<u>**UNIT- II**</u>**: Decision Making:** Concepts, Methods, Tools, Procedures, Organizational decision making, MIS and Decision making concepts, Information: A Quality Product, Classification of information, Value of information, General model of Human as information processor, Types of systems, Handling system complexity, Development of long range plans of the MIS, Development and implementation of MIS, Factors of Success and failure for MIS.

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Decision : A **decision** is the choice out of several options made by the decision maker to achieve some objective in a given situation.

➢ The **decision-making process** requires creativity, imagination and a deep understanding of human behaviour.

➢ Also requires a foresight to predict the post-decision implications and a willingness to face those implications.

➢ All decisions solve a 'problem' but over a period of time they give rise to a number of other 'problems.'

➢ **Rational Decision-Making:** A rational decision is the one which, effectively and efficiently, ensures the achievement of the goal for which the decision is made.

  Eg: If it is raining, it is rational to look for a cover so that you do not get wet.

Similarly, If some one are in business and want to make profit, then one must produce goods and sell them at a price higher than cost of production.

➢ In reality, there is no right or wrong decision but a rational or an irrational decision. The quality of decision-making is to be judged on the rationality and not necessarily on the result it produces.

➢ The rationality, is a multi-dimensional concept. For example, the business decisions in a private organisation and a Public Sector Undertaking differ under the head of rationality.

➢ Simon **A.Herbert differentiates** among the types of rationality. A decision, in a given situation is:

- •**Objectively** rational if it maximises the value of the objective.
- •**Subjectively** rational if it maximises the attainment of value within limitation of the knowledge and awareness of the subject.
- •**Consciously** rational to the extent the process of the decision-making is deliberate and a conscious one.
- •**Organisationally** rational to the degree of the orientation towards the organisaton.
- •**Personally** rational to the extent it achieves an individual's personal goals.

❖ **DECISION-MAKING PROCESS**: Decision-making is a process which the decision maker uses to arrive at a decision.

➢ The core of this process is described by **Herbert Simon** in a model. He describes the model in three phases.

➢ **Phases in Decision Making by Herbert Simon:**

  (a) Intelligence;

  (b) Design; and

  (c) Choice.

➢ MIS follow this model in its development stage as shown in **figure**.

➢ **Intelligence**: Raw data collected, processed and examined. Identifies a problem calling for a decision.

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

- **Design:** Inventing, developing and analysing the different decision alternatives and testing the feasibility of implementation. Assess the value of the decision outcome.

- In the **design phase**, the manager develops a model of the problem situation on which he can generate and test the different decisions to facilitate its implementation. If the model developed is useful in generating the decision alternatives, he then further moves into phase of selection called as choice.

- **Choice:** Select one alternative as a decision, based on the selection criteria.

- In the **phase of choice**, the manager evolves a selection criterion such as maximum profit, least cost, minimum waste, least time taken, and highest utility. The criterion is applied to the various decision alternatives and the one which satisfies the most is selected.

- In these three phases, if the manager fails to reach a decision, he starts the process all over again from the intelligence phase where additional data and information is collected, the decision- making model is refined, the selection criteria is changed and a decision is arrived at.

- ❖ **Methods** or **Tools** for Deciding Decision Alternatives: There are several methods to help the manager decide among the alternatives. The methods basically are search processes to select the best alternative upon satisfying certain goals.

- **Tools/ Methods:** There methods for selection of decision alternatives are:
  (a) Optimisation Techniques;
 (b) Payoff Analysis; and
  (c) Decision Tree Analysis.

- **Optimisation Techniques :** Linear Programming, Integer Programming, Dynamic Programming, Queuing Models, Inventory Models, Capital Budgeting Models and so on are the examples of optimisation techniques.

- These tools are used in cases where decision-making situation is closed, deterministic and requires to optimize the use of resources under conditions of constraints. To handle these situations, software packages are available. These methods are termed operational research (OR) techniques.

- **The Payoff Analysis ;** When all the alternatives and their outcomes are not known with certainty, the decision is made with the help of payoff analysis. The payoff matrix is constructed where the rows show the alternatives and the columns show the conditions or the states of nature with the probability of occurrence.

- **Decision Tree Analysis:** When a decision maker must make a sequence of decisions, the decision tree analysis is useful in selecting the set of the decisions. The method of analysis can be explained by an example. The decision tree is drawn in Figure with the

help of symbols.
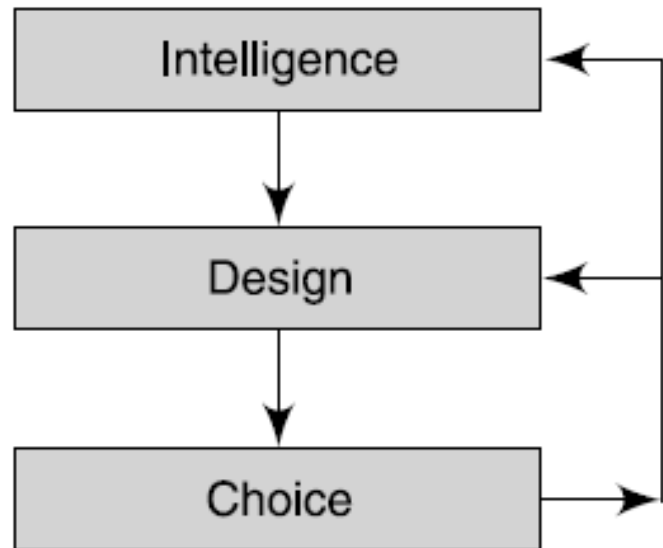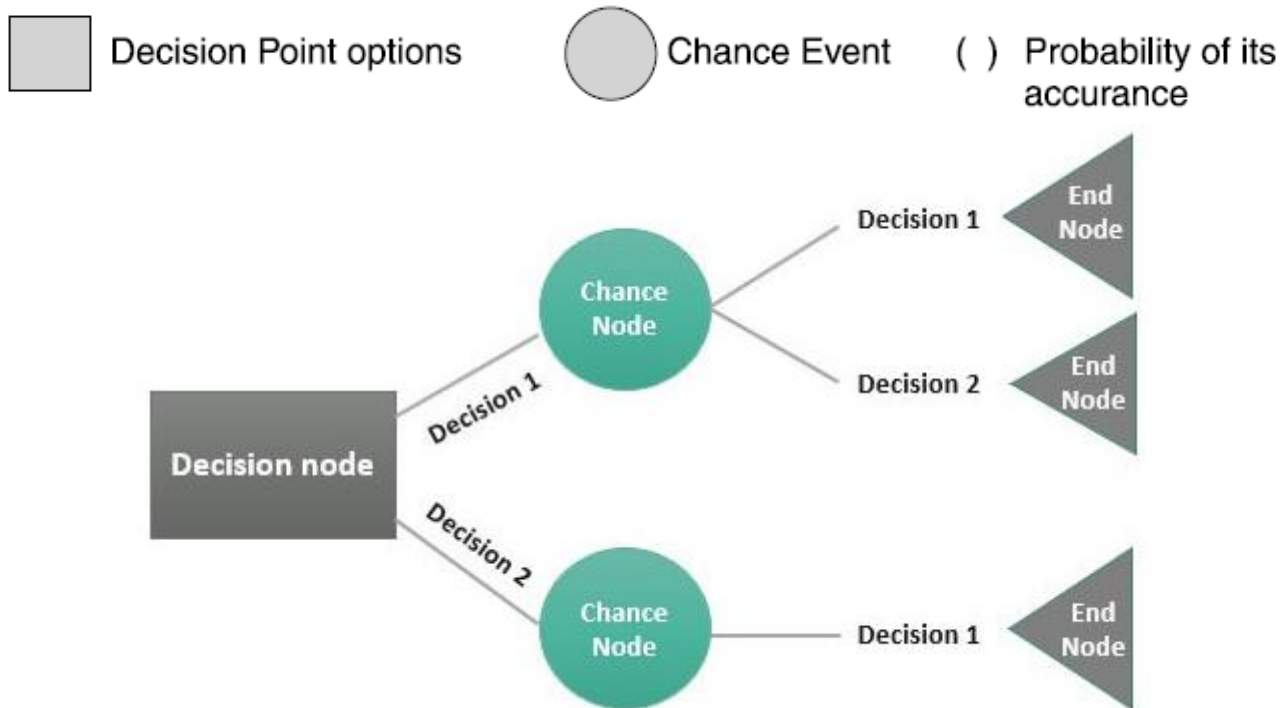
❖ **Organizational decision making:**
  ➢ An **organization** is an arrangement of individuals having different goals. Each individual enjoys different powers and rights because of his position, function and importance in the organisation.
  ➢ The organisational decision-making should help in the resolution of conflicts among depts.
  ➢ The organizational behaviour theory provides **different methods** for resolution of avoiding such conflicting goals.

Method	Explanation	Example
Allowing local rationality in the setting of goals.	Where the functional interdependence is minimum and the goals/ objectives/targets do not significantly influence the corporat goals.	Security, Time office functions, Legal, Commercial, Administrative functions.
Permission to set goals which can be achieved with an acceptable decision making rule and systems.	Where there is functional dependence, to set local goals which will not adversely affect the goals of dependent functions.	Production versus Sales versus Materials functions can evolve decision rules to meet the local goals and affect the goals of the dependent functions, or the corporate goals.

|		
Permission to achieve the goals in a sequential manner.	If the goals are conflicting, they are resolved in a sequential manner one at a time. It is a deliberate decision to ignore the conflicting goals within a bounded rationality.	Maximisation of profit, quality, level, customer satisfaction, leadership image, etc.

❖ **MIS and Decision making concepts:**

➢ It is necessary to understand the concepts of decision-making as they are relevant to the design of the MIS.

➢ The Simon Model provides a conceptual design of the MIS and decisionmaking, wherein the designer has to design the system in such a way that the problem is identified in precise terms. That means the data gathered for data analysis should be such that it provides diagnostics and also provides a path to bring the problem to surface.

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

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

➢ The methods of decision-making can be used directly in the MIS provided the method to be applied has been decided. A number of decision-making problems call for optimisation, and OR models are available which can be made a part of the system.

➢ The concepts of the organisational and behavioural aspects of decision-making provide an insight to the designer to handle the organisational culture and the constraints in the MIS.

❖ **Information: A Quality Product:**

➢ **"Information is defined** as a data that has been processed into a form that is meaningful to the recipient and is of real or perceived value in the current or the prospective actions or decisions of the recipient." - **Davis and Olson**

➢ **Conceptual Model of Communication:**
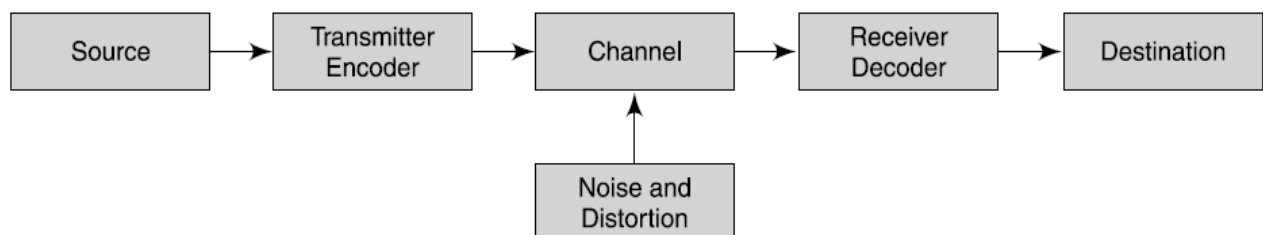
➢ Information is a product of data processing.

➢ The manager will determine the quality of the information based on the degree of motivation it provides for action, and the contribution it provides for effective decision-making.

➢ If **quality is high**, if it creates managerial impact leading to attention and decision making.

➢ **Quality** of information can be **measures** on **four dimensions**;
  # utility
  # satisfaction
  # error and
  # bias.
➢ The **utility** dimensions has four facets—the form, the time, the access and the possession.
➢ If the information is presented in the form the manager requires, then its utility increases.
  # Time - if Information is made available when it is needed.
  # Form - If information is presented in the form managers need.
  # Access – if information is easily and quickly accessible from online systems.
  # Possess – If information is possessed by the manager who need it.
➢ **Satisfaction** – If the organization has high degree of satisfaction then it seems the information systems are properly designed to meet managers need.
➢ **Error** – An erroneous information is a serious problem as decision maker can not make adjustment as he is not aware of it.
➢ **Error** may be due to
   # incorrect data collection method, measure, processing procedure, data validation or garbage data deliberate falsification .
  # Proper approaches must be defined to eliminate errors like data validation, data audit etc.
➢ **Bias** means giving more attention, partiality, favoritism. When choosing the appropriate method of communicating information care has to be taken to see that it is not biased. It should not happen that certain information gets eliminated or does not get classified.
➢ **Parameters Impacting Quality of Information:**
➢ # **Impartiality**, # **validity**, #**consistency**, # **reliability** and # **age**.
➢ **Impartiality** : An impartial information contains no bias.
➢ **Validity** – Does the information meet the purpose of decision making for which it is being collected?
➢ **Reliability**: It is connected to the representation and the accuracy of what is being described
➢ **Consistency** : The information is termed as inconsistent if it is derived from a data which does not have consistent pattern of period.
➢ **Age**: If the information is old, it is not useful today.

❖ **Classification of the Information (Types of Information):**
  ➢ **John Dearden** of Harvard University classifies information in the following manner:
  ➢ **Action vs No action Information** :
    Action Information – which induces action.
    E.g. No stock report
    No-action – which communicate status of a situation is a no-action information. E.g. stock ledger
  ➢ **Recurring vs Non-recurring information**:
    Recurring information – generated at regular interval e.g. monthly sales report
    Non-recurring information – generated on ad-hoc basis e.g. financial analysis
    .
  ➢ **Internal vs External Information**:
    Internal Information : Information generated through the internal sources of organization

is termed as internal information. Like central nervous system of body.

External Information : Information generated through the external sources (government reports, industry survey etc.) is termed as external system.

➢ Further classified into **social** and **natural**.

➢ **Figure** shows the **source** and **kind** of information required vis-a-vis levels of management in the organisation.

Organisation Structure
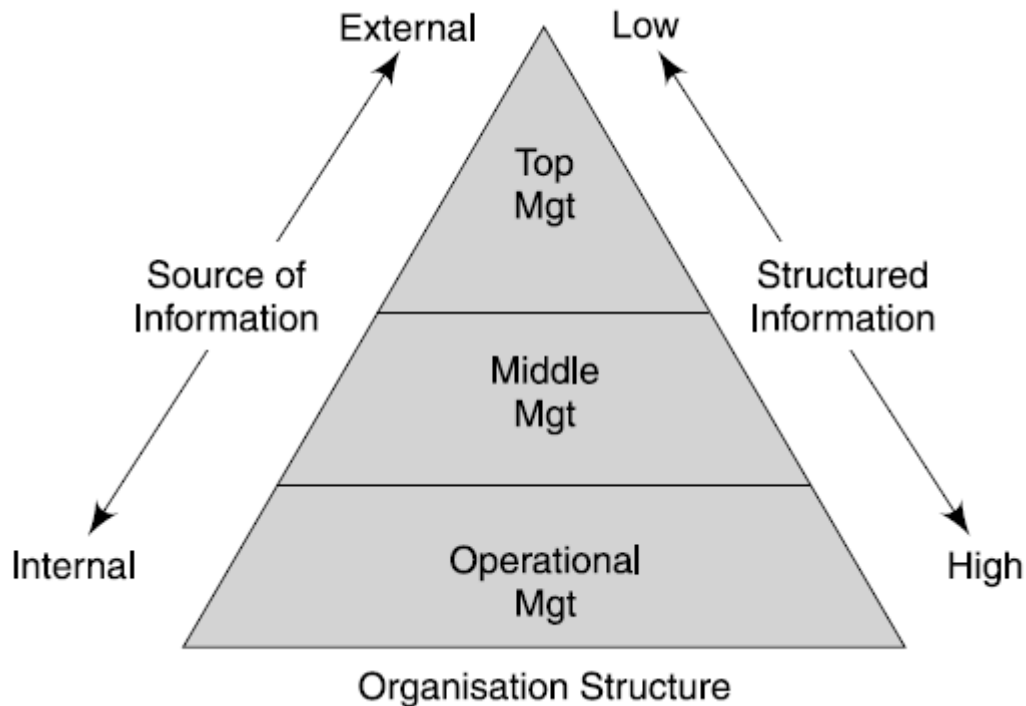
❖ **General model of Human as information processor:**

➢ A manger or a decision maker uses his sensory receptors to pick information and transmit them to brain for processing and storage.

➢ Filtering is a process where by a manger selectively accepts inputs, which his mental ability can manage to process.
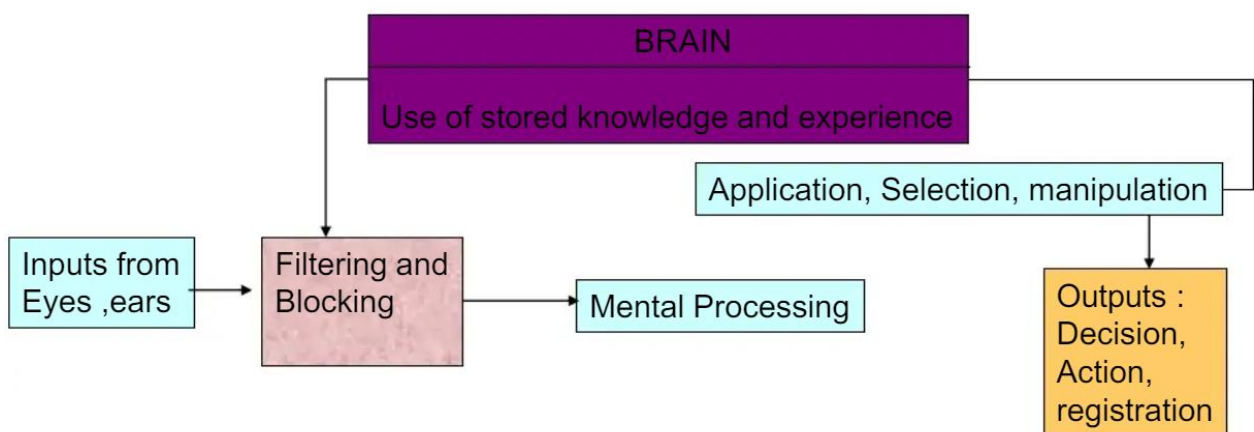
➢ Each manager has his own style, a method to perceive the data, organize and process the same as per his frame of reference, confidence in the decision procedures and time

available for decision making.

> **Influenced by personal values:**

The personal values of decision maker play a major role in DM

A decision otherwise being very sound on the business principle and economic relationally on basis of personal values which are defeated if such a decision is implemented.

The culture, discipline and individual's commitment to the goals will decide the process and success of decision.

❖ **Types of Decision Making Systems**

A **system** is defined and determined by its **boundaries** and **objectives**. It is quite likely that a system is an arrangement of smaller systems in a logical order.

The **systems** can be **classified** in different categories based on the **predictability** of its output and the degree of information exchange with the environment.

1) A system is called **deterministic** when the inputs, the process and the outputs are known with certainty. In a deterministic system, we can predict the output with certainty.

2) A system is called **probabilistic**, when the output can only be predicted in probabilistic terms.

Based on environment, Decision Making Systems can be classified into **Two Types** :

1) **Closed DM system**
2) **Open DM system**

> **Closed DM system:** If the manager operates in a known environment, then it is a closed DM system.

Conditions are: # The manager has a known set of decision alternatives and knows their outcomes fully in terms of value, if implemented.

Manager has a model, a method or rule whereby the decision alternatives can be generated, tested and ranked.

Manager can choose one of them, based on some goal or objectives.

Ex: examination system to declare result, an acceptance of fixed deposit.

> **Open DM system** : If the manager operates in an environment not known to him then it is a open DM.

Conditions are: # Here the manager doesn't know all decision alternatives

Outcome of decision is also not known fully.

No method, rule or model is available to study

Difficult to decide an objective or a goal and the manager resorts (choice) to that decision where his appreciations or desires are met best.

❖ **Development of long range plans of the MIS:**

> Any kind of business activity calls for long range plans for success, the same is true for MIS.

> In MIS the information is recognised as a major resource like capital, time and capacity. And if this resource is to be managed well, it calls upon the management to plan for it and control it for the appropriate use in the organisation.

> **Contents of the MIS Plan:**

> A long range MIS plan provides direction for the development of the systems, and provides a basis for achieving the specific targets or tasks against a time frame.

> The plan would have the following contents which will be dealt by the designer under a support from the top management.

> Management information system, objectives, consistent to the business goals and

objectives.
➢ Information strategy for the business plan implementation playing a supportive role.
➢ Architecture of the Management Information System to support decisions.
➢ System development schedule, matching the plan execution.
➢ Hardware and software plan for the procurement and the implementation.

❖ **Handling system complexity:**
➢ Information systems are relatively complex as compared to physical systems, and, therefore, they should be handled properly enabling the system designer to understand, design, develop and implement.
➢ # To handle the complexity, the system can be viewed as an assembly of subsystems each with a clear definition of the boundaries. The process is called **factorisation**
➢ # Another method of handling the complexity is to resort to **simplification** by **clustering** the subsystems together.
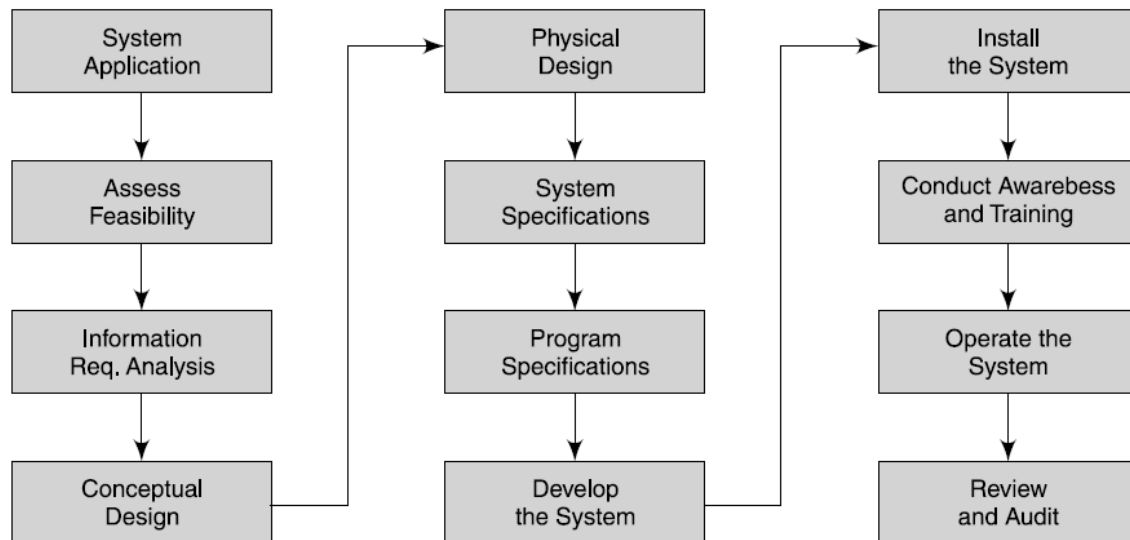
The number of interconnections increases with the increase in the number of subsystems. Each interconnection acts as a channel for the input-output communication. The process of **simplification** provides a way to handle these interconnections and reduce the complexity.

The method of **simplification** is as follows:
1. Identify the subsystems which have to be together for the functional 'cohesion.'
2. Form a cluster of these subsystems and identify interconnections in this cluster.
3. Form clusters of the remaining subsystems.
4. Connect the clusters with an interface.

❖ **Development And Implementation Of The MIS**:
❖ Having made the plan of the MIS, the development of the MIS calls for determining the strategy of development. As discussed earlier the plan consists of various systems and subsystems.
❖ The development strategy determines where to begin and in what sequence the development can take place with the sole objective of assuring the information support.
❖ **Life Cycle Approach:** There are many systems or subsystems in the MIS which have a life cycle, that is, they have birth and death. Their emergence may be a sudden or may be a part of the business need, and they are very much structured and rule-based. They have hundred per cent clarity of inputs and their sources, a definite set of outputs in terms of the contents and formats.
❖ Examples of such systems are pay roll, share accounting, basic financial accounting, finished goods accounting and dispatching, order processing, and so on. These systems have a fairly long duration of survival and they contribute in a big way as sources of data to the Corporate MIS. Therefore, their role is important and needs to be designed from the view point as an interface to the Corporate MIS. The **life cycle approach**, therefore, has a method of its own as explained in the **Figure**.

```
System            Physical           Install
Application  -->  Design        -->  the System
    |                 |                  |
    v                 v                  v
Assess            System             Conduct Awarebess
Feasibility       Specifications     and Training
    |                 |                  |
    v                 v                  v
Information       Program            Operate the
Req. Analysis     Specifications     System
    |                 |                  |
    v                 v                  v
Conceptual   -->  Develop       -->  Review
Design            the System         and Audit
```

Advantages: # The above details more or less remain static from the day the system emerges and remains in that static mode for a long time.

Minor modifications or changes do occur but they are not significant in terms of handling either by the designer or the user of the system.

Such systems, therefore, have a life and they can be developed in a systematic manner, and can be reviewed after a year or two, for significant modification.

❖ **Factors of Success and failure for MIS:**

➢ Factors Contributing to Success:

    ➢ MIS - The factors of Success and Failure

    # The **MIS** is integrated into the managerial functions. It **sets clear objectives** to ensure that the MIS focuses on the major issues of the business.

    # An appropriate information processing technology required to **meet** the data processing and analysis **needs of the users of the MIS is selected**.

    # The MIS is oriented, defined and designed in terms of the user's requirements and its operational viability is ensured.

    # The MIS is kept under **open system design** is modified according to the changing information needs.

    # **Focuses on the results and goals**, and highlights the factors and reasons for non achievement.

    # MIS is not allowed to end up into an information generation mill **avoiding the noise** in the information and the communication system.

    # The MIS systems must consider all **the human behavioral factors** in the process of the management.

➢ **Factors Contributing to Failures**: When…

    # The MIS is conceived as a data processing and not as an information processing system.

    # The **MIS does not provide that information** which is needed by the managers .The MIS then becomes an impersonal system.

    # **Underestimating the complexity** in the business systems and not recognizing it in the MIS design leads to problems in the successful implementation.

Adequate attention is not given to the **quality control** aspects of the inputs, the process and the outputs leading to insufficient checks and controls in the MIS.

The **MIS is developed without streamlining the transaction** processing systems in the organization.

Lack of training and appreciation that the users of the information .

Questions: UNIT-2:

1) Define Decision making? Explain the Process of Decision making?
   (Explain the steps of Decision making procedure?)

2) Explain various **Methods** or **Tools** or Techniques for Deciding Decision Alternatives?

3) Explain why Information is A Quality Product?

4) Give the **Classification of the Information?**

5) What are the Factors of Success and failure for MIS?

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