental runs, the decision maker actively varies some of the parameters or relationships in the system. If the mathematical model behind the simulation is valid, the results of the simulation runs will imitate the results of the real system if it were to operate over some period of time.

In order to better understand the fundamental issues of simulation, an example is useful. Suppose a regional medical center seeks to provide air ambulance service to trauma and burn victims over a wide geographic area. Issues such as how many helicopters would be best and where to place them would be in question. Other issues such as scheduling of flight crews and the speed and payload of various types of helicopters could also be important. These represent decision variables that are to a large degree under the control of the medical center. There are uncontrollable variables in this situation as well. Examples are the weather and the prevailing accident and injury rates throughout the medical center's service region.

Given the random effects of accident frequencies and locations, the analysts for the medical center would want to decide how many helicopters to acquire and where to place them. Adding helicopters and flight crews until the budget is spent is not necessarily the best course of action. Perhaps two strategically placed helicopters would serve the region as efficiently as four helicopters of some other type scattered haphazardly about. Analysts would be interested in such things as operating costs, response times, and expected numbers of patients who would be served. All of these operating characteristics would be impacted by injury rates, weather, and any other uncontrollable factors as well as by the variables they are able to control.

4. Network techniques

Meaning and Concept of Network Analysis: Project formulation and Project implementations are two essential functions of project management. Project formulation ensures the scientific selection of a project whereas project implementation ensures an optimal allocation of time and resources to the project activities. All project design should have contain five elements it should systematically formulates and describe each of the basic elements i.e. inputs, activities, outputs, effects, and impact. Project design should start with defining the desired impact. So we work from the Top down i.e what effects are needed to achieve the desired impact? what outputs are needed to achieve the desired effects? and so on

Importance of Network technique: A project has divided into many small activities and these activities can be analyzed with the help of network technique to achieve the objectives of the project.

- Network analysis helps management to minimize the total cost and total maintenance time. With the use of network analysis cost of production can be minimized through reducing the maintenance time.
- Network analysis ensures the effective utilization of limited resources. It also ensures the optimal use of resources and help to control the idle resources so that project can be effectively executed within the budgeted costs and scheduled time.
- Network analysis facilitates co-ordination among the activities as well the persons responsible for project.
- Time management plays a crucial role in every project. Sometimes available resources have to be arranged with a view to reduce the total time for the project rather than reducing the cost of the project. Network analysis helps the managers to manage activities without any delay.
- Network analysis is great tool which helps in planning, scheduling and controlling the activities of the project.
- Network analysis also creates inter-relationship as well as inter-dependence of various activities of project. It helps in integrating the project planning and this relationship assists in bringing out the technological inter-dependence of the various activities.
- Network analysis provides the project formulation team an apparent picture of the work elements and also sequential relationship of the project.

Classification of Network Techniques: There are number of network techniques which are used by the various people according to their purpose. The main techniques are given below:

1. CPM: It is popularly known as Critical Path Method. Critical path method is a project management tool used to formulate a time frame for a project in order to determine where potential delays are most likely to take place.

2. PERT: The Programme Evaluation and Review Technique is basically a scheduling technique. It helps project manager in planning, scheduling, monitoring, evaluating, and controlling large and complex projects. It is a probabilistic model and introduces uncertainties in project network.

3. GERT: The Graphical Evaluation and Review Technique is a new technique and superior over the above mentioned techniques. In this analysis only simulation can be used.

4. LOB: It is known as Line of Balance technique. Line of balance is a graphical technique to show the progress achieved during the project with the help of key events.

5. PERT/Cost: It is an extension of the PERT technique to cover the cost of project. It is not only helpful to plan the completion of project within a specific time but also within a specific cost.