MAA OMWATI DEGREE COLLEGE HASSANPUR (PALWAL)

Notes

BCA 5th Sem

Management Information System

Q2.(a) Explain system and types of system.

MDU BCA 2018

OR

What do you mean by system? Explain different types of system.

MDU BCA 2017

OR

What is system? Explain basic system concepts and its types.

MDU BCA 2015

OR

What is system? Explain the basic system concept and the types of systems.

MDU BCA 2014

Ans. System

The word 'System' is derived from a Greek word 'systema' which means an organized relationship among functioning units or components.

A system is an orderly grouping of interdependent components linked together according to a plan to achieve a specific purpose.

System is a set of interrelated components, with a clearly defined boundary, working together to achieve a common set of objectives by accepting inputs and producing outputs in an organized transformation process.

From the above definition, it is clear that:

- ***System is a group of components.***

- *The components are interdependent.*
- *The components are linked together to achieve a specific purpose.*

e.g. (i) A business organization is a system with its components as:

- Marketing
- Manufacture
- Sales
- Research
- Shipping
- Accounting
- Personnel
- Administrative

All these components work together to create a profit.

(ii) Human body is a biological system which has a complex nervous system, a set of parts including brain, spinal cord, nerves and special sensitive cells under our skin that work together to make one experience the physical sensations like hot, cold and so on.

Basic System Concepts

The study of system concepts has three basic implications:

1. ***A system must be designed to achieve a predetermined objective.***

2. *Interrelationships and interdependence must exist among the components.*

3. *The objectives of the organization as a whole have a higher priority than the objectives of its subsystems. For example, computerizing personnel applications must conform to the organization's policy on privacy, confidentiality and security, as well as making selected data (e.g. payroll) available to the accounting division on request.*

Various types of other systems may be:

- Telephone System
- Accounts System
- Education System
- Computer System etc.

Components of a system must be interdependent. Independent components do not make a system. For example a cock, a table and motorcycle do not make a system because they are neither interdependent nor they do any work to achieve a specific objective.

Types / Classification of System

Viewing the behaviour of a system, a system can be classified into following types:

1. Physical and Abstract Systems
2. Deterministic and Probabilistic Systems
3. Open and Closed Systems

1. Physical and Abstract systems

Physical Systems

Physical systems are concerned with tangible entities/components i.e. the components which we can touch.

They can be seen and felt. These tangible entities may be static or dynamic in operation. For example, desks and chairs are the static physical parts. Static parts do not change. An air-conditioning unit is a dynamic physical system which responds to the environment and changes with time. A programmed computer is also a dynamic system. Data, programs, output and applications change as the user's demands or the priority of the information requested changes.

It is comparatively easy to make quantitative measurements in physical systems. This facilitates the accurate control of process and the quantity of output.

Abstract Systems

Abstract systems are those systems which are non-physical or these systems are conceptual.

For example, an educational system; our social system.

These systems consist of concepts like:

- Theories concepts,
- Laws concepts,
- Principles concepts,

- Formula stating relation-ship among large number of variables,
- Equations having large number of variables.

It is usual to analyze abstract systems with the help of mathematical models. Abstract models are often used to understand physical systems, their components and interrelationship etc.

2. Deterministic and Probabilistic systems

Deterministic Systems

Deterministic systems are those systems which are based on predetermined set of rules.

The behaviour of a deterministic system is completely known. The outputs/results or events are perfectly predictable. There is no uncertainty involved in defining the outputs of the system for the known inputs. Interactions between various subsystems is known with certainty.

Thus a system is called deterministic when the inputs, process and the outputs are known with certainty.

For example, a computer program like accounting system is deterministic.

Probabilistic Systems

Probabilistic systems are not based on predetermined or predefined rules.

In the probabilistic systems, only probabilistic estimates can be given. The outputs/results or events cannot be predicted with certainty. Such systems are controlled by chance events.

For example, sale of desert coolers depends on summer, sale of generator sets depends on power shortage.

In these systems, interactions between various subsystems cannot be defined with certainty. The system analyst deals almost with such systems.

3. Open and Closed Systems

Open Systems

Systems that interact with their surrounding or external environment are called open systems.

An open system receives or accepts inputs and delivers outputs to its environment. This type of system can adapt to changing environmental conditions. Such systems are successful. For example, an information system, a business organization.

Open systems are adaptive in nature as they tenu to react with the environment in such a way, so as to favour their continued existence. Such systems are 'self-organizing', in the sense that they change their organization in response to changing conditions. An organization which is sensitive to changes in customer tastes, preferences, likes, dislikes and demands, and in consequence, adjusts its prices, changes its product mix or looks for new markets, is an open organization.

Closed Systems

Systems that do not interact with their environment are called closed systems.

A closed system is self contained. Closed systems usually exist as a concept only. Such system cannot continue to operate for a long period of time. Such systems are rare and are unsuccessful.

In reality, a completely closed system is rare but a machine tool working in a pre-defined manner can be taken as a good example of a closed systems.

Q2.(b) What do you mean by system approach? Explain. **MDU BCA 2016**

OR

Explain systems approach. **MDU BCA 2015**

OR

Give a brief idea about the systems approach. **MDU BCA 2014**

Ans. A system is a set of interrelated but separate parts of working towards a common purpose. A system is composed of related and dependent elements which when in interaction, form a unitary whole. The arrangement must be orderly and there must be proper communication facilitating interaction between the elements and finally this interaction should lead to achieve a common goal.

A system approach can be explained as identifying, understanding and managing a system of interrelated processes for a given objective. A system approach improves the organization's effectiveness and efficiency and thus necessary.

Benefits that may be derived from the use of system approach include:

- ***Integration and alignment of processes.***
- ***Achievement of desired results.***
- ***Increase in effectiveness and efficiency in the organization.***
- ***Achievement of organization's objectives.***

Systems approach views the organization as a unified, purposeful system composed of interrelated parts. Systems approach is based on the generalization that everything is inter-related and interdependent.

Systems approach also gives the manager to see the organization as a whole and as a part of the larger external environment. A systems oriented manager would make decisions only after they have identified impact of these decisions on all other departments and the entire organization.

Features of System Approach

Following are the features of Systems Approach:

- ***One of the most important characteristic is that it is composed of hierarchy of sub-systems i.e. the parts forming the major system and so on.***
- ***A system consists of interacting elements. It is set of inter-related and inter-dependent parts arranged in a manner that produces a unified whole.***
- ***The various sub-systems should be studied in their inter-relationships rather, than in isolation from each other.***
- ***An organisational system has a boundary that determines which parts are internal and which are external.***
- ***A system does not exist in a vacuum. It receives information, material and energy from other systems as inputs. These inputs undergo a transformation***

process within a system and leave the system as output to other systems.

- *In the systems approach, attention is paid towards the overall effectiveness of the system rather than the effectiveness of the sub-systems. The interdependence of the sub-systems is taken into account.*
- *In applying system concepts, organisations are taken into account and not only the objectives and performances of different departments (sub-systems).*
- *Systems approach is useful because it aims at achieving the objectives and it views organisation as an open system.*

Contribution of System Approach

Contribution of systems approach are as under:

- *System approach integrated all sub-systems for the proper and smooth functioning of the organization.*
- *As it considers value of output, it facilitates goal achievement.*
- *System approach facilitates adoption to internal requirements and environmental demands in order to facilitate growth.*

Limitations of System Approach

Limitations of.systems approach are as under:

- *The applicability of systems approach is not universal. Only big organizations are benefited by it. It is not suitable to small organizations.*

- *The approach is more conceptual, vague and abstract. This approach fails to specify the nature of interactions and interdependencies particularly between organization and its external environment.*

Q2.(c) What are the various elements of a system? Explain various characteristics of a system.

Ans. Elements of a System

The various elements of a system are as follows:

1. Outputs
2. Inputs
3. Processor
4. Control
5. Environment
6. Feedback
7. Boundaries and interface

1. Outputs

A system must be capable of producing an output that must be of value to the user. Whatever be the nature of the output (goods, services or information), it must be in accordance or inline with the user's expectations. Output is the outcome of a processing.

2. Inputs

Inputs are the elements that enter the system for processing. The essential characteristics of the input are:

(a) Accuracy: If the input data is not accurate, the output will be inaccurate/wrong.

(b) Proper Format: The input must be in a proper format.

(c) **Timeliness:** If the data is not available at the time, the whole system may fail.

(d) **Economical:** It is required that the data must be produced at a low cost.

3. Processor

Processor is the operational component of a system. This involves the programs and the way in which data is processed through the computer.

This element of the system involves the actual transformation of input to output. It may modify/transform the input totally or partially as per the requirement.

4. Control

This element is needed to control all the activities governing/concerning input, processing and producing the output. The system is always guided by control.

For example, in an organization, management as a decision making body controls the following activities of the organization:

- Inflow
- Handling
- Outflow etc.

Hence, each system should have the control to operate within tolerable performance levels. For example, a slight deviation in the normal human body temperature causes imbalance in the health condition. If it continues for long, it may lead to the death/end of the system.

5. Environment

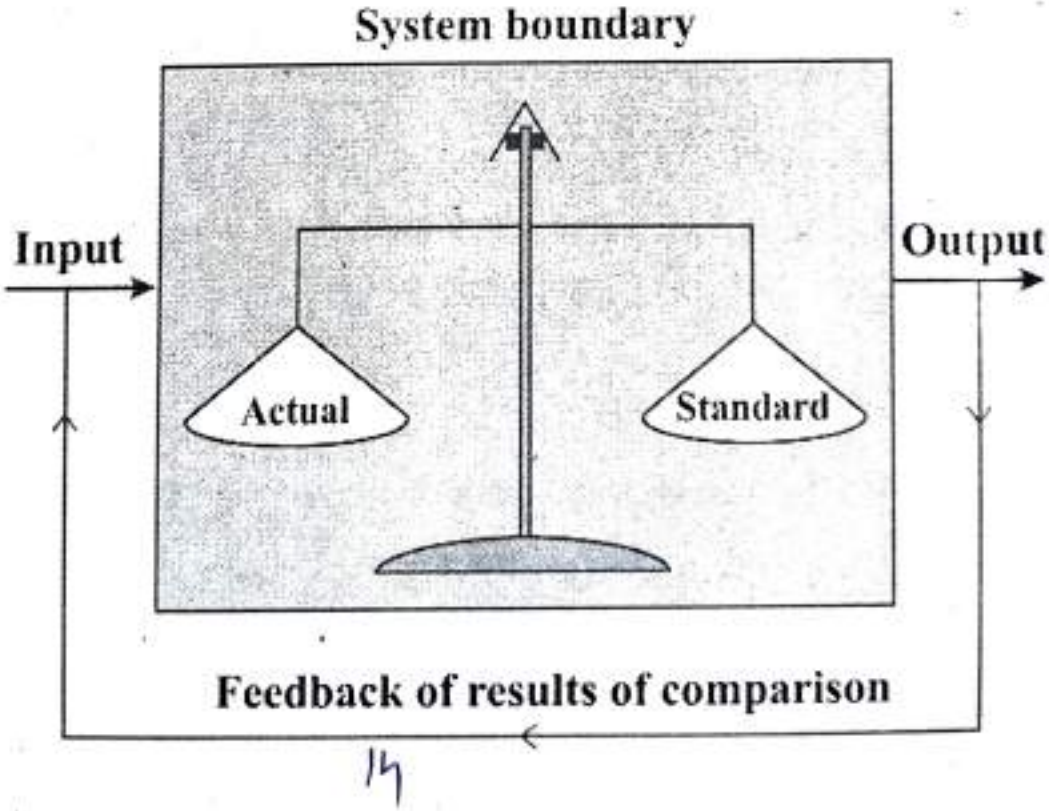
It refers to the external elements that effect on the system. It determines how a system must function.

For example, the environment consisting of vendors, competitors and others may influence the actual performance of a business system.

Thus, a system must be capable enough to adjust with its environment. It should change according to the changing environment.

6. Feedback

The information supplied by comparing results with standard and informing the control elements about the differences is termed as "Feedback".



Feedback is a way to measure/compare output against a standard output. Feedback may be positive or negative. Positive feedback reinforces the system performance. Negative feedback provides information for an action.

Thus feedback is an important element of systems. The output of a system needs to be observed and feedback from the output is considered in order to improve the system and make it achieve the laid standards.

7. Boundaries and Interface

The limits of a system are specified by its boundaries. Every system has defined boundaries within which it operates. It enables to know which elements lie or do not lie within the system.

The limits or boundaries of a system help to identify its components, processes and interrelationships when it interfaces with another system.

Characteristics of a System

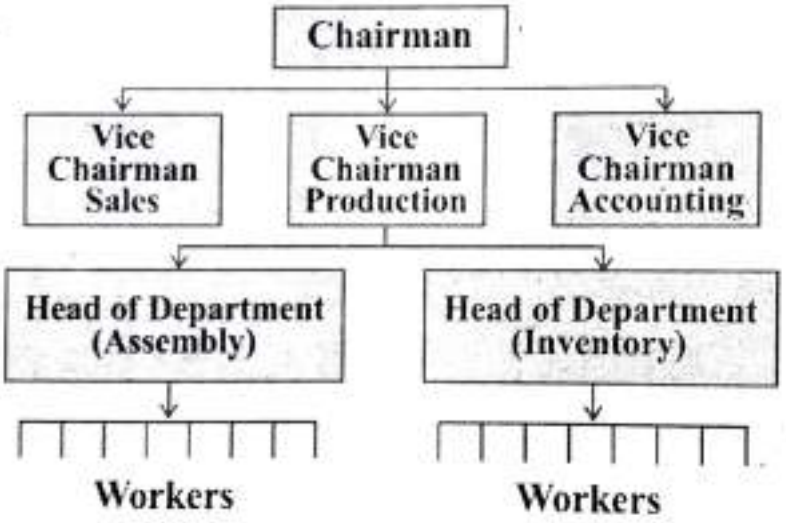
The definition of the system itself suggests basic characteristics present in all systems. These are:-

1. Organization/Order
2. Interaction
3. Interdependence
4. Integration
5. Central objective or Purpose

1. Organization/Order

Organization refers to order and structure that determines the flow of control, communications and chain of commands. In other words organization refers to the arrangement of components or sub-systems that help to achieve the objectives.

For example, a company is a system, made up of different departments which are its sub-systems. The employees are organized in a hierarchical order, with the chairman at the top leading the workers present downwards.



2. Interaction

Interaction refers to the manner in which each component functions with the other co-existing components of the system.

Examples: 16

- In an organization, having different departments, each department interacts with the other department in order to successfully achieve a common objective.

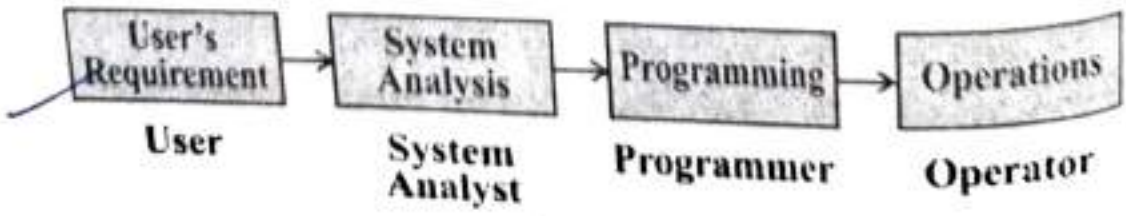
- Advertising interacts with Sales.
- In a computer system, the CPU must interact with the input device to solve a problem.

3. Interdependence

Interdependence implies that parts of the organization or computer system depend on one another.

In any system, all the parts are interrelated or linked according to a plan. All the components or sub-systems work in co-ordination with each other. One sub-system may depend on the input of another subsystem i.e. the output of one sub-system is the required input for another sub-system. This interdependence is very important in system's work.

For example, a user decides to computerize an application, an analyst analyses and designs it, a programmer does the programming & testing and then the application is run by the computer operator as shown in the figure. Each of these persons performs properly on the basis of the required input from others in the computer-based system.



4. Integration

Integration is concerned with how a system is tied together.

A system is made up of various sub-systems. These sub-systems are tied together in a system in order to produce the required results or to realize its objectives.

5. Central Objective

It is the most important characteristic of any system.

Every system has a predefined goal or objective towards which it works. A system cannot exist without a defined objective.

The central objective must be known well in advance. It is on the basis of the central objective that the whole system is built. These objectives may be real or stated.

For example, a business system may have profit making as its central goal.

Q3.(a) Define Information. What are the characteristics of information?

Ans. Information

Information is processed form of data i.e. data that have been processed and shaped into a form that is meaningful to its users is known as information.

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

Information is derived from data. For example, volume of the room is the information which can be derived from the data by using the formula

$$\text{Volume} = \text{length} \times \text{Breadth} \times \text{Height}$$

It is the main activity of the computer to process data to produce useful information.

On the basis of information a number of decisions may be taken i.e. information is a vital input in any decision making process in an organization.

Information is needed for:

- ***Strategic planning.***
- ***Competition.***
- ***Marketing environment.***
- ***Customer needs.***

Good quality information can be used:

- *To maximise sales.*
- *To cut costs.*
- *To develop new products.*
- *To take good management decisions.*

Characteristics of Information

Data that have been processed and shaped into a form that is meaningful to its users is known as information. Information is considered as a valuable resource required by management in order to run business organization. Information can be said to have a number of different characteristics or attributes that can be used to describe its quality. Each of these attributes adds value to information. There are following different characteristics of information:

1. Accuracy

Information provided must be accurate and should not contain errors. Information required at all the levels needs to be correct because the further development is based on the available information If the supplied information is not accurate it will spoil the whole development system.

2. Availability

Information is only valuable if it is available on time. If information is made available too early, it may not be relevant. On the other hand, if it is obtained too late, it will be of no use to the recipient.

3. Completeness

The information should be complete in respect of the key elements of the problem. Incomplete information may not sometimes solve the purpose.

4. Meaningful

Information should be to the point and it should contain all the pros and cons of the concerned topic.

5. Unambiguity

Information must be unambiguous and should be communicated in such a way that it conveys the same meaning to different users.

6. Reliable

The information should be reliable. It means it does not depend upon the sample selected method of selection.

7. Clarity

Clarity of information is an important attribute of good information. The supplied information should be clear enough to its intended user and the user should be able to locate the necessary details easily.

8. Presentation

The information must be presented in the format which is understandable to all. Moreover, different methods can be adopted to make the presentation as appropriate as possible for the intended user.

9. Consistent

The information must be consistent. It means it does not change from time to time. A consistent base is to be provided to the information.

10. Conciseness

Only information relevant to the information needs of the user should be supplied and it should be supplied in compact form.

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Q3.(d) Discuss the various levels of information.

MDU BCA 2009

Ans. Various levels of information

There are three levels of information systems:

1. Strategic information
2. Tactical information
3. Operational information

1. Strategic information

This level of information is needed for long range planning policies and deciding the direction the business should take.

Strategic information is used by the top management to make plans for the organisation and to ensure that the business objectives are achieved with the help of a system called Executive Support System.

For example, information like population growth would be of interest to the top management which is responsible for determining long range goals.

Strategic information is concerned with long term organization planning and is helpful in taking decisions that are unstructured and are made less frequently.

Strategic information may be used by managers to find sources of funds for carrying planned future projects. Another application of strategic information could be a decision taken to move to a new market.

2. Tactical information

Tactical information is used in making short range decisions to run the business efficiently.
For example, sales analysis, annual financial statements are used for short range planning i.e. for months rather than years.

Tactical information is used by the middle management for ensuring that the resources are used properly to achieve what is decided by the strategic management.

This type of information is used to monitor the performance of the organisation. It is basically used for allocating resources and establishing controls in order to execute or implement the plans made by top level management.

Tactical information is usually used for the decision making at middle management level with the help of a system called decision Support System.

3. Operational information

Operational information is required for short term daily operations of a business organisation.
It includes the information related to day to day details of the business. For example, daily absent information of employees and current stock available for sales.

Operational information is used by lower level management/mangers to ensure that assigned tasks are planned and carried out properly in the business organisation.

Q4.(a) What is Information System?

MDU BCA 2018, 2015

OR

What do you mean by information system? Explain its definition and characteristics.

Ans. Information System

Information System is a system that processes the raw data to convert it into useful information. Information system is a system that helps the management of an organization in analysis of problems, solving complex situations by simulation. It helps the organization in generating new ideas for creating new products.

An information system or computer-based system includes hardware, software, data, procedures and the users that interact with the computer. The data is provided to the information system and processed information is obtained. The procedures/ programs are building blocks of information systems.

An information system is considered to be a set of interrelated elements or components that collect (input), manipulate (processes) and disseminate (output) data and information and provide a feedback mechanism to meet an objective.

Technically, an information system can be defined as sets of inter-related modules that can collect, process, store and distribute information to support decision making in an organization. 25

Activities performed by the information system, produce the information which are utilized by the business organizations, analyzing problems and generating ideas for creating new products and services.

Characteristics of Information System

Following are the characteristics of an information system:

- ***An information system is based on a long-term planning.***
- ***It provides a holistic view of the dynamics and the structure of the organization.***
- ***It works as a complete and comprehensive system covering all interconnecting sub-systems within the organization.***
- ***It is planned in a top-down way, as the decision makers or the management take part and provide a clear direction at the development stage of the information system.***
- ***It is based on need of strategic, operational and tactical information of managers of an organization.***
- ***It is capable of making forecasts and estimates, and generating advanced information. Thus it provides a competitive advantage. Decision makers can take actions on the basis of such predictions.***
- ***It creates a linkage between all sub-systems within the organization, so that the decision makers can take the right decision based on an integrated view.***

Q4.(b) Explain different types of information systems. MDU BCA 2018

OR

List various types of information systems. Explain each briefly. MDU BCA 2011

Ans. An information system is a collection of hardware, software, data, people and procedures that are designed to generate information that supports the day-to-day, short range and long-range activities of users in an organization. There are various types of information system. Some of them are:

1. Management information system
2. Transaction processing system
3. Decision support system
4. Expert systems
5. Executive information system
6. Office automation system

1. Management information system

When information systems are designed to provide information needed for effective decision making by managers, they are called management information systems.

MIS is a formal system for providing management with accurate and timely information necessary for decision making. The system provides information on the past, present and project future and on relevant events inside and outside the organization.

It may be defined as a planned and integrated system for gathering relevant data, converting it into right information and supplying the same to the concerned executives. The main purpose of MIS is to provide the right information to the right people at the right time.

A management information system is an integrated man-machine system that provides information to support the planning and control function of manager in an organization i.e. MIS helps the managers to make planning and control decisions.

Need of Management Information System

Effective management information systems are needed by all business organisations because of the increased complexity and rate of change of today's business environment.

For example:

- *Marketing manager* ***needs information about sales performance and trends.***
- ***Financial manager needs information about returns.***
- *Production* ***manager needs information for analyzing resources requirement and workers productivity.***
- ***Personnel manager*** *requires* ***information concerning employees compensation and professional development.***

Thus, effective management information systems must be developed to provide modern managers with the specific marketing, financial, production and personnel information that they require to support their decision making responsibilities.

2. Transaction processing system

A transaction processing system (TPS) is an information system that captures and processes data generated during an organization's day-to-day transactions.

TPS processes business transaction of the organization. Transaction can be any activity of the organization such as a deposit, payment order or reservations.

Transactions differ from organization to organization. For example, take a railway reservation system. Booking, canceling etc. are all transactions. Any query made to it is a transaction. However, there are some transactions which are common to almost all organizations. Like maintaining employees leave status, maintaining employee's accounts etc.

Transaction processing includes the following activities:

- ***Calculation***
- ***Storage and retrieval***
- ***Classification***
- ***Summarization***
- ***Sorting***

A TPS is a basic business system which:

- ***is often connected to other systems. For example inventory system which tracks stock supplies and starts reordering as stocks get low.***
- ***serves the most elementary day-to-day activities of an organization.***
- ***supports the operations of the business.***
- ***supplies data for higher-level management decisions. (e.g. MIS, EIS).***
- ***is essential for the organization.***
- ***supports predefined, structured tasks.***
- ***deals with high volumes of input and output.***
- ***provides data which is summarized into information by systems used by higher levels of management.***

Thus, a transaction processing system is an information system which captures, classifies, stores, maintains, updates and retrieves transaction data for record keeping and for input to other types of computer based information systems.

3. Decision Support System

Computer systems that provide users with support to analyze complex information and help to make decisions are called decision support systems (DSSs).

More specifically the term is usually used to describe a computer based system designed to help decision-makers

use data, knowledge and communication technology to identify problems and make decisions to solve those problems.

A decision support system is a way to model data and make quality decisions based upon it. It is very important to make the right decisions to climb the ladders of success. Making such critical decisions depends on the quality of data and the ability to analyze them. Taking such decisions is easier if decision support system is used.

The decision support system (DSS) is a data modeling method that analyzes business statistics and helps the users to take business related decisions effortlessly. A decision support system can be used to present the information textually as well as graphically.

DSS generally gathers and presents the information given below:

- ***A list of all the existing information assets.***
- ***Comparative sales figures between one week and the next.***
- ***Projected revenue figures based on new product sales assumptions.***
- ***The consequences of different decision alternatives.***

Main applications of decision support system are:

- ***DSS is extensively used in business and management. Business performance software allows faster decision making, identification of***

negative trends and better allocation of business resources.

- *In manufacturing, decision support systems are solving design problems by using analytical, statistical and model-building software, especially in the car and aircraft making industries.*
- *Air Lines are also using DSS to schedule flights and even arrange seating.*
- *DSSs are widely used in environmental science, particularly in air quality impact analysis.*
- *A growing area of DSS application is in agricultural production and marketing for continuous development. It helps in rapid assessment of several agricultural production systems around the world to facilitate decision-making at the farm and policy levels.*

4. Expert System

Expert systems are systems that can replace human experts under certain conditions in restricted areas.

An expert system uses human knowledge to solve problems that normally require human intelligence. An expert system is a rule-based artificial intelligence application program that performs a task that requires expert knowledge.

Thus an expert system is an information system that captures and stores the knowledge of human experts. These expert systems represent the expertise knowledge

as data or rules within the computer. These rules and data can be called upon when needed to solve problems. Expert systems are also called as "Knowledge based system".

Components of an Expert System

Components of an expert system can be classified as:

1. **The User Interface:** This component connects the user to the expert system i.e. the user interface is the means of communication between a user and the expert system's problem-solving processes. It allows the user to enter instructions and information into the expert system and to receive information from it.

2. **The Knowledge Base:** It is the most important component of expert system. It is because of this that expert system is called knowledge based system. The knowledge base stores all the facts and rules about a particular problem domain.

3. **The Inference Engine:** The inference engine tells how the rules are to be applied in knowledge base to solve the problem. The inference engine is the program that locates the appropriate knowledge in the knowledge base and infers new knowledge by applying logical processing and problem-solving strategies.

Application areas of Expert Systems

Expert systems are designed and created to facilitate tasks in the field of:

- ***Accounting and finance to select forecasting models, providing tax advice, credit authorization decisions etc.***
- ***Manufacturing to determine whether process is running correctly, maintaining facilities etc.***
- ***Medicine to diagnose and researches.***
- ***Marketing to determine rebate policies, respond to customer inquiries etc***

5. Executive Information System

An executive information system (EIS) is a computer based information system designed to provide senior managers access to information relevant to their management activities.

An executive information system (EIS) is a tool that

- ***Provides direct on-line access to relevant information in a useful and navigable format.***
- ***Consolidates and summarizes ongoing transactions within the organization.***
- ***Provides accurate, timely and actionable information about aspects of a business that are of particular interest to the senior manager.***
- ***Provides top management with all the information it requires at all times from internal and external sources.***

- *Provides management with real time updates on critical elements of company-wise data in a graphical, easy-to-read format.*
- *Provides quick access to key business measures, allowing to monitor the operations and increase the speed and accuracy of the decision making process.*

Thus an Executive Information System (EIS) is a computer based system intended to facilitate and support the information and decision making needs of senior executives by providing easy access to both internal and external information relevant to meet the strategic goals of the organization.

Purpose of EIS

- *The primary purpose of an executive information system is to support managerial learning about an organization, its work processes and its interaction with the external environment.*
- *They are meant to help the executives and provide support functions and make their job easier and more effective. They help them to formulate strategies to overcome the technical difficulties and look into the various feasibilities of tackling a problem.*

6. Office Automation System

An office automation system is an information system that uses computer machinery and software to digitally create, collect, store, manipulate and relay office

information needed for accomplishing basic tasks and goals.

Office automation refers to the application of computer and communication technology to office function. Office automation improves the productivity and co-ordinates the flow of information in the organisation.

The backbone of office automation is a LAN, which allows users to transmit data, mail and even voice across the network. All office functions, including dictation, typing, filing, copying, fax, telex, microfilm and records management fall into this category.

Office automation is about using the technology appropriately:

- ***To make the work less tedious.***
- ***To manage the workload more efficiently.***
- ***To reduce repetitive tasks by writing simple code so that the computer can perform the repetitive tasks error free.***
- ***To enable employees to focus more on the business function.***
- ***To make data entry easier with fewer tabs and mouse movements.***

Q4.(c) Do IS's fail? Discuss its cause using suitable examples, if you agree and justify if you disagree.

Ans. Information systems (IS) have become an important tool in today's environment. They have, in fact, become lifelines to many business organisations. Their daily activity, operations etc. depend highly on some form of computerized information system. Though the usage of IS is widespread, there is still a large amount of system failure in many areas.

So it can be said 'Yes' IS's fail.

Reasons:

There are many reasons why IS/IT systems fail and cause great trouble in any business or organisation. The failure is not caused by technological difficulties alone.

The factors other than technological problems are the following:

- ***IS fails when it does not meet its design objectives, excessive costs etc. and hence does not deliver benefits to the business/organisation.***
- ***Lack of proper communication flow among the different departments is also a major factor of failure.***
- ***Information systems perform processing of data. But that data may come from multiple locations, from different people with different expectation. IT***

people and operational people may differ as each looks at a situation from a different angle. This tends to enlarge small differences. For this reason also the system fails as the system does what it was programmed to do.

- *Failure of delivery. ISs fail to deliver because they fail to process as designed. Information systems perform the tasks they were programmed to do and the failure is due to the decision to use the application in other environment or the environment is not using the system as designed.*

- *Lack of quality planning. These systems fail because of the factors like: degree of change, quality of project planning, use of project management tools etc.*

- *The rapid development of the Internet has resulted in more and more embedded systems connecting to company intranets or to the Internet. Unfortunately this leaves an open door for potentially harmful programs to enter into the system.*

- *Another reason why IS fails is because it is not well planned, a study is not implemented properly, there are no specific goals and the contribution of staff's co-ordination, knowledge and performance are unattended.*

- *Is fails when the users cannot interact well with the IS. IS becomes unable to meet the clients' expectations.*

Q6.(a) Explain EDP. **MDU BCA 2018, 2017, 2015**

Ans. Electronic Data Processing (EDP)

The process of collecting data and processing them to produce meaningful information using computers is called Electronic Data Processing (EDP).

EDP approach capitalizes on the ability of computers to perform accurate processing of repetitive data with practically no signs of fatigue. It eliminated performance degradation exhibited generally by human beings when confronted with such data processing work.

The focus of EDP was on record keeping – an activity that is statutory requirement in many organizations. The majority of the items whose records had to be maintained were accounting data. So the finance and accounts departments took early lead in EDP activity.

Elements of EDP

A well-designed and implemented EDP system will generally be composed of following four basic elements:-

- **Hardware**:- The servers and desktops or terminals used to enter and store data.
- **Software**:- Spreadsheets, custom applications, databases and other pieces of code used to manage and collect the data.
- **Procedure**: A coherent and agreed-upon system for entering and manipulating data, designed to eliminate duplication of entry and data corruption.

- **Personnel**: The staff trained to work with the EDP.

EDP Cycle

EDP goes through a three-stage cycle:

- **Input**: The data is collected by the system, via keyboard, file upload or other workflow.
- **Processing**: The data is manipulated in some way, usually automated. This can include translation, formula or code application, or encryption.
- **Output**: The data is then output as information, either as part of a report or as a translated and modified form.

EDP Equipment

Any equipment used to input, process, output, or display the data can be considered EDP Equipment. This would include:

- Desktop, laptop, tablet computers, terminals or dedicated data input equipment.
- Network equipment, wired or wireless, used to transmit data.
- Servers used to store data.
- Projectors, printers, and any other device used to output processed data.

Advantages of Electronic Data Processing

The advantages of EDP over manual data processing are numerous. These are:

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1. Speed
2. Automatic Operation
3. Decision-making Capability
4. Complex Problems
5. Efficient
6. Economic and reduced Labour
7. Accuracy
8. Compact Storage
9. Reports

1. Speed

The major advantage of EDP is its speed. Computer operates at very high speed. Typically, a computer can perform several hundreds of thousands of additions in a second which would otherwise take several hours using manual methods. Thus, information stored and managed via EDP can be retrieved almost instantly on a well-maintained internal network.

2. Automatic Operation

Data and set of instructions are given to the computer as input and the computer automatically processes the data according to the given set of instructions.

3. Decision-making Capability

The computer can make decisions based on the outcome of testing for a condition. One of a set of alternative courses of action is chosen based on this system. This

facility is available in all computer languages and is called branching.

4. Complex Problems

Problems that are too complex to be solved by manual methods can be easily solved through computers and can be repeated any number of times for routine applications. For example, any operation research application will be very difficult manually. But using computer, such problem becomes very easy.

5. Efficient

Summary documents and related materials such as invoices, reports, and statements can be automatically and quickly generated via EDP.

6. Economic and reduced Labour

Once an Electronic Data Processing system is created and implemented, over time it reduced the costs of managing data by a significant margin. Duplication of effort and repeated entries due to mistakes in manual data entry are reduced or eliminated by EDP.

7. Accuracy

A computer can be considered as 100% Accurate. Checking circuits are built directly into the computer, so that computer errors that are undetected are extremely rare. Because of the speed and accuracy, computer systems are capable of processing large amount of data more cheaply than if manual methods are used.

8. Compact Storage

Electronic data processing systems have the ability to store large amounts of data in a compact and easily retrievable form.

9. Reports

Reports can be easily generated using the computer within a reasonable time. Also, reports involving consolidation of data from different files can be produced without any difficulty.

Example of EDP

One of the most common examples of EDP in the modern age is warehouse stock monitoring and logistics. As orders come in, the data is input into the system and processed, transformed into a picking order and transmitted to the warehouse. The stock is picked from the shelves (manually or via automated system) and the item is deducted from the database to reflect the new reality in the warehouse itself.

Q6.(b) Explain MIS subsystem of an information system.

Ans. Management information system

When information systems are designed to provide information needed for effective decision making by managers, they are called management information systems.

MIS is a formal system for providing management with accurate and timely information necessary for decision making. The system provides information on the past, present and project future and on relevant events inside and outside the organization.

It may be defined as a planned and integrated system for gathering relevant data, converting it into right information and supplying the same to the concerned executives.

The main purpose of MIS is to provide the right information to the right people at the right time.

A management information system is an integrated man-machine system that provides information to support the planning and control function of manager in an organization i.e. MIS helps the managers to make planning and control decisions.

Need of Management Information System

Effective management information systems are needed by all business organisations because of the increased complexity and rate of change of today's business environment.

For example:

- ***Marketing manager needs information about sales performance and trends.***
- ***Financial manager needs information about returns.***
- ***Production manager needs information for analyzing resources requirement and worker productivity.***
- ***Personnel manager requires information concerning employee compensation and professional development.***

Thus, effective management information systems must be developed to provide modern managers with the specific marketing, financial, production and personnel information products they require to support their decision making responsibilities.

Q6.(c) Explain DSS. **MDU BCA 2018, 2017, 2014**

OR

Explain DSS and its components.

Ans. Decision Support System

Computer systems that provide users with support to analyze complex information and help to make decisions are called decision support systems (DSSs).

More specifically the term is usually used to describe a computer based system designed to help decision-makers use data, knowledge and communication technology to identify problems and make decisions to solve those problems.

A decision support system is a way to model data and make quality decisions based upon it. It is very important to make the right decisions to climb the ladders of success. Making such critical decisions depends on the quality of data and the ability to analyze them. Taking such decisions is easier if decision support system is used.

The decision support system (DSS) is a data modeling method that analyzes business statistics and helps the users to take business related decisions effortlessly.

A decision support system can be used to present the information textually as well as graphically.

DSS generally gathers and presents the information given below:

- *A list of all the existing information assets.*
- *Comparative sales figures between one week and the next.*
- *Projected revenue figures based on new product sales assumptions.*
- *The consequences of different decision alternatives.*

Main applications of decision support system are:

- *DSS is extensively used in business and management. Business performance software allows faster decision making, identification of negative trends and better allocation of business resources.*
- *In manufacturing, decision support systems are solving design problems by using analytical, statistical and model-building software, especially in the car and aircraft making industries.*
- *Air Lines are also using DSS to schedule flights and even arrange seating.*
- *DSSs are widely used in environmental science, particularly in air quality impact analysis.*
- *A growing area of DSS application is in agricultural production and marketing for continuous development. It helps in rapid assessment of several agricultural production systems around the world to facilitate decision-making at the farm and policy levels.*

Components of a DSS

A decision support system (DSS) has four basic components:

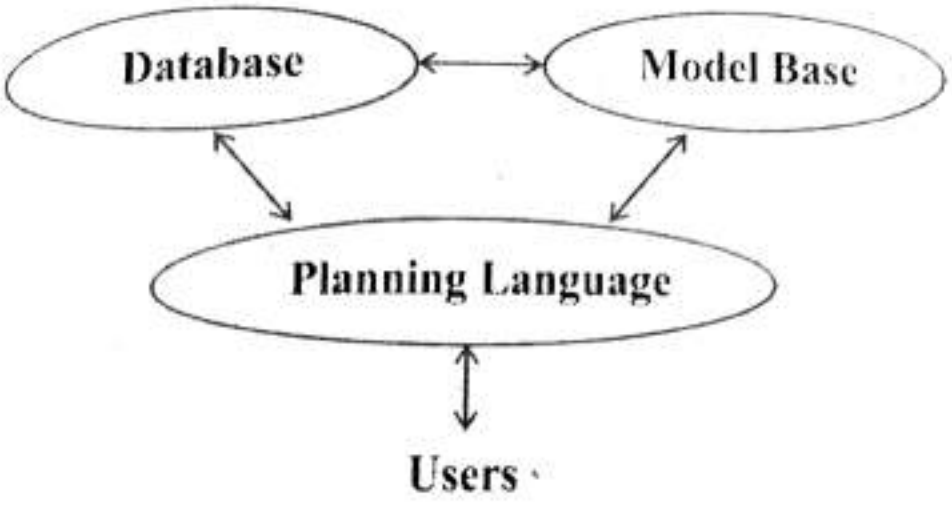
1. User
2. Database
3. Planning Language
4. Model Base

1. User

The user of a decision support system (DSS) is usually a manager with an unstructured or semi-structured problem to solve. In fact, user does not require a computer background to use a DSS for problem solving. He must have complete understanding of the problem and the factors to be considered in finding a solution.

2. Database

The DSS needs databases from which information can be obtained for decision making. DSS includes one or more database. These databases contain both routine and non-routine data from both internal and external sources. The data from external sources include data about economic condition, market demand for goods and services and industry competition. The internal data includes data from the financial and management accounting system, marketing, production and personnel department. The data is organized in such a way that it provides easy access. DSS do not create or update the data but only use the data to make decisions.



3. Planning Language

Two types of planning languages are commonly used in DSS. These are:

- **General purpose programming language**

These languages allow users to perform many routine tasks like retrieving various data from a database, budgeting, forecasting and worksheet oriented problems. The language used is Electronic Spread Sheets Language.

- **Special purpose programming language**

Special purpose programming languages are statistical languages like SA, SPSS and Mini Tab. These languages perform statistical and mathematical operations.

4. Model Base

The model base is the brain of the decision support system because it performs data manipulation and computations. Model base is custom developed model

Q7.(a) What is MIS? Discuss various characteristics expected of a good MIS. Also explain the components of MIS in detail. MDU BCA 2018

OR

What are the characteristics and components of MIS? Explain. MDU BCA 2017, 2016, 2014

Ans. Management Information System (MIS)

When information systems are designed to provide information needed for effective decision making by managers, they are called management information systems.

MIS is a formal system for providing management with accurate and timely information necessary for decision making. The system provides information on the past, present and project future and on relevant events inside and outside the organization.

It may be defined as a planned and integrated system for gathering relevant data, converting it into right information and supplying the same to the concerned executives.

The main purpose of MIS is to provide the right information to the right people at the right time.

A management information system is an integrated man-machine system that provides information to support the planning and control function of manager in an organization i.e. MIS helps the managers to make planning and control decisions.

Characteristics of MIS

A management information system should possess the following characteristics:

1. Management Oriented
2. Flexible
3. Versatile
4. Analytical
5. Management directed
6. Integrated
7. Subsystem division
8. Avoid duplicacy

1. Management Oriented

The system is designed from the top to work downwards. MIS should meet all requirements of mangers at each level for better business judgment. A good MIS must provide information to the managers to expand their knowledge and also the support to take decisions.

2. Flexible

Management information system should be flexible so that it can provide alternative ways of processing data and assigning values to different decision variables.

Management information system should include the relevant factors that can be quantified as well as the factors that cannot be quantified.

Information systems should be flexible enough to absorb the unforeseen future changes in the information needs of business.

Thus while building an MIS system all types of possible means which may occur in future should be added to make it flexible. A feature that often goes with flexibility is the ease of use. The MIS should be able to incorporate all those features that make it readily accessible to a wide range of users with easy usability.

3. Versatile

Regarding business processes, different managers may differ in their:

- ***Style of decision-making.***
- ***Computational and analytical skills.***
- ***Knowledge and experience.***

An effective management information system should be capable of catering to the information needs of the managers.

4. Analytical

An effective management information system must be analytical i.e. the system must help in the analysis of data and also keep track of alternative ways.

Such systems would help the managers in selecting the appropriate tools for analysis and also in interpretation of the results after applying the tools to the given data.

5. Management directed

Since it is the responsibility of management to devote proper time in specification, designing and implementation etc. so MIS should be management directed. In order to ensure the effectiveness of system designed, management should continuously make reviews.

For example, in the marketing information system, the management must determine what sales information is necessary to improve its control over marketing operations.

6. Integrated

MIS should be integrated which means that all the functional and operational subsystems should be tied together to produce meaningful information, with a view to achieve the objectives of the organization.

7. Subsystem Division

MIS should be divided into proper sub-systems so that each sub-subsystem can be implemented for efficiency.

8. Avoid duplicacy

MIS should avoid the duplication of data in data storage and maintain all relevant information.

Components and framework for understanding MIS

Following are the various components of MIS:

1. Hardware
2. Software
3. Procedures
4. Personnel

1. Hardware

The hardware component of MIS refers to all the input and output devices that help in the feeding and displaying of the information as per requirement. Hardware devices are the physical parts of MIS which can help in maintaining the data of business. They include input devices and output devices. Different input devices are keyboard, scanners and mouse etc. The output devices are monitor, printer, network devices etc.

2. Software

Softwares are the programmes and applications which convert machine into readable language. Different softwares are used for processing the information of an organisation such as ERP and CRM. ***ERP*** is software package that combines all data and processes of an organisation. In order to achieve the integration, it uses multiple components of computer software as well as hardware. ***CRM*** is a software package which includes the capabilities, methodologies and technologies to support an organisation in managing the relationship with customers. CRM can enable the organisation to manage their customers through the introduction of reliable systems, processes and procedures.

Q7.(b) What are the objectives of a Management Information System? Also explain the various advantages and disadvantages of MIS.

Ans. Objectives of a Management Information System

The objectives of MIS are:

- *To facilitate the decisions-making process by furnishing information in the proper time frame. This helps the decision-maker to select the best course of action.*
- *To support decision-making in both structured and unstructured problem environments.*
- *To provide requisite information at each level of management to carry out their functions.*
- *To provide each manager at every level, the planning and control tools and help in highlighting the critical factors to be closely monitored for successful operation of the enterprise.*
- *To provide documents for collecting, storing, retrieving and transmitting information to the users.*
- *To ensure transparent documentation and reporting of planning and management procedures for research monitoring, evaluation and decision support.*

Advantages of MIS

The main advantages of MIS are:

1. It facilitates planning

MIS improves the quality of plans by providing relevant information for sound decision making. MIS is designed and managed in such a way that it collects information, monitors the company's activities and operations and enhances communication and cooperation among employees. This ensures better planning for all activities and better ways to measure performance.

2. It minimizes information overload

MIS provides the larger amount of data into summarized form and thus avoids the confusion arising due to the detailed facts.

3. It helps in decision making

Information distribution to all levels of management becomes quite faultless with streamlined MIS. Managers are able to make quick, timely and informed decisions. Top management and board members can take strategic decisions, plan future growth and business expansion activities based on the data and information generated by MIS.

4. MIS encourages decentralization

Decentralization of authority allows monitoring operations at lower levels. Thus MIS can be successfully used for measuring performance and making necessary change in the organizational plans and procedures.

5. Core Competencies

MIS provides the necessary tools to gain a better understanding of the market as well as a better understanding of the enterprise itself. Every market leading enterprise will have at least one core competency i.e. "a function they perform better than their competition". By building an exceptional management information system into the enterprise it is possible to push out ahead of the competition.

6. It brings Co-ordination

MIS helps in integration of specific activities by keeping each department aware of the problems and requirements of other departments. Thus all decision centers in the organization can co-ordinate.

7. Fast Reflexes

Better MIS enables an enterprise to react more quickly to their environment, enabling them to push out ahead of the competition and produce a better service and a larger piece of the pie.

8. It makes control easier

MIS serves as a link between managerial planning and control and thus makes the management and control easier. Control helps in forecasting, preparing accurate budgets and providing the tools and vital information to employees, top management and business partners.

Disadvantages of MIS

The main disadvantages of MIS are:

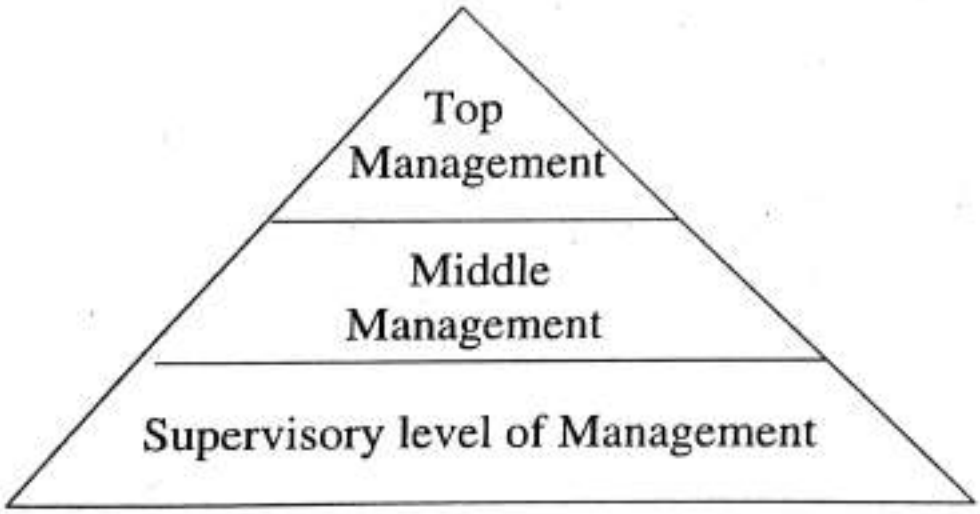
- ***MIS is less useful in making non-programmed decisions.***
- ***If in the MIS design the complexity of business systems are under-estimated or are not recognized it would not lead to successful implementation.***
- ***As the users of information and the generators of data are different, lack of training would make MIS ineffective.***
- ***MIS cannot replace managerial decisions in different functional areas.***
- ***The MIS does not give perfect information to all the users in the organization and every user has his own knowledge and may have certain assumptions which are not known to the designer. MIS takes into account only quantitative factors.***
- ***The frequent changes of top management and operational team can decrease the effectiveness of MIS.***
- ***MIS cannot provide readymade information packages which are suitable for every type of decision made by executives.***
- ***In a fast changing and complex environment, MIS may not have enough flexibility to update itself quickly.***
- ***MIS is less effective in organizations where information is not being shared with others.***

Q8.(a) Explain levels of management. MDU BCA 2018

Ans. The term "Level of Management" refers to a line of demarcation between various managerial positions in an organisation.

(The number of levels in management increases when the size of the business and work force increases.)

The level of management determines the authority and status of managers. The levels of management can be classified in three broad categories:



1. Top Management
2. Middle Management
3. Supervisory Level of Management

1. Top Management

Top management consists of managers at the highest level in the management hierarchy. This level consists of the Board of Directors, Chairman and Chief executive. The top management is the ultimate source of authority. The activities of this level centre around establishing

overall, long term policies, goals and ways of attaining these. It devotes more time on planning and coordinating functions.

The role of the top management can be summarized as following:

- *Top management lays down the objectives and broad policies of the enterprise.*
- *It sets up an organisational frame work.*
- *It issues necessary instructions for preparation of department budgets, procedures, schedules etc.*
- *It prepares strategic plans to achieve the objectives laid.*
- *It works as a link between internal organisational environment and external environment by representing organisation.*
- *It appoints the executive for middle level i.e. departmental managers.*
- *It controls and coordinates the activities of all the departments.*
- *It assembles the required resources.*
- *It monitors the planned performance.*
- *It is also responsible for maintaining a contact with the outside world.*
- *It provides guidance and direction.*
- *It provides overall leadership to organisation.*

Thus, top level managers make decisions affecting the entire firm. They do not direct the day-to-day activities of the firm; rather, they set goals for the organisation and direct the company to achieve them. Top managers in most organisations have a great deal of managerial experience and have moved up through the ranks of management within the company or in another firm. Many top managers possess an advanced degree, such as Master in Business Administration.

2. Middle management

The branch managers and departmental managers constitute middle level. They are responsible to the top management for the functioning of their department. It is basically concerned with the task of implementing the policies and plans laid down by the top management. They devote more time to organisational and directional functions.

The important functions of middle management are as follows:

- ***The main function performed by this level managers consists of linking the top and supervisory level of management. They transmit orders, suggestions and decisions downwards and carry the problems and suggestions upwards.***
- ***They are responsible for coordinating the activities within the division or department.***
- ***They explain and interpret the policy decisions made at the top level to the lower levels.***

- *They execute the plans of the organisation in accordance with the policies and directives of the top management.*
- *They assign duties and responsibilities for timely execution of the plans.*
- *They motivate personnel to achieve high productivity.*
- *They collect reports; statistical information and other records about the work turned out in respective departments and forward the same with their observations to the top management.*
- *They recommend to the top management, new or revised policies for their department to get better performance.*
- *They coordinate with other departments so as to ensure a smooth functioning of the entire organisation.*

Thus, middle-level managers are responsible for carrying out the goals set by top management. They motivate and assist personnel to achieve business objectives. They may also communicate upward, by offering suggestions and feedback to top managers. Because middle managers are more involved in the day-to-day workings of a company, they may provide valuable information to top managers to help to improve the organisation's bottom line.

3. Supervisory level of management

This level consists of supervisors, section officers, superintendent etc. Supervisory management refers to

those executives whose work has to be largely with personal oversight and direction of operative employees.

In other words, they are concerned with direction and controlling function of management.

Functions of lower level management are:

- ***They issue orders and instructions to the workers and to supervise and control their functioning.***
- ***They guide and instruct workers for day to day activities.***
- ***They help to solve the grievances of the workers.***
- ***They communicate workers problems, suggestions and recommendatory appeals etc. to the higher level.***
- ***They supervise and guide the sub-ordinates.***
- ***They are responsible for providing training to the workers.***
- ***They develop a spirit of discipline among their subordinates and establish good human relationships***
- ***They eliminate the work-related problems of employees.***
- ***They ensure discipline in the enterprise.***
- ***They motivate workers.***
- ***They provide on the job training to the workers.***

Thus, supervisory level of managers is responsible for the daily management of workers. Although, they do not set

Q9.(a) Explain Simon's model of decision-making.

MDU BCA 2018, 2017, 2016, 2015

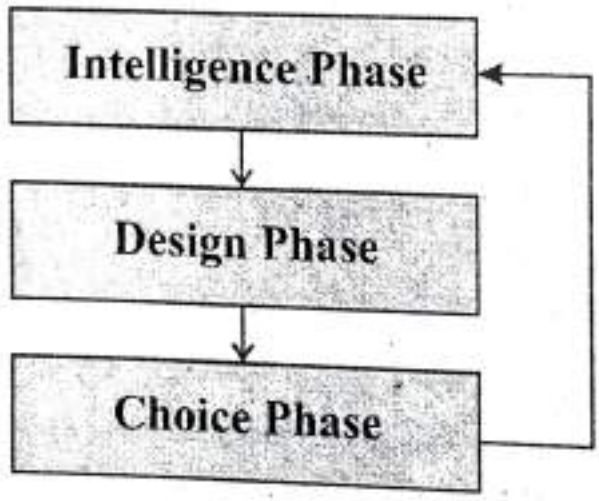
OR

Give a brief description about Simon's model of decision-making. **MDU BCA 2014**

Ans. Simon's model of decision-making

Decision refers to a choice that individuals and group make among two or more alternatives. Decision making is a process which the decision maker uses to arrive at a decision.

According to Simon's model, decision making is a systematic process composed of three major phases: intelligence, design and choice. MIS plays its role in all the three phases.



1. Intelligence Phase

In the intelligence phase, the MIS collects the data. The data can be collected from internal as well as external environments. Internal data can be collected from functional areas, whereas external data is collected from

various sources such as databases, newspapers, government reports etc.

The collected data is scanned, examined, checked and edited with the help of information systems. Further, the data is sorted and merged with other data and computations are made, summarized and presented.

In this process, the attention of the manager is drawn to all the problem situations by highlighting the significant differences between the actual and the expected, the budgeted or the targeted.

In order to get the required information in the intelligence phase of decision making, MIS must be designed so as to answer pre-specified and ad-hoc queries (unique, unscheduled, situation-specific) made by the decision maker.

2. Design Phase

In the design phase, various alternatives are developed and evaluated. A model of the problem situation in the system is constructed by the manager. This is done by making assumptions that simplify reality and writing down the relationships among all the variables.

The model is then validated and criteria for evaluation of the alternative courses of action are identified. The manager 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 stage of selection called as choice.

The information system should be designed to incorporate various models of business operations so that these can be used to manipulate the information already collected in the intelligence stage to develop and evaluate various alternatives.

3. Choice Phase

The choice phase includes selection of a proposed solution to the model. This solution is tested to determine its possibility. When the proposed solution seems reasonable, decision is implemented.

Thus, a course of action is selected and feedback is collected on the implemented decision.

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.

Information systems provide summarized and organized information to decision-makers at this stage. An information system should have optimization models and suggestion models in order to support the choice stage of decision-maker.

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. The MIS achieves this in an efficient manner without repeated use of the Simon Model again and again.

Q10.(b) Differentiate between structured and unstructured decisions.

MDU BCA 2018, 2017, 2016

Ans. Following are the differences between structured and unstructured decisions:

Structured Decision	Unstructured Decision
1. A decision in which all the steps are well structured is called structured decision.	1. A decision in which none of the steps are structured is called unstructured decision.
2. Well defined decision making procedure.	2. Not well defined input, output set and procedures.
3. They are repetitive and routine in nature.	3. They are exceptional and non-routine in nature.
4. Algorithms can be designed for these decisions.	4. Fixed algorithm can not be designed for these decisions.
5. The information needed to make structured decisions is relatively predictable and steps can be taken in advance to supply it in the reports that decision , makers receive.	5. These decisions lack a structure and the information needed to make unstructured decisions is not completely known in advance.

Structured Decision	Unstructured Decision
6. Structured decisions are those we can predict will happen.	6. Unstructured decisions can not be predicted.
7. Examples are: Payroll production, Accounts receivable, budget analysis, inventory control etc.	7. Examples are: what strategy should be setup, how many more service counters should be opened up etc.
8. Structured decisions can be easily programmed.	8. Unstructured decisions can not be programmed.

Q11.(b) Differentiate between formal & informal systems. MDU BCA 2017, 2016

Ans. Following are the differences between formal and informal systems:

Formal system	Informal system
1. Formal systems are designed and developed using a set of well-established policies, procedures and principles.	1. Informal systems are not designed and developed using pre-established rules.
2. The formal system is likely to have a set of rules and procedures.	2. Informal system relies on common practice and common sense of employees.
3. A formal system is based on the organization represented by the organization chart, which shows the positions and their authority relationships indicated by boxes and connected by straight lines.	3. An informal system is an employee based system designed to meet personnel and vocational needs and to help in the solution of work related problems.
4. For example, a company's accounting system would be a formal information system that processes financial transactions.	4. A good example of an informal information system is office gossip, in which people try to acquire information through conversations with others.

Q12.(b) What are the steps involved in developing an information system? Explain.

Ans. System development process consists of activities like:

- Understanding the problem
- Deciding a plan for a solution
- Coding the planned solution
- Testing the coded program

For developing an information system successfully, the following steps are involved:

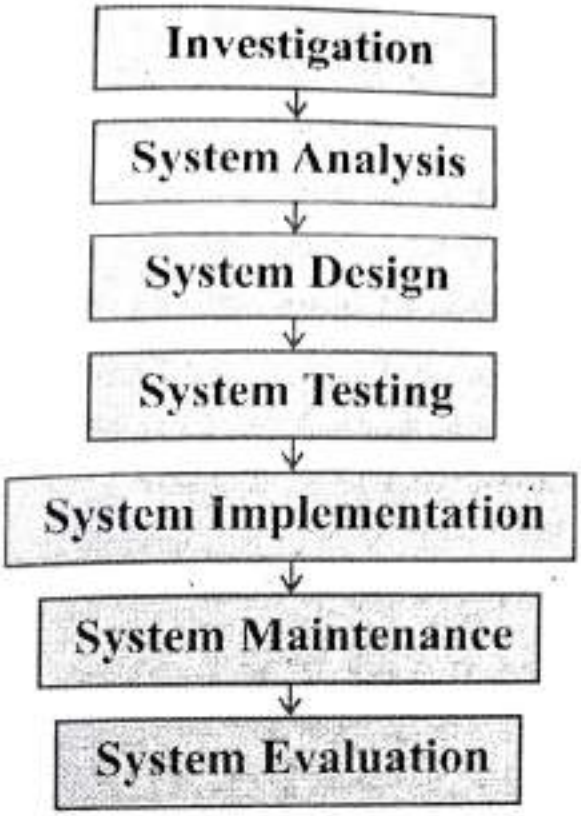
1. Investigation
2. System Analysis
3. System Design
4. System Testing
5. System Implementation
6. System Maintenance
7. System Evaluation

1. Investigation

In this stage, mainly two aspects are performed:

(a) Feasibility Study

(b) Cost Benefit Analysis



(a) Feasibility Study

Feasibility study refers to the determination of whether it is practical and beneficial to build that information system. This study helps in determining whether the system requested is feasible or not.

In this study, the requirements of the proposed system are compared with the constraints like cost, time, manpower, technical and physical resources etc. to know that all the requirements can be fulfilled in lieu of constraints or not.

This study determines the best way to achieve the objectives of new information system which will solve the problems. It is really a system study which is accomplished in full details.

Thus, the contents and recommendations of such a study helps to decide whether to proceed, postpone or cancel the project.

Feasibility study should be conducted competently and no fundamental errors of judgment are made.

Various types of feasibility study are:

- Organizational Feasibility
- Economic Feasibility
- Technical Feasibility
- Operational Feasibility

Organizational Feasibility

In this feasibility study, it is seen that how well a proposed information system supports the objectives of the organization and its strategic plans for information system.

Economic feasibility

In this feasibility study, it is seen that the information system which is going to be made is cost saving with decreased investment, increased profit/revenue. It is also seen that development cost and operational cost should be recoverable.

Technical Feasibility

In this feasibility study, the focus is on hardware and software capabilities for meeting the needs of a proposed information system. It is taken in terms of hardware, software and network capability, reliability and availability.

Operational feasibility

In this feasibility study, the focus is on the willingness and ability of the management employees, customers, suppliers and others to operate, use and support a proposed system.

(b) Cost Benefit Analysis

There are two types of costs involved:

- Tangible cost
- Intangible cost

Tangible cost

The cost which is quantifiable. For example, salary, hardware and software cost.

Intangible cost

The cost factors which are difficult to quantify. For example, loss of customer goodwill and error caused by installation of new system.

2. System Analysis

System analysis refers to the identification, understanding and examining the system for achieving pre-determined goals/objectives of the system.

System analysis involves a detailed study of:

- ***The information needs of the organization and its end users.***

- ***Existing information systems, their activities resources and products.***
- ***The expected information system required to mee the information needs of users.***

System analysis phase can be categorized as:

(a) Organizational Analysis

(b) Analysis of Present System

(c) Functional Requirements Analysis

(a) Organizational Analysis

An organizational analysis is an important first step in systems analysis. An organizational analysis is a process by which an organization's systems, capacity and functionality are assessed. The management structures, its business activities, its people, its current information system and the environment system it must deal with are also analyzed.

(b) Analysis of present system

It is important to study the system that is going to be improved. Here the things to be analyzed are:

- How the present system uses hardware, software, network and resources to convert data into information product?
- How these activities are accomplished?

(c) Functional Requirements Analysis

There is a need to know the information requirements, its format, volume, frequency and response time. So this analysis aims to determine the information processing capabilities required for each system activity.

Functional requirements can be categorized as:

- **User interface requirements:** These are basically input/output needs of the end users that must be supported by the information system. These may include the parameters of information system like: source, format, content, volume, frequency etc.
- **Processing requirements:** Such requirements include the division rules like throughput, turn around time, response time needed for processing.
- **Storage requirements:** Such requirements include the organizational database contents, size of databases, type and frequency of updating etc.
- **Control requirements:** These requirements involve accuracy, validity, safety and security and adaptability requirements for a system input, processing, output and storage function.

3. System Design

System design is the most creative phase in the information system development. It is an exercise of specifying "how" the system will accomplish the objectives laid by the requirement and analysis stage. The

design phase describes the input data, the processes involved in the manipulation of data and the output.

The designed system should be:

- ***User-friendly***
- ***Program-friendly***
- ***Able to meet user requirements***
- ***Cost-effective***
- ***Easy to use and***
- ***According to design standards.***

System design process composes of the following:

(a) **Output Design:** The design process starts with the proper knowledge of system requirements which will be termed as output.

(b) **Input Design:** After the output design, the next step is to determine the data need to be supplied to the system to produce the desired outputs.

(c) **File Design:** The data is stored in files. The designer has to devise the techniques of storing and retrieving data from these files.

(d) **Procedure Design:** This step involves specifications of how processing will be performed.

(e) **Control Design:** The control design involves procedures which will ensure correctness of processing, accuracy of data, timely output etc.

4. System Testing

Testing involves making sure that the information system will produce the desired results. It also tests whether:

- ***The system runs according to its specifications.***
- ***The system runs in the way the users expected and***
- ***It fulfills the customer requirements.***

For this purpose, various test cases are prepared. A test case is a certain made up situation on which system is exposed so as to find the behaviour of system in that situation. These test cases require data. The system is tested with special test data and the results are examined for their validity.

There are various types of tests which are used to test the information system. These include unit testing, system testing and acceptance testing.

The first level of testing is unit testing. This test verifies that each individual program is working properly.

The second level of testing is system testing. It involves determining if the individual programs will function together as planned.

The third level of testing is acceptance testing, which users and managers do in order to certify that the information system is ready to be used.

Effective testing contributes to:

- ***The delivery of higher quality information system.***

- *More satisfied users.*
- *Lower maintenance costs.*
- *Accuracy.*
- *Reliability of results.*

5. System Implementation

Implementation is the practical job of putting a theoretical design into practice. It may involve the complete implementation of a computerized system or the introduction of one small subsystem.

It covers the period from the acceptance of the tested design to its satisfactory operation.

It is a major operation across the whole organization structure and requires a great deal of planning. Planning for implementation must begin from the initial conception of the project.

It requires a thorough knowledge of the new system, its personnel needs, hardware and software requirements, file and procedure for conversion activities.

Thus the term implementation may be defined, as ***"Implementation is the process of converting the manual or old computerized information system with the newly developed system and making it operational, without disturbing the functioning of the organization".***

6. System Maintenance

After implementation, the maintenance begins. It is an iterative process. System maintenance is required after

the system is delivered to the customer's site, installed and is operational.

Systems maintenance can be categorized into four groups. Each of these four categories can affect an organization's information strategy plan in different ways:

(a) Corrective maintenance

Corrective maintenance is correcting errors that were not discovered during the information system development phase.

Regardless of how well designed, developed, and tested a system or application may be, errors will unavoidably occur. This type of maintenance deals with fixing or correcting problems with the system. This usually refers to problems that were not identified during the implementation phase. An example of corrective maintenance is the lack of a user-required feature or the improper functionality of the information system.

(b) Adaptive maintenance

This type of maintenance refers to the creation of new features or adapting existing ones as required by changes in the organization or by the users. e.g. changes on the organization's tax code or internal regulations.

(c) Enhancement Maintenance

It deals with enhancing or improving the performance of the system either by adding new features or by changing existing ones. An example of this type of maintenance is

the conversion of text-based systems to GUI (Graphical User Interface).

(d) Preventive Maintenance

This type of maintenance may be one of the most cost effective, since if performed timely and properly, it can avoid major problems with the system. An example of this maintenance is the correction for the year 2000.
The main purpose of maintenance phase is to preserve the information system for a long time.

7. System Evaluation

Evaluation of information system is an essential part of the management control process. During the evaluation phase, the organizations determine the quality of their information systems.

Evaluation of information system is a process of measuring performance of organizational information systems. The feedback obtained helps in determining the necessary adjustments to be made in their existing information systems.

The various approaches for evaluation of IS in an organization are:

- Cost/Benefit Analysis
- Quality Assurance Review
- Compliance Audits
- Information System Personnel Productivity Measurement

Q16.(b) Explain pitfalls in MIS development.

MDU BCA 2018

OR

What are the pitfalls in MIS development? Explain.

MDU BCA 2016

OR

Explain the different Pitfalls in the MIS Development.

BCA MDU 2015, 2014

Ans. Various pitfalls in the development of a MIS are as follows:

1. Organizational Framework

Some managers think that they can solve company's shortcomings using MIS. An MIS does not help to achieve this goal without a good planning and control within the framework of an organizational structure. The MIS must be built on top of a management system that includes the organizational arrangements, the structure and procedures for adequate planning and control.

2. Generation of Information

The lack of managerial and operational applications to the MIS makes a great impact because it implies that the process of management is not being performed well to generate the information. The information is the raw material of decision making for MIS, and if information is not being generated, disseminated, and used for management, then no system manual or computer is going to solve organizational problems.

3. Managerial Participation

The most important characteristics of a successful company is that the MIS development has been viewed as a responsibility of management. Their success is attributed directly to the fact that managers are required to become involved in the design of their own system. This includes both top managerial and operating line management. Moreover, the presidents need to take personal interest and participate directly in defining what work the computer should do for the company.

4. Communication Gap

In MIS, user cannot adequately express information needs and the designer designs the flow chart and graphs according to the user requirements. After designing, the programmer incorporates his own ideas and interpretations, for developing the system. In these development stages, one undefined requirement can develop an incorrect information system.

5. Bias in Information

The presentation of information may generate a bias and may influence the user. For example, if the information is presented in an alphabetic order and if it is lengthy, the first few information entries will get more attention.

6. Delayed Delivery of Information

It reduces the immediate action or decision. Thus, delayed information will only have knowledge value.

7. Suppression and Filtering of Information

This is done with the confidential and sensitive data to achieve unrealistic goals.

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Q17.(a) Give a complete description about functional MIS. MDU BCA 2015, 2014

OR

What is Functional MIS? What are the various types of functional MIS? Briefly explain the main activities of various functional MIS.

Ans. Functional MIS

Management Information Systems developed around the functional areas of a business organization are known as the functional MIS.

The popular functional areas of the business organization are:

- ***Marketing***
- ***Finance***
- ***Personnel***
- ***Production***

These departments or functions are known as functional areas of business. Each functional area requires applications to perform all information processing related to the function.

Various types of functional MIS

1. Financial Information System
2. Marketing Information System
3. Production Information System
4. Human Resource Information System

1. Financial Information System

Financial information system refers to the information system that:

- *Tracks financial events,*
- *Summarizes information,*
- *Supports adequate management reporting,*
- *Facilitates policy decision making and*
- *Helps in preparation of financial statements.*

Financial Management Information Systems (FMIS) accumulate and analyze financial data in order to make good financial management decisions for running the business.

2. Marketing Information System

The marketing information system provides information that relates to the firm's marketing activities.

Marketing information system is defined as a set of procedures and methods for regular and planned collection, analysis and presentation of information in making marketing decisions.

It is an interacting, continuing, future-oriented structure of persons, machines and procedures designed to generate an orderly flow of information collected from internal and external sources of information. A marketing information system continuously gathers data i.e. facts and figures from the internal and external sources of information. Then this information is sorted out, classified, analysed and sorted for future reference. The sorted information can be recalled or restored immediately in the form required for decision making by marketers.

3. Production Information System

Production information system is an information system designed to provide information on production/operation activities of an organization and thus facilitates the decision making process of production managers of an organization.

4. Human Resource Information System

A human resource information system is a system used to acquire, store, manipulate, retrieve and distribute pertinent information regarding an organization's human resources.

Main activities of various functional MIS

Marketing MIS

- ***Sales order forecasting***
- ***Sales analysis***
- ***Billing***
- ***Distribution***
- ***Stock availability***
- ***Sales quota control***
- ***Pricing***
- ***Product phenomenon***

Finance / Accounting MIS

- ***Financial planning***
- ***Budgeting***
- ***Cost accounting***
- ***Accounts receivable***
- ***Payroll***

- *Accounts payable, etc.*

Personnel MIS

- *Employee recruitment*
- *Selection*
- *Development*
- *Transfers*
- *Evaluation*
- *Retirements, etc.*

Production MIS

- *Production planning and control*
- *Engineering standards*
- *Quality control*
- *Plant location and plant layout decision*
- *Product design*

Q19.(a) Give a brief explanation of the e-business systems. Also explain the e-Business Application Architecture.

Ans. E-business Systems

E-business systems are a set of online technologies, equipment and tools that an organization uses to conduct business via the Internet. These systems help a company connect with customers, process orders and manage information. For example, Flipkart which is a web-based retail store where customers can purchase products online.

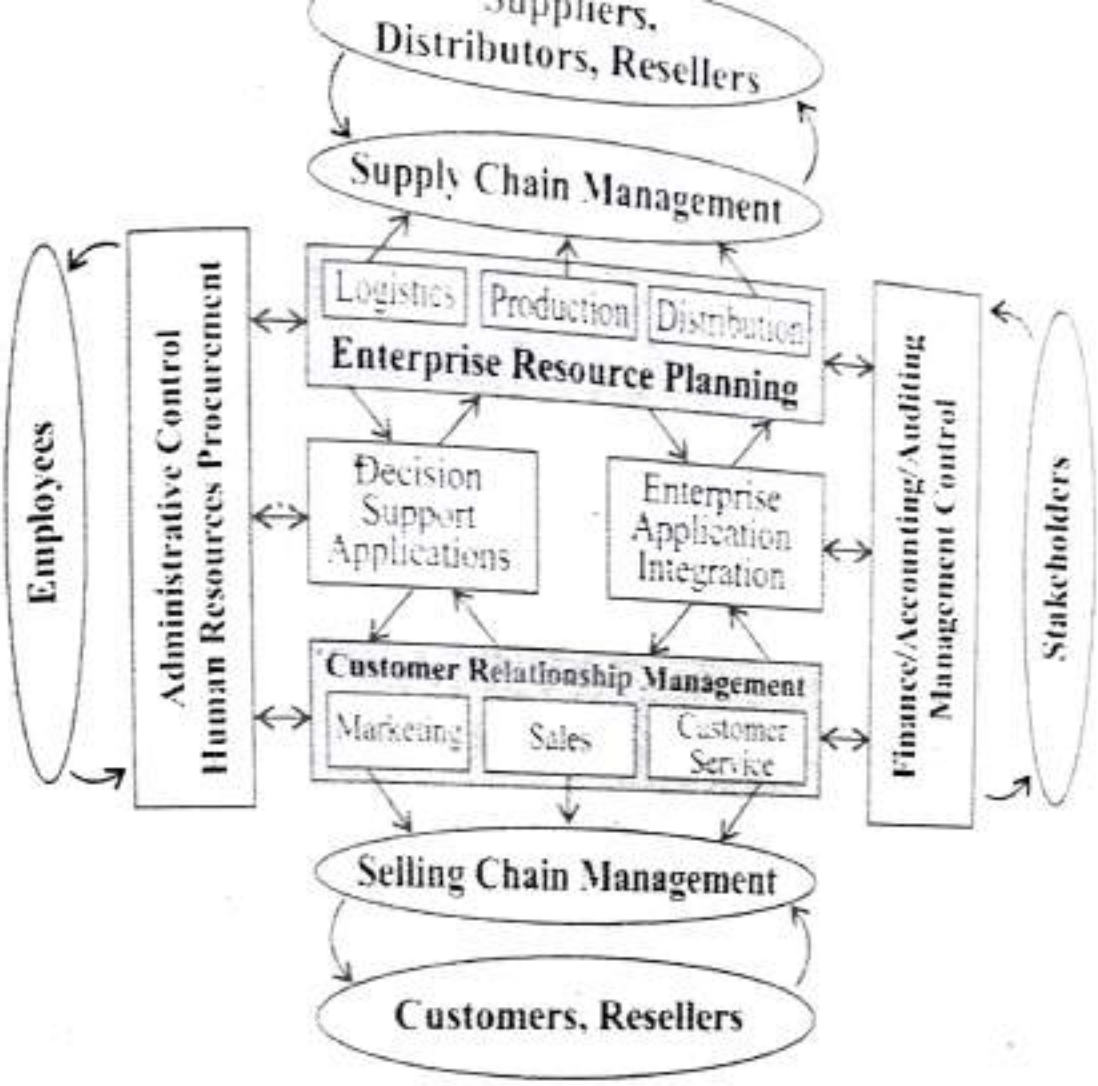
E-business refers to the conducting of business on the Internet, not only buying and selling, but also serving customers and collaborating with the business partners.

E-Business presents a broader dimension of e-Commerce as it represents the use of electronic technology, especially web and other network technology, for business. E-business is a way to facilitate improvements in a company's processes, in addition to allowing a company to expand market penetration, geographical markets, etc.

The e-Business Application Architecture

This figure gives a good overview of the inter-relatedness, interdependence, and integration of the e-business applications that are vital components of the successful operations and management of an e-business enterprise.

The e-business application architecture illustrates the application components, interrelationships, and interfaces with customers, employees, business partners, and other stakeholders of an e-business enterprise.



Instead of concentrating on the traditional business functions, the e-business systems focus on accomplishing fundamental business processes in connection with company's customers, suppliers, partners and employee stakeholders.

The e-business applications are integrated into cross-functional enterprise application clusters like:

1. Enterprise Resource Planning
2. Customer Relationship Management
3. Partner Relationship Management
4. Supply Chain Management
5. Knowledge Management

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- Enterprise Resource Planning (ERP) concentrates on the efficiency of a firm's internal production, distribution and financial processes.

Q19.(b) What are the major success factors for e-business? Also explain the various tools required for collaborating of the enterprise with e-business systems.

Ans. Major success factors for e-business

The following major success factors must be incorporated into a company's strategy to ensure success:

- ***Internet technology should be fully integrated into the company's overall strategy.***
- ***Competitive advantage must be maintained in both operational efficiency and distinctive strategic positioning.***
- ***Basis of competition should not be shifted from traditional competitive advantage such as cost, profit, quality, service and features.***
- ***Company's strategic positioning should be well maintained.***
- ***There should be proper support from top management.***
- ***Availability of right system infrastructure.***
- ***Good e-business education and training to employees, management and customers.***
- ***Customers' and partners' expectations should be well managed.***
- ***Good products and services should be offered by e-business.***
- ***New competitors and market shares should be tracked.***

Q21.(c) Explain decision support system for planning. **MDU BCA 2018**

OR

Describe how decision support system helps in Planning. **MDU BCA 2016**

OR

Explain the role played by decision support systems in planning, control and decision-making.

OR

How DSS helps in the process of decision-making? Explain the various applications of DSS.

Ans. Decision Support system (DSS)

Decision Support System is a computer based system designed to help decision-makers use data, knowledge and communication technology to identify problems and make decisions to solve those problems. It is an information system application that assists decision making.

Role of DSS

Decision support system plays a significant role in planning, control and decision-making. It helps in achieving the following objectives:

- ***To provide support for various management levels ranging from top management to line managers.***
- ***To help in processing the collected data and in producing a suggested solution to a problem.***
- ***To save time and effort in decision making process.***

- *To provide support to individuals as well as groups.*
- *To provide efficient and effective solution of very complex problems.*
- *To provide user with an easy access to decision model and data in order to support semi-structured and unstructured decision.*
- *To provide support in semi-structured and unstructured situations by bringing together human judgment and computerized information.*
- *To provide report and presentation flexibility.*
- *To offer both textual and graphical orientation.*
- *To perform complex, sophisticated analysis and comparisons using advanced software packages.*
- *To support several interdependent and/or sequential decisions.*
- *To promote learning which leads to new demands and the refinement of the system.*

DSS helps in decision making in the following ways:

- *The key to decision support systems is to collect data, analyze and shape the data that is collected and then construct strategies from analysis and make sound decisions.*
- *DSS improves personal efficiency, speeds up the problem solving process and eases interpersonal communication.*
- *DSS encourages learning and training processes, helps regulate organizational control and produces new evidence to support decision making.*

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- *The decision support system is a data modeling method that analyzes business statistics and helps the users to take business related decisions effortlessly.*

Thus decision support system (DSS) helps the decision makers to make decisions. Decision maker has to use his experience to select the best solution to make a decision. For example, a problem is entered into a DSS to develop an advertisement plan. DSS generates all possible solutions on the basis of investment amount and nature of the product to make a decision.

Applications of DSS

Main applications of decision support system are:

- ***DSS is extensively used in business and management. Business performance software allows faster decision making, identification of negative trends and better allocation of business resources.***
- ***In manufacturing, decision support systems are solving design problems by using analytical, statistical and model-building software, especially in the car and aircraft making industries.***
- ***A growing area of DSS application is in agricultural production and marketing for continuous development. It helps in rapid assessment of several agricultural production systems around the world to facilitate decision-making at the farm and policy levels.***
- ***Modern DSSs can be applied to all aspects of Forest management, from log transportation to harvest scheduling and even ecosystem protection.***

- ***Air Lines are also using DSS to schedule flights and even arrange seating.***
- ***DSSs are widely used in environmental science, particularly in air quality impact analysis.***
- ***Decision support tools help the health-care professionals in analysis of clinical data and in determining whether a patient is eligible for clinical research based on the patient's clinical history. Such tools are also utilized in hospitals operating rooms, intensive care units (ICUs), laboratories and other medical facilities.***

In brief, DSS applications are rapidly increasing in different fields. DSS has its application areas in:

- ***Accounting***
- ***Finance***
- ***Human resource management***
- ***International business***
- ***Stock market***
- ***Water resource management***
- ***Education***
- ***Military***
- ***Urban and community planning etc.***