MODULE 4

ORGANISING FOR DECISION MAKING

CHAPTER 1 – ORGANISING FUNCTION

Organizing Function of Management

Organising is the process of defining and grouping activities and establishing authority relationships among them to attain organizational objectives.
"Organization involves the grouping of activities necessary to accomplish goals and plans, the assignment of these activities to appropriate departments and the provision of authority, delegation and co-ordination."

Nature or Characteristics of Organising

(1) Division of Work: Division of work is the basis of an organization. Under division of work the entire work of business is divided into many departments .The work of every department is further sub-divided into subworks. In this way each individual has to do the same work repeatedly which gradually makes that person an expert.

(2) Coordination: Under organizing different persons are assigned different works but the aim of all these persons happens to be the some - the attainment of the objectives of the enterprise. Organization ensures that the work of all the persons depends on each other's work even though it happens to be different.
(3) Plurality of Persons: Organization is a group of many persons who assemble to fulfill a common purpose. A single individual cannot create an organization.
(4) Common Objectives: There are various parts of an organization with different functions to perform but all move in the direction of achieving a general objective.
(5) Well-defined Authority and Responsibility: Under organization a chain is established between different posts right from the top to the bottom. It is clearly specified as to what will be
the authority and responsibility of every post

Importance of Organizing

Specialization: The work of an organization is separated into units and departments through an organizational network of associations. This helps in getting specialization in different areas of work in an organization.

Well-defined jobs: Organizational structure aids in getting the right people to do the job by choosing people in accordance with their skills, knowledge and qualifications for working in different departments of the organization. This aids in properly defining the work of an organization which further aids in explaining the responsibilities of each person.

Clarifies authority: Organizational structure aids in helping the manager to understand each person's role. This can be achieved in the manager being able to understand clearly how he has to use his powers. This aids in an increase in production as jobs and responsibilities that are well defined make the manager's jobs much more efficient.

Co-ordination: Organization is a process of establishing co-ordination amongst various departments and it also aids in defining relations amongst various positions and individuals assisting each other. If the managers at a higher level implement their power over the network of activities of managers at lower levels, it can bring about efficiency in work.

Effective administration: The organizational structure aids in clarifying the positions of the jobs. The roles and responsibilities of different managers are well-defined and by dividing the work it is easy to achieve specialization. This further aids in an organization that is well-organized and efficient.

Organising Process

***Determination of Objectives*:** Determination of objectives will consist in deciding as to why the proposed organization is to be set up and, therefore, what will be the nature of the work to be accomplished through the organization

***Division of work*:** The first process of Organising includes identification and division of work which shall be done in accordance with the plans that are determined previously.

***Departmentation*:** once the work of identifying and dividing the work has been done those that are similar are to be grouped together.

Linking departments: When the process of departmentation was completed, linking of departments has to be done so that those departments operate in a co-ordinated manner which gives a shape to overall organisation structure.

Assigning Duties: On completion of departmentation process assigning duties i.e. defining authority and responsibilty to the employees on the basis of their skills and capabilities has to be done, which in consequence magnifies efficiency with regard to their work.

Defining hierarchal structure: Each employee should also know from whom he has to take orders and to whom he is accountable/responsible.

Principles of organizing

1. Principle of unity of objectives – An organisation must have cearly defined objective. Organisational structure is effective if it facilitates the contribution made by all individuals in the enterprise towards the attainment of objectives of the enterprise.
2. Principle of span of control - span of control is a span of supervision which depicts the number of employees that can be handled and controlled effectively by a single manager. According to this principle, a manager should be able to handle what number of employees under him should be decided.
3. Principle of scalar chain - Scalar chain is a chain of command or authority which flows from top to bottom. With a chain of authority available, wastages of resources are minimized, communication is affected, overlapping of work is avoided and easy organization takes place.
4. Principle of Unity of command - It implies one subordinate-one superior relationship. Every subordinate is answerable and accountable to one boss at one time. This helps in avoiding communication gaps and feedback and response is prompt.
5. Principle of authority and responsibility – Manager should keep a balance between authority and responsibility
6. Principle of specialisation - the whole work of a concern should be divided amongst the subordinates on the basis of qualifications, abilities and skills. It is through division of work specialization can be achieved which results in effective organization

Span of Control

Span of Control means the number of subordinates that can be managed efficiently and effectively by a superior in an organization. It suggests how the relations are designed between a superior and a subordinate in an organization.

Factors Affecting Span of control:
a) Capacity of Superior:

Different ability and capacity of leadership, communication affect management of subordinates.

b) Capacity of Subordinates:

Efficient and trained subordinates affects the degree of span of management.

c) Nature of Work:

Different types of work require different patterns of management.

d) Degree of Centralization or Decentralization:

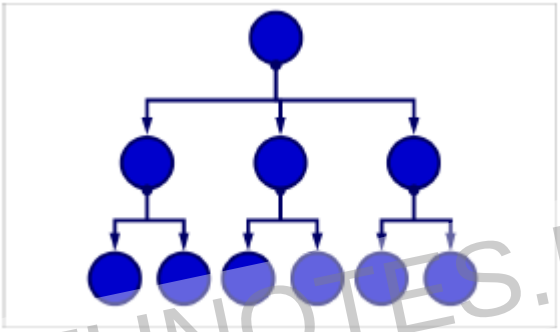
Degree of centralization or decentralization affects the span of management by affecting the degree of involvement of the superior in decision making.

e) Degree of Planning:

Plans which can provide rules, procedures in doing the work higher would be the degree of span of management.

Span of control is of two types:

1. Narrow span of control: Narrow Span of control means a single manager or supervisor oversees few subordinates. This gives rise to a tall organizational structure.



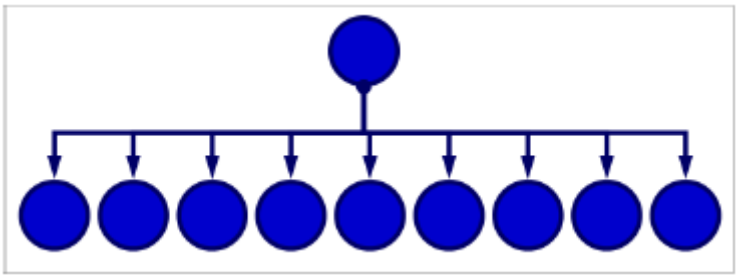
Advantages:

- Close supervision
- Close control of subordinates
- Fast communication

Disadvantages:

- Too much control
- Many levels of management
- High costs
- Excessive distance between lowest level and highest level

2. Wide span of control: Wide span of control means a single manager or supervisor oversees a large number of subordinates. This gives rise to a flat organizational structure



Advantages:

- More Delegation of Authority

• Development of Managers
• Clear policies

Disadvantages:

• Overloaded supervisors
• Danger of superiors loss of control
• Requirement of highly trained managerial personnel
• Block in decision making

Types of Organisation Structure

There are two types of organisation structure – Formal organisation structure and Informal Organisation structure

Formal organisation means an intentional structure of roles in a formally organised enterprise. It refers to the structure of jobs and positions with defined functions and relationships. This type of organisation is built by the management to realise its objectives.

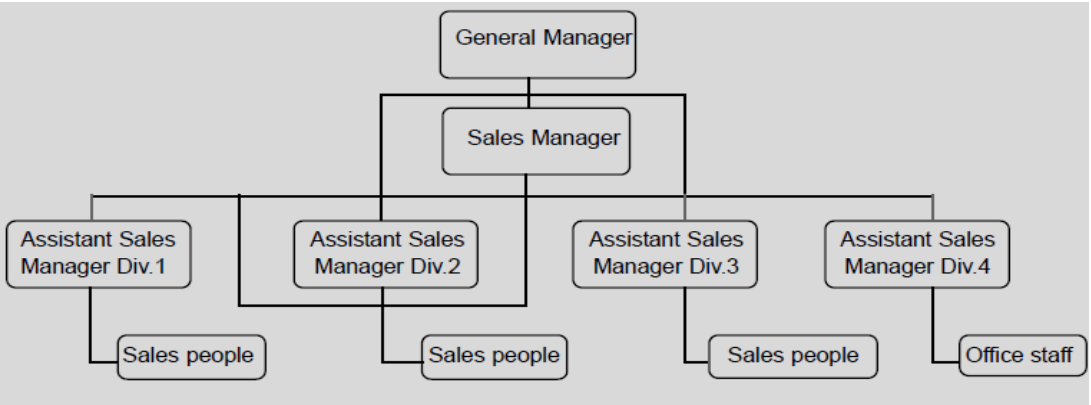
Informal organisation is a network of interpersonal relationships that arise when people interact with each other. It refers to the relationships between people based not on procedures but on personal attitudes, prejudices, likes and dislikes.

TYPES OF FORMAL ORGANISATIONAL STRUCTURE

a. Line Organisation

It is perhaps the oldest and the simplest organisational structure. Line functions are those which have direct responsibility for accomplishing the objective of the enterprise. In this kind of structure every manager exercise a direct authority over his subordinate who in turn directly reports to their superiors.

- There is a hierarchical arrangement of authority.
- Each department is self contained and works independently of other departments.
- Lines of authority are vertical i.e. from top to bottom.
- There are no staff specialists.



Advantages

- Simple to establish and operate
- Promotes prompt decision making.
- Easy to control as the managers have direct control over their subordinates.
- Communication is fast and easy as there is only vertical flow of communication.

Disadvantages

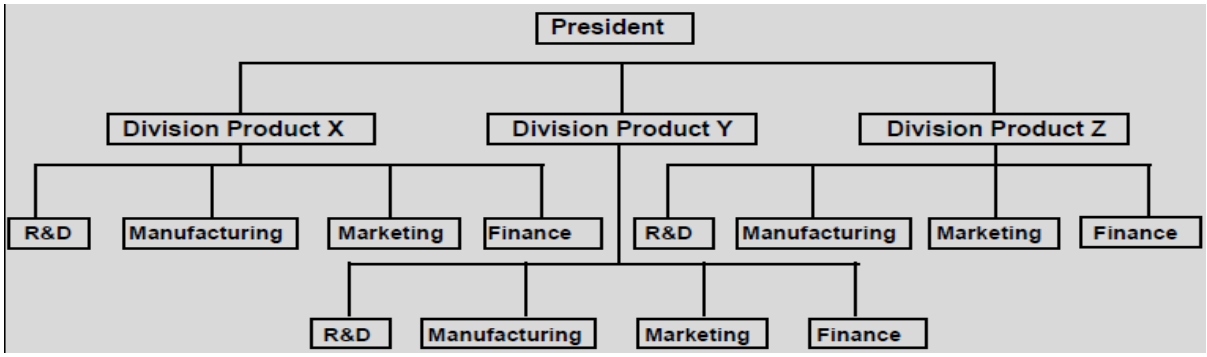
- Lack of specialisation
- Managers might get overloaded with too many things to do.
- Failure of one manager to take proper decisions might affect the whole organisation.

However, line structures are suitable for

- small businesses where there are few subordinates
- organisations where there is largely of routine nature and methods of operations are simple.

b. Functional Organisation

Under this system, the whole task of management and direction of subordinates is divided according to the type of work involved. The organisation is divided into a number of functional areas. This organisation has grouping of activities in accordance with the functions of an organisation such as production, marketing, finance, human resource and so on. The specialist in charge of a functional department has the authority over all other employees for his function.



Advantages

- Is logical and reflection of functions
- Follows principle of occupation specialisation
- Simplifies training
- Better control as the manger in charge of each functional department is usually an specialist.

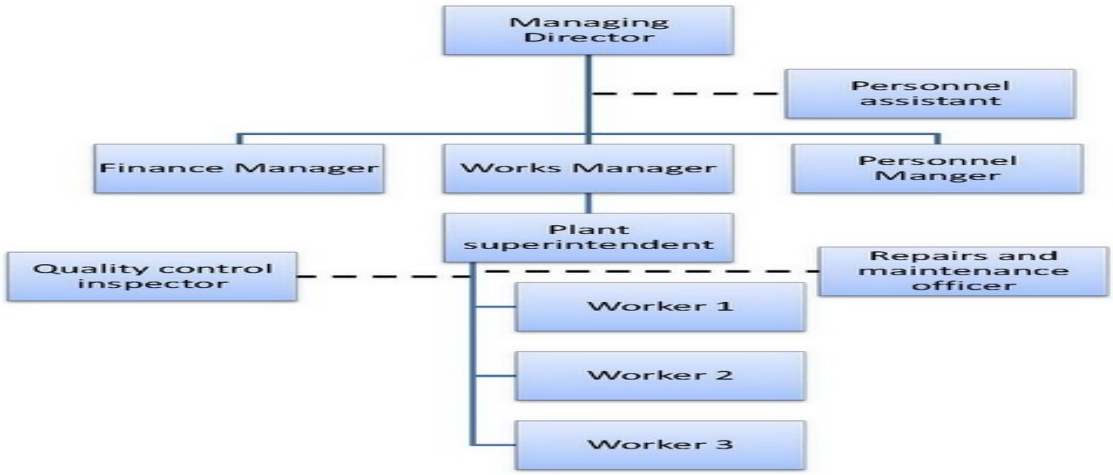
Disadvantages

- Reduced coordination between functions.
- Conflicts between different functions could be detrimental for the organisation as a whole.
- Difficult for general managers to coordinate different departments.

However, it is much suitable for large organisations where there is ample scope for specialisation. Once harmony and proper coordination among different functions is achieved, it could lead to sure success for an organisation.

c. Line and Staff Organisation

It is a combination of line and functional structures. Under this organisation the "line" is supported by the "staff". Staff personnel acts as an advisory group adjacent to the line. In this organisation structure, the authority flows in a vertical line and gets the help of staff specialist who are in advisory. When the line executives need advice, information about any specific area, these staff specialists are consulted.
For example Chief accountant has command authority over accountants and clerks in the accounts departments but he has only advisory relationship with other departments like production or sales.



Advantages

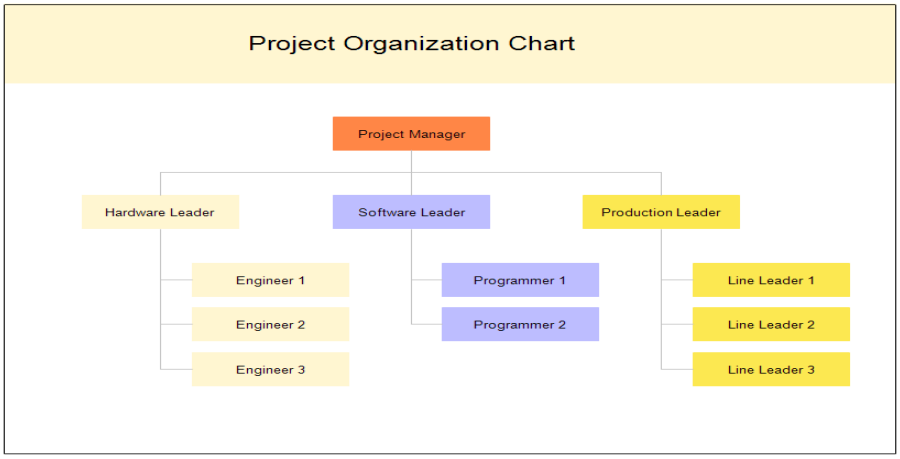
- Line managers are provided expert advice by these specialists.
- Staff managers provide specialist advice which can improve quality of decisions in various departments.

Disadvantages

- Line managers and staff managers might have conflicts on particular issues.
- Line and staff managers might not be clear as to what the actual area of operations is and what is expected of them. Co-ordination may be a problem.

d. Project Organisation

Project organisation is not a separate type of organisation like the line, functional or line and staff organisation; rather it is set up within an organisation for the purpose of completing a project or accomplishing assigned objectives in time and within cost and profit goals laid down by the management. The project structure consists of a number of horizontal organisational units to complete projects of a long duration. A team of specialists from different areas is created for each project. Usually this team is managed by the project manager. The project staff is separate from and independent of the functional departments.



Advantages

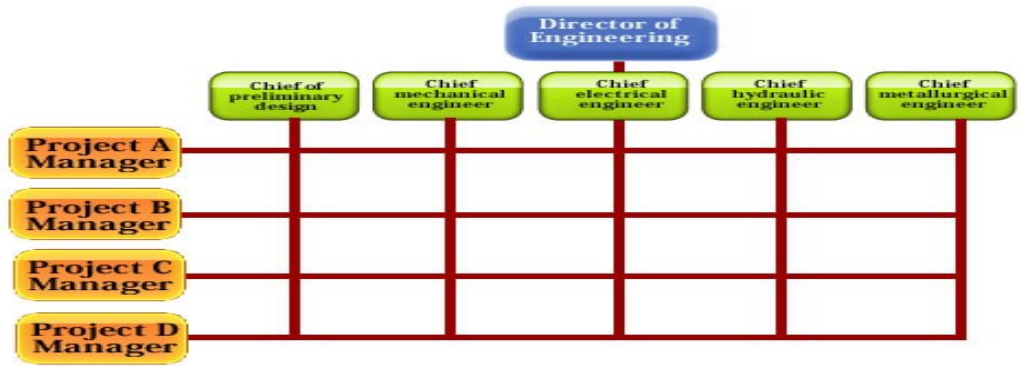
- Special attention can be provided to meet the complex demand of the project.
- It allows maximum use of specialist knowledge thus chances of failure are very less.
- Project staff works as a team towards common goal which results in high motivation level for its members.

Disadvantages

As the project staff consists of personnel from diverse fields, it might be quite challenging for the project manager to coordinate among them.

e. Matrix Organisation

- Matrix organisation combines two structures – functional departmentation and project structure.
- Functional department is a permanent feature of the matrix structure and retains authority for overall operation of the functional units.
- Project teams are created whenever specific projects require a high degree of technical skill and other resources for a temporary period.
- Project team form the horizontal chain and functional departments create a vertical chain of command.
- Members of a particular team are drawn from the functional departments and are placed under the direction of a project manager who has the overall responsibility of a particular project.



Matrix Organisation Structure

Determinants of organizational structure

1. Environment – An organization's structure is affected by its environment because of environmental uncertainty. Some organizations face relatively static environments, ie few forces in the environment are changing. Other organizations face very dynamic environments, which are rapidly changing. One word to reduce environmental uncertainty is through adjustments in the organization structure.

2. Strategy – There is a close relation between the organizational strategy and its structure. The understanding of this relationship is important so that in implementing the strategy, the organization structure is designed according to the needs of the strategy. Without coordination between structure and strategy there would be confusion and misdirection within the organization.

3. Size – Organization size is defined as the total number of employees. The larger an organization becomes, the more complicated is its structure. When an organization is small its structure is simple. In a small organization it may not sometimes have a formal organization structure. Individuals may simply perform tasks based on their likes, dislikes, ability or need. As an organization becomes bigger it becomes difficult to operate without a formal organization structure.

4. Organization life cycle – As an organization ages it tends to be more larger. Hence the need for a more formal organization structure.

5. Technology – Technology refers to the methods used in production. The process that transforms inputs to outputs differ by their degree of routineness. The more routine the technology the more standardized the structure.

Departmentation

Determining the functions to be performed involves consideration of division of labour, this is usually accomplished by a process of departmentation. Grouping related functions into manageable units to achieve the objectives of the enterprise in the most efficient and effective manner is departmentation.

Departmentation is the process by which similar activities of the business are grouped into units for the purpose of facilitating smooth administration at all levels.

Purpose of departmentation

1. Group the individuals with common background and shared characteristics
2. Define relationships of positions within an organisation
3. Establish formal lines of authority and fix clear responsibility
4. Provide job specialisation to the members
5. Increase economies of scale (cost reduction through enhanced production)

Types of departmentation

Function wise Departmentation

When departments are formed on the basis of the specialized activities or functions performed by an organization, it is called functional departmentation.

The advantages of this type of structure are as follows:

(i) It is a logical reflection of functions.
(ii) It follows the principle of specialisation.
(iii) Maintains power and prestige of major functions.
(iv) Inter-departmental co-ordination is facilitated.
(v) The structure is simple, logical and easy to understand.

There are also some disadvantages:

(i) Responsibility for profits tends to be at the top.
(ii) There may be chances of heavy centralisation in decision-making.
(iii) Where geographical centralisation is desirable or required, this form becomes unsuitable.
(iv) This is not very suitable where product lines have to be emphasized.
(v) There is a lower potential for manager development.

Product wise Departmentation

Grouping of activities based on product lines or products is product wise departmentation. In this kind of departmentation, all activities connected with each product, including its production, marketing etc are grouped together under one department. For eg in an automible

manufacturing company, departments may be created for two wheelers, three wheelers, four wheelers etc

The advantages of this type of structure are:

(i) Places greater effort on individual product line.
(ii) Better customer service arising from greater product knowledge.
(iii) Simplifies departmentation of profitability of each product line. Responsibility for profits is at the Division level.
(iv) Improves co-ordination of functional activities.
(v) New department may be added without difficulty. Permits growth and diversity of products and services.

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Some of the disadvantages inherent in such departmentation are:

(i) A customer has to deal with different salesmen or managers for different products of the same company.
(ii) Extra costs of maintaining separate sales force for each product.
(iii) Duplication of costs on travel, etc.
(iv) Tends to make maintenance of economical central services difficult.
(v) Results in increased problems of the top management control.

Territorial or Geographical Departmentation

When organsiations are spread out throughout the world or have territories in many parts of the country, departmentation by geographic area may provide better service to customers and be more cost effective. It may be important that activities in a given territory be grouped and assigned to a manager.

The advantages of such departmentation are:

(i) Regional expertise is generated and managers can tackle customers or competition better. Places responsibility at lower levels.
(ii) Proximity will reduce costs of operation and administration.
(iii) Places emphasis on local markets and problems. Local conditions might warrant different types of selling. This is possible only in territorial departmentation.
(iv) Improves co-ordination at the regional level.
(v) Better face-to-face communication with local interests in mind.

Some disadvantages are listed as follows:

(i) Involves higher costs of co-ordination and control from headquarters.
(ii) Results in more managerial levels which increases overhead costs.
(iii) Unsuitable for departments like Finance, where no gains are possible by specialisation on local factors.
(iv) Increases problems of the top management control.

Departmentation by Customers

When the organizational activities are grouped on the basis of the type of customers served, it is called customer departmentation. The primary purpose of this form of departmentalization

is to ensure that organizations respond to the requirements of a specific customer groups efficiently. Example in case of banks there could be corporate banking, agricultural banking, institutional banking, community banking etc.

Some advantages of this type of structure are:

(i) Greater specialized customer service.

(ii) Where marketing channels are considerably different for various types of customers, this type of structure is very useful.

Some disadvantages of this type are:

(i) May not be enough work for certain types of customers. Hence, under employment of facilities and manpower specialized in terms of customer groups.

(ii) Problems of co-ordination might pose difficulties.

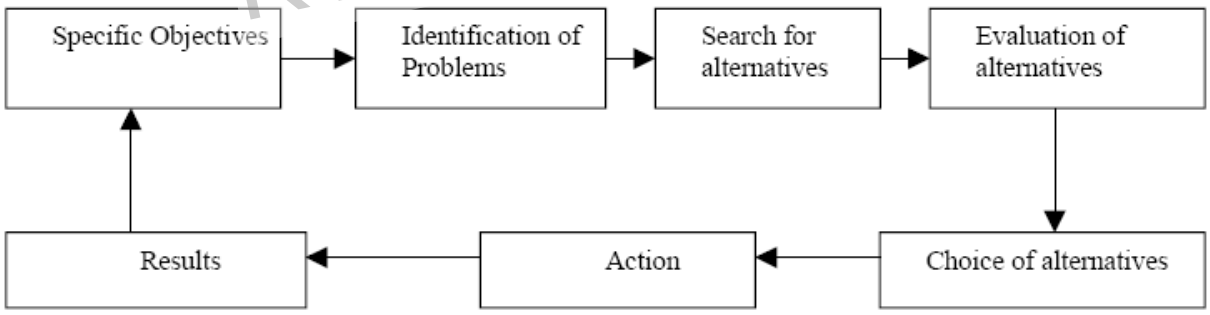
(iii) Unequal development of customer groups.

CHAPTER 2 – DECISION MAKING

"Decision-making is the selection based on some criteria from two or more possible alternatives".

Decision Making Process

The decision making process is presented in the figure below:



1. Specific Objective: The need for decision making arises in order to achieve certain specific objectives. The starting point in any analysis of decision making involves the determination of whether a decision needs to be made.

2. Problem Identification: A problem is a felt need, a question which needs a solution. A good decision is dependent upon the recognition of the right problem. The objective of problem identification is that if the problem is precisely and specifically identifies, it will provide a clue in finding a possible solution. A problem can be identified clearly, if managers go through diagnosis and analysis of the problem.

Diagnosis: Diagnosis is the process of identifying a problem from its signs and symptoms. A symptom is a condition or set of conditions that indicates the existence of a problem. Diagnosing the real problem implies knowing the gap between what is and what ought to be,

identifying the reasons for the gap and understanding the problem in relation to higher objectives of the organization.

Analysis: Diagnosis gives rise to analysis. Analysis of a problem requires:

• Who would make decision?
• What information would be needed?
• From where the information is available?

Analysis helps managers to gain an insight into the problem.

3. **Search for Alternatives:** A problem can be solved in several ways; however, all the ways cannot be equally satisfying. Therefore, the decision maker must try to find out the various alternatives available in order to get the most satisfactory result of a decision. A decision maker can use several sources for identifying alternatives:

• His own past experiences
• Practices followed by others and
• Using creative techniques.

4. **Evaluation of Alternatives:** After the various alternatives are identified, the next step is to evaluate them and select the one that will meet the choice criteria. /the decision maker must check proposed alternatives against limits, and if an alternative does not meet them, he can discard it. Having narrowed down the alternatives which require serious consideration, the decision maker will go for evaluating how each alternative may contribute towards the objective supposed to be achieved by implementing the decision.

5. **Choice of Alternative:** The evaluation of various alternatives presents a clear picture as to how each one of them contribute to the objectives under question. A comparison is made among the likely outcomes of various alternatives and the best one is chosen.

6. **Action:** Once the alternative is selected, it is put into action. The actual process of decision making ends with the choice of an alternative through which the objectives can be achieved.

7. **Results:** When the decision is put into action, it brings certain results. These results must correspond with objectives, the starting point of decision process, if good decision has been made and implemented properly. Thus, results provide indication whether decision making and its implementation is proper.

Factors affecting the decision making process

1. The decision situation – Elements of change, risk and uncertainty are common in a decision situation and recognizing and making sense of these elements are the main challenges that decision makers face

2. The decision makers – Different people approach decision making in different ways. Individuals are unique in terms of their personalities, abilities, beliefs and values. There are therefore many issues around who is involved in decision making process

3. Time – A decision is made at a particular time in a particular set of circumstances. The decision situation can change very rapidly which will affect the decision making

4. People affected by the decision – People likely to be affected will have an influence on the outcome of a decision

5. Decision criteria – The criteria that are established and used to evaluate alternative courses of action in decision making will affect the outcome of a decision.

Characteristics of Decision Making

1. Decision making implies that there are various alternatives and the most desirable alternative is chosen to solve the problem or to arrive at expected results. It implies **choice**
2. Decision making is **continuous** and a dynamic process.

3. It **involves inbuilt risk and uncertainty** as it relates to the future
4. It is a **time consuming activity** as various aspects need careful consideration and various steps are required to be followed.
5. Decision-making is **goal-oriented**.

Importance of decision making

1. Better utilization of resources
2. Helps to face challenges and problems effectively
3. Helps to achieve objectives
4. Increases efficiency
5. Facilitates innovation

Limitations of decision making

1. Time consuming
2. Compromised decisions
3. Biased Decision
4. Limited analysis
5. Uncertain future

Types of Decisions

a) Programmed and Non-Programmed Decisions:

i) Programmed decisions: Programmed decisions are routine and repetitive and are made within the framework of organizational policies and rules. These policies and rules are established well in advance to solve recurring problems in the organization. Programmed decisions have short-run impact. They are, generally, taken at the lower level of management.
ii) Non-Programmed Decisions: Non-programmed decisions are decisions taken to meet non-repetitive problems. Non-programmed decisions are relevant for solving unique/ unusual problems in which various alternatives cannot be decided in advance. A common feature of non-programmed decisions is that they are novel and non-recurring and therefore, readymade solutions are not available. Since these decisions are of high importance and have long-term consequences, they are made by top level management.

b) Strategic, Tactical and Operational Decisions: Organizational decisions may also be classified as strategic or tactical.

i) Strategic Decisions: Basic decisions or strategic decisions are decisions which are of crucial importance. Strategic decisions a major choice of actions concerning allocation of resources and contribution to the achievement of organizational objectives. Decisions like plant location, product diversification, entering into new markets, selection of channels of distribution, capital expenditure etc are examples of basic or strategic decisions.
ii) Tactical Decisions: Routine decisions or tactical decisions are decisions which are routine and repetitive. They are derived out of strategic decisions. The various features of a tactical decision are as follows:
• Tactical decision relates to day-to-day operation of the organization and has to be taken very frequently.

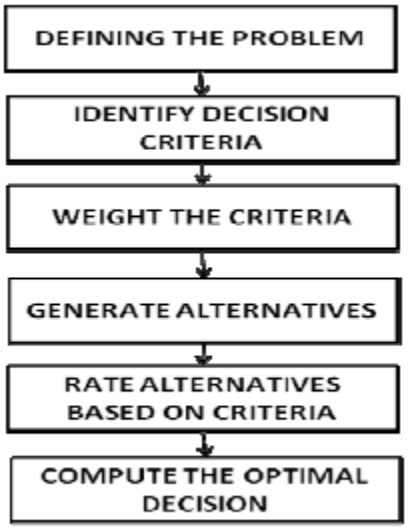
• Tactical decision is mostly a programmed one. Therefore, the decision can be made within the context of these variables.
• The outcome of tactical decision is of short-term nature and affects a narrow part of the organization.
• The authority for making tactical decisions can be delegated to lower level managers because: first, the impact of tactical decision is narrow and of short-term nature and Second, by delegating authority for such decisions to lower-level managers, higher level managers are free to devote more time on strategic decisions.

iii) Operational decisions: These are day to day decisions made by junior managers that are simple and routine. This could involve the regular ordering of supplies or the creation of a staff rota. They are decisions regarding the day-to-day functions of a business. These decisions are considered operational decisions and they are subordinate to strategic and tactical decisions. While these decisions are the responsibility of low-level managers, good decision making is crucial here since such decisions focus on productivity, quality control and employee performance. Moreover, operational decisions can be broken down into:

- Short term planning needs like ordering supplies, establishing work priorities and enlisting temporary help
- Medium term planning like hiring and firing personnel, purchasing equipment, training individuals and modifying procedures
- Long term planning like replacing subcontractors, redesigning production facilities and modifying capacity

Rational Decision Making model

The process is one that is logical and follows the orderly path from problem identification through solution. It provides a structured and sequenced approach to decision making. Using such an approach can help to ensure discipline and consistency is built into your decision making process.



The Six-Step Rational Decision-Making Model

1. Define the problem.
2. Identify decision criteria
3. Weight the criteria
4. Generate alternatives
5. Rate each alternative on each criterion
6. Compute the optimal decision

1) Defining the problem

This is the initial step of the rational decision making process. First the problem is identified and
then defined to get a clear view of the situation.

2) Identify decision criteria

Once a decision maker has defined the problem, he or she needs to identify the decision criteria that will be important in solving the problem. In this step, the decision maker is determining what's relevant in making the decision. This step brings the decision maker's interests, values, and personal preferences into the process.

Identifying criteria is important because what one person thinks is relevant, another may not. Also keep in mind that any factors not identified in this step are considered as irrelevant to the decision maker.

3) Weight the criteria

The decision-maker weights the previously identified criteria in order to give them correct priority
in the decision.

4) Generate alternatives

The decision maker generates possible alternatives that could succeed in resolving the problem. No attempt is made in this step to appraise these alternatives, only to list them.

5) Rate each alternative on each criterion

The decision maker must critically analyze and evaluate each one. The strengths and weakness of each alternative become evident as they compared with the criteria and weights established in second and third steps.

6) Compute the optimal decision

Evaluating each alternative against the weighted criteria and selecting the alternative with the highest total score.

Decision making under various circumstances

The conditions for making decisions can be divided into three types. Namely a) Certainty, b) Risk and c) Uncertainty

Decision Making under Certainty

In this environment, the decision maker knows with certainty the consequences of selecting every course of action or decision choice. In this type of decision problems the decision maker presumes that only one state of nature is relevant for his purposes. He identifies this state of nature, takes it for granted and presumes complete knowledge as to its occurrence. For example, suppose a person has Rs 5,00,000 to invest for a one year period. One alternate is to open a savings account paying 4% interest and another is to invest in a government treasury paying 9% interest. If both investments are secure and guaranteed, then there is a certainty that the treasury note will be the better investment.

The various techniques for solving problems under certainty are i) System of equations ii) Linear programming iii) Inventory models iv) Break even analysis

Decision Making under Risk

The future conditions are not always made in advance. In real life most managerial decisions are made under risk decisions, that is, some information is available but it is insufficient to answer all the questions about the outcome. So a decision maker has to make probability estimates of these outcomes. In decision making under **risk** one assumes that there exist a number of possible future states of nature. Each has a known (or assumed) probability of occurring, and there may not be one future state that results in the best outcome for all alternatives

Examples of future states and their probabilities are as follows:

• Alternative weather (weather) will affect the profitability of alternative construction schedules; here, the probabilities of rain and of good weather can be estimated from historical data.

Important methods of decision making under risk include:

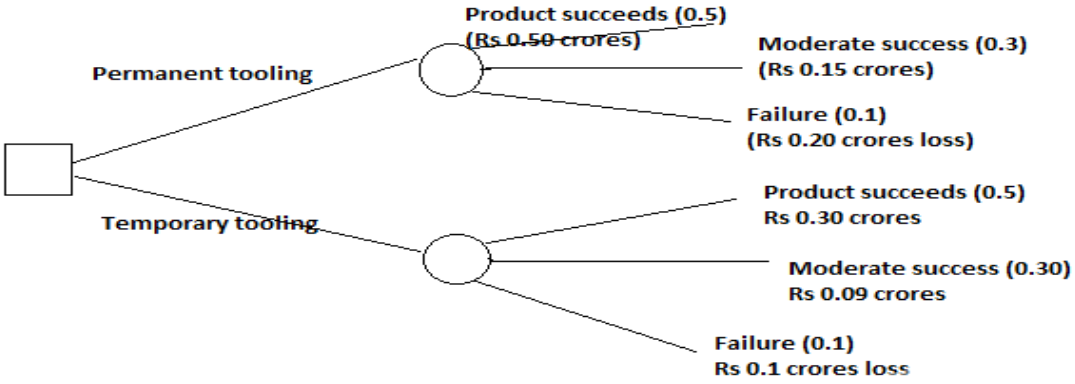
Decision trees

Some decisions involve a series of steps, the second step depending on the outcome of the first, the third depending on the outcome of the second and so on. Often uncertainty surrounds each step, so the decision maker faces uncertainty piled on uncertainty. Decision trees are a model for solving such a problem.

Decision tree is a graphical method for identifying alternate actions, estimating probabilities, and indicating the resulting expected payoff. This graphical form visually helps the decision maker view his alternatives and outcomes. Instead of compressing all the information regarding a complex decision into a table, decision maker can draw a schematic representation of the problem that displays the information in more easily understandable fashion.

Example of the problems which can be solved through decision tree may be when a new product is to be introduced, whether to tool up for tool up for it in a major way as to assure production at the lowest possible cost or to undertake cheaper temporary tooling involving a higher manufacturing cost but lower capital losses if the product does not sell well as estimated etc.

Here the second step of decision, that is, going for major or minor tooling, depends on the outcome of the first decision, that is, whether to go for new product or not. Similarly within the major tooling, there may be alternatives which can be considered in the light of decision made of tooling.



Squares represent decisions you can make. The lines that come out of each square on its right show all the available distinct options that can be selected at that decision analysis point. Circles show various circumstances that have uncertain outcomes (For example, some types of events that may affect you on a given path). The lines that come out of each circle denote possible outcomes of that uncontrollable circumstance.

Decision Making under Uncertainty

At times a decision maker cannot assess the probability of occurrence for the various states of nature. Uncertainty occurs when there exist several (i.e., more than one) future states of nature but the probabilities of each of these states occurring are not known. In such situations the decision maker can choose among several possible approaches for making the decision. A different kind of logic is used here, based on attitudes toward risk. Such situations arise when a new product is introduced in the market or a new plant is set up.

Following choices are available before the decision maker in situations of uncertainty - Maximax, Minimax, Maximin, Laplace and Hurwicz Alpha criteria.

Maximax Decision Criterion

The term Maximax is the abbreviation of the phrase maximum of the maxima. It is alsocalled the criterion of optimism. An adventurous and aggressive decision maker chooses that act that

would result in the maximum payoff possible . Suppose for each act there are three possible payoffs,corresponding to three states of nature as given in the following decision matrix

Payoff Table

	States of nature		
Acts	S1	S2	S3
A1	220	160	140
A2	180	190	170
A3	100	180	200

The maximum of these three maximums is 220 which relates to A1. Consequently, according to the maximax criteria, the decision is to choose A1.

Minimax Decision Criterion

Minimax is just opposite to maximax. Application of the minimax criterion requires a table of losses instead of gains The losses are the costs to be incurred or the damages to be suffered for each of the alternative act and states of nature. The minimax rule minimizes the maximum possible loss for a course of action. The term minimax is an abbreviation of the phrase minimum of maxima loss. Under each of the various acts, there is a maximum loss and the act that is associated with the minimum of the various maximum losses is the act to be undertaken according to the minimax criterion. Suppose the loss table is

Opportunity loss table

	States of nature		
Acts	S1	S2	S3
A1	0	3	18
A2	4	0	14
A3	10	6	0

Maximum losses incurred by the various decisions. And the minimum among these three maximums is 10 which if offered by A3. According to Minimax criteria, the decision maker should take A3.

Maximin decision criterion (criterion of Pessimism)

The maximin criterion of decision making stands for choice between alternative courses of action assuming pessimistic view. Taking each act in turn, we note the worst possible results in terms of pay off and select the act which maximizes the minimum pay off.

Suppose the pay off table is

Payoff table

	States of nature			
Acts	S1	S2	S3	S4
A1	-80	-30	30	75
A2	-60	-10	15	80
A3	-20	-2	7	25

Minima under each decision A1 = -80, A2 = -60, A3 = -20. According to Maximin criterion, A3 is to be chosen, which gives maximum pay off among minima.

Laplace criterion

As the decision maker has no information about the probability of occurrence of various events, the decision maker makes a simple assumption that each probability is equally likely. The expected Pay off is worked out on the basis of these probabilities. Then act having maximum expected pay off is selected.

	States of nature		
Acts	S1	S2	S3
A1	20	25	30
A2	12	15	20
A3	25	30	22

We associate equal probability for each event – 1/3 to each state of nature. So, as per Laplace criterion, expected pay off are

A1 = 20 x 1/3 + 25 x 1/3 + 30 x 1/3 = 25

A2 = 12 x 1/3 + 15 x 1/3 + 20 x 1/3 = 15.67

A3 = 25 x 1/3 + 30 x 1/3 + 22 x 1/3 = 25.67

Since A3 has maximum expected pay off, as per Laplace criterion, A3 is the Act to be selected.

Hurwicz Alpha criterion

This method is a combination of maximin criterion and minimax criterion. In this method, the decision maker's degree of optimism is represented by alpha -the coefficient of optimism. Alpha varies between 0 and 1.When alpha is = 0, there is total pessimism and when alpha is =1, there is total optimism. As per the criterion, Hurwicz value is calculated for each Act, considering maximum pay off and minimum pay off as per an Act. Hurwicz value is the total of products of maximum payoff and alpha, and minimum pay off and 1 – alpha.

Hurwicz value = Max pay off x alpha + mini pay off x 1- alpha for an Act.

Consider following pay off table. Hurwicz alpha value given is = .6

Payoff table

	States of nature		
Acts	S1	S2	S3
A1	20	25	30
A2	12	15	20
A3	25	30	22

Hurwicz value for A1 = 30 x .6 +20 x .4 = 26

Hurwicz value for A2 = 20 x .6 + 12 x .4 = 16.8

Hurwicz value for A3 = 30 x .6 + 22 x .4 = 26.8

Since Hurwicz value is maximum for A3, it is the optimal Act. It is to be chosen.

Creative Process and Innovation

The term creativity refers to the ability and power to develop new ideas. Innovation means the use of these ideas.

The Creative Process:

1. Unconscious scanning – This scanning requires an absorption in the problem, which may be vague in the mind.

2. Intuition – It connects unconscious with the conscious. This stage may involve a combination of factors that may seem contradictory at first. Intuition requires that people find new combinations and integrate diverse concepts and ideas.

3. Insight – It is mostly the result of hard work. Insight may come at times when the thoughts are not directly focused on the problem at hand.

4. Logical formulation – it is the verification stage. Insight needs to be tested through logic or experiment.

Brainstorming

One of the best known techniques for facilitating creativity was developed by Alex F Osborn. Brainstorming is the name given to a situation when a group of people meet to generate new ideas around a specific area of interest. Using rules which remove inhibitions, people are able to think more freely and move into new areas of thought and so create numerous new ideas and solutions. The participants shout out ideas as they occur to them and then build on the ideas raised by others. All the ideas are noted down and are not criticized. Only when the brainstorming session is over are the ideas evaluated.
The rules of brainstorming are:
1. No ideas are ever criticized
2. The more radical the ideas, the better
3. The quantity of idea production is stressed
4. The improvement of ideas by others is encouraged

Brainstorming process:
1. Define and agree the objective.
2. Brainstorm ideas and suggestions having agreed a time limit.
3. Categorise/condense/combine/refine.
4. Assess/analyse effects or results.
5. Prioritise options/rank list as appropriate.
6. Agree action and timescale.
7. Control and monitor follow-up