



# AVS

## COLLEGE OF ARTS & SCIENCE (AUTONOMOUS)

Attur Main Road, Ramalingapuram, Salem - 106.

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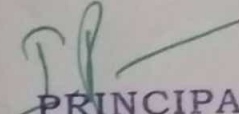
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## Study Material

**Paper Name** : MANAGEMENT INFORMATION SYSTEM  
**Paper Code** : 21UBXA02  
**Batch** : 2021 -24  
**Semester** : Odd Semester  
**Staff In charge** : Ms.G.MANIMEGALAI

  
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# **SYLLABUS**

## **SEMESTER-V**

### **CORE: XIV MANAGEMENT INFORMATION SYSTEM**

#### **UNIT-I**

Introduction to information system (IS) – Data and Information- Classification of Information Importance of Information System-components-information system resources- Management Information System (MIS) – Meaning – Definition-Importance of MIS

#### **UNIT-II**

Systems approach: System – meaning-characteristics-components- Types - System Development Life Cycle- System Analysis- System Design -Steps in implementing systems. System analyst-Meaning- Functions.

#### **UNIT-III**

Transaction Processing System- Meaning – Importance- Components. Decision Making – Meaning - Types – Decision Support System (DSS) – Characteristics – Components – Expert System (ES) – Components – Applications – Introduction to Artificial Intelligence

#### **UNIT -IV**

Office Automation System (OAS) – Meaning-Benefits. Executive Information Systems (EIS) – Components – Advantages. Functional Information System for Business – Marketing Information System – Human Resource Information System – Production / Manufacturing Information System – Accounting Information System. Finance Information System.

#### **UNIT-V**

Telecommunication revolution – Introduction to Email, Internet, Intranet, Extra-net, Teleconferencing, video conferencing, Virtual office, ERP – Benefits and challenges - Electronic payments. Introduction to cloud computing –concept of Big data

#### **Text Book:**

1. Management information systems – C.S.V. Murthy – Himalaya publishing house.

#### **REFERENCE BOOKS:**

2. Management information systems – L.M. Prasad and Usha Prasad – Sultan Chand & Sons

3. Management Information Systems- Text & Cases- Jawadekar. Tata McGraw Hill

4. Management Information Systems – Managing Information Technology in the E-business enterprise - James O Brien – Tata McGraw Hill.

**MODEL QUESTION PAPER**

**TIME : 3 HOURS**

**MAXIMUM : 75 MARKS**

**PART – A (15 x 1 = 15 Marks)**

**[ Answer all Questions ]**

1. From Unit – I
2. From Unit – I
3. From Unit – I
4. From Unit – II
5. From Unit – II
6. From Unit – II
7. From Unit – III
8. From Unit – III
9. From Unit – III
10. From Unit – IV
11. From Unit – IV
12. From Unit – IV
13. From Unit – V
14. From Unit – V
15. From Unit – V

**PART – B (2 x 5 = 10 Marks)**

**[Answer ANY TWO Questions & Answer to each question shall not exceed three pages]**

16. From Unit – I
17. From Unit – II
18. From Unit – III
19. From Unit – IV
20. From Unit – V

**PART – C (3 x 10 = 30 Marks)**

**[ Answer ALL FIVE Questions & Answer to each question shall not exceed six pages ]**

21. A)From Unit – I OR B) From Unit – I
22. A)From Unit – II OR B)From Unit – II
23. A)From Unit – III OR B)From Unit – III
24. A)From Unit – IV OR B)From Unit – IV
25. A)From Unit – V OR B)From Unit – V

## UNIT-I

Introduction to information system (IS) – Data and Information- Classification of Information -Importance of Information System-components-information system resources- Management Information System (MIS) – Meaning – Definition-Importance of MIS

### INTRODUCTION TO INFORMATION SYSTEM (IS)

#### DEFINITION:

“Information systems (IS) is the study of complementary networks of hardware and software that people and organizations use to collect, filter, process, create, and distribute data.”



### CLASSIFICATION OF INFORMATION

Information can be classified in a number of ways and in this chapter, you will learn two of the most important ways to classify information.

#### **Classification by Characteristic**

Based on Anthony's classification of Management, information used in business for decision-making is generally categorized into three types –

**Strategic Information** – Strategic information is concerned with long term policy decisions that defines the objectives of a business and checks how well these objectives are met. For example, acquiring a new plant, a new product, diversification of business etc, comes under strategic information.

**Tactical Information** – Tactical information is concerned with the information needed for exercising control over business resources, like budgeting, quality control, service level, inventory level, productivity level etc.

**Operational Information** – Operational information is concerned with plant/business level information and is used to ensure proper conduction of specific operational tasks as planned/intended. Various operator specific, machine specific and shift specific jobs for quality control checks comes under this category.

#### **Classification by Application**

In terms of applications, information can be categorized as –

**Planning Information** – These are the information needed for establishing standard norms and specifications in an organization. This information is used in strategic, tactical, and operation planning of any activity. Examples of such information are time standards, design standards.

**Control Information** – This information is needed for establishing control over all business activities through feedback mechanism. This information is used for controlling attainment, nature and utilization of important processes in a system. When such information reflects a deviation from the established standards, the system should induce a decision or an action leading to control.

**Knowledge Information** – Knowledge is defined as "information about information". Knowledge information is acquired through experience and learning, and collected from archival data and research studies.

**Organizational Information** – Organizational information deals with an organization's environment, culture in the light of its objectives. Karl Weick's Organizational Information Theory emphasizes that an organization reduces its equivocality or uncertainty by collecting, managing and using these information prudently. This information is used by everybody in the organization; examples of such information are employee and payroll information.

**Functional/Operational Information** – This is operation specific information. For example, daily schedules in a manufacturing plant that refers to the detailed assignment of jobs to machines or machines to operators. In a service oriented business, it would be the duty roster of various personnel. This information is mostly internal to the organization.

**Database Information** – Database information construes large quantities of information that has multiple usage and application. Such information is stored, retrieved and managed to create databases. For example, material specification or supplier information is stored for multiple users.

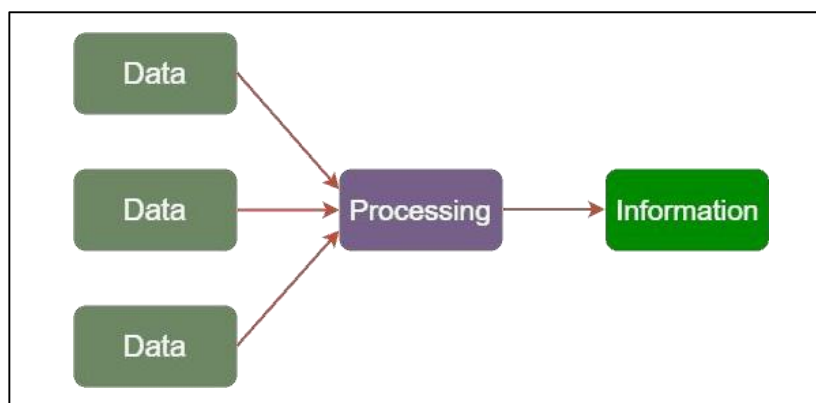
### DATA AND INFORMATION

#### DATA:

- ❖ Data is raw facts or Observation about physical phenomena or Business Transaction.
- ❖ Data is also objective measurement of the attributes (characteristics) of entities such as People, place, things & events.
- ❖ Data is Raw, un- summarized, unanalyzed facts. Data is used in the form of raw material & must be subjected to data manipulation or processing to produce useful information.

#### INFORMATION:

- ❖ Information is data placed in a meaningful & useful context for end users.



## IMPORTANCE OF INFORMATION:

- ◆ Its form is aggregated, manipulated and organized.
- ◆ Its content is analyzed and evaluated.
- ◆ It is placed in proper context for a human user.

### **Information contains:**

- ◆ An element of surprise.
- ◆ Reduces uncertainty.
- ◆ Triggers action.
- ◆ Data Process Information Decision Action MANOHAR S (MBA ,M.Sc, DSE,HDCA, BEd), Asst. Professor in Dept, of Commerce SIDDASHREE FIRST GRADE COLLEGE, NITTUR. Information is one of the major resources of an Information system.
- ◆ Without information no action could take place.
- ◆ An information system generates information using data. If the information system generate information useful for managers in planning & control the whole system is called “management information system”.

Data	Information
<ul style="list-style-type: none"><li>• Data refers to raw facts that have no specific meaning.</li></ul>	<ul style="list-style-type: none"><li>• Information refers to processed data that has a purpose and meaning.</li></ul>
<ul style="list-style-type: none"><li>• The word 'data' is derived from the Latin word 'datum', which means 'something that is given'.</li></ul>	<ul style="list-style-type: none"><li>• The word 'information' is derived from the Latin word 'informatiō', which means 'formation or conception'.</li></ul>
<ul style="list-style-type: none"><li>• The data is independent of the information.</li></ul>	<ul style="list-style-type: none"><li>• Information is dependent on data.</li></ul>
<ul style="list-style-type: none"><li>• Data or raw data is not enough to make a decision.</li></ul>	<ul style="list-style-type: none"><li>• The information is sufficient to help make a decision in the respective context.</li></ul>

## IMPORTANCE OF INFORMATION SYSTEM

An information system is the application of data production, flows, and use inside organizations. Information system creates huge use of data technology defines. But it is essential to appreciate that its capacity encompasses systems in their entirety, such as manual events, the interface among manual and automated elements of systems, design elements of IT means, and economic, legal, organizational, behavioural, and social elements of systems.

Information systems overlap with both the computer science and business administration disciplines. The information system of an organization can be represented as a system that serves to support data within the organization when and where it is required at some managerial level.

An information system is a group of people, processes, and resources that communicate to satisfy the information processing required of an organization. During the processing, the data is collected, saved, modified, and distributed in an organization. Such a system should take the data received and store, fetch, transform, process, and connect it using the computer system or some other means.

It is not essential that an information system cannot function in the absence of computers. An information system is a reasonably interrelated group of business processes that produce organizational goals. Management Information System is generally dependent upon data, which is an essential ingredient of any Management Information System. Information is the most demanding resource of the Management Information System.

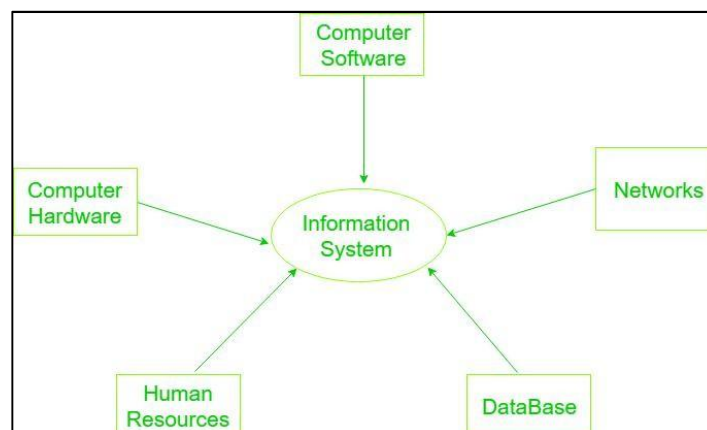
Information is a big input for achieving the objectives such as learning to support each other and to become an integral element of society. The goals of these information systems were to determine the well-being of their people in the kingdom and to adequately and efficiently manage the kingdom. The church had its data system. In India, Tainali Rama, Akbar, and several had impressive management information systems in operation. Concurrently, the merchants of Venice had their own completely functional applicable management information system in place.

An information system differs from some types of systems in that its objective is to monitor the operations of different systems, which it can call a target system. An information system cannot continue without such a target system.

Production activities can be the target system for a production scheduling system, human resources in the business services would be the target system of a human resource information system, etc. It is essential to identify that inside a vending machine there is a sub-system that can be treated as an information system. In some sense, each reactive system will have a subsystem that can be treated an information system whose goal is to monitor and control such a reactive system.

## COMPONENTS

An **Information system** is a combination of hardware and software and telecommunication networks that people build to collect, create and distribute useful data, typically in an organization. It defines the flow of information within the system. The objective of an information system is to provide appropriate information to the user, to gather the data, process the data and communicate information to the user of the system.



Components of the information system are as follows:

### **1. Computer Hardware:**

Physical equipment used for input, output and processing. The hardware structure depends upon the type and size of the organization. It consists of an input and an output device, operating system, processor, and media devices. This also includes computer peripheral devices.

### **2. Computer Software:**

The programs/ application program used to control and coordinate the hardware components. It is used for analysing and processing of the data. These programs include a set of instruction used for processing information.

Software is further classified into 3 types:

1. System Software
2. Application Software
3. Procedures

### **3. Databases:**

Data are the raw facts and figures that are unorganized that are later processed to generate information. Softwares are used for organizing and serving data to the user, managing physical storage of media and virtual resources. As the hardware can't work without software the same as software needs data for processing. Data are managed using Database management system.

Database software is used for efficient access for required data, and to manage knowledge bases.

### **4. Network:**

- Networks resources refer to the telecommunication networks like the intranet, extranet and the internet.
- These resources facilitate the flow of information in the organization.
- Networks consists of both the physical devices such as networks cards, routers, hubs and cables and software such as operating systems, web servers, data servers and application servers.
- Telecommunications networks consist of computers, communications processors, and other devices interconnected by communications media and controlled by software.
- Networks include communication media, and Network Support.

### **4. Human Resources:**

It is associated with the manpower required to run and manage the system. People are the end user of the information system, end-user use information produced for their own purpose, the main purpose of the information system is to benefit the end user. The end user can be accountants, engineers, salespersons, customers, clerks, or managers etc. People are also responsible to develop and operate information systems. They include systems analysts, computer operators, programmers, and other clerical IS personnel, and managerial techniques.



## **INFORMATION SYSTEM RESOURCES**

An **Information System** is generally integrated and co-ordinate a network of components, which combine together to convert data into information. The information system provides access of information when it is required. The information system is a set of the component which generally helps a system.

### **Resources of Information System:**

There are 5 resources of information system which are given below:

#### **1. Hardware:**

The system components which can physically touch – the system unit (tower, desktop, laptop), internal devices and peripheral devices (keyboards and monitors) – are called hardware and it is important to remember that basic definition: The hardware are the parts of the computer that are tangible and can be touched.

Peripheral devices are provided in many other ways, but think of them as hardware that surrounds the system unit. These peripherals devices may be connected by wired or wireless technology to the system unit. Generally peripherals devices communicate with the interior components of the system unit via installed software. The software itself is intangible and can't be touched physically.

#### **2. Software:**

We know that, the hardware needs to know what to do, and that is the role of software. The software may be divided into two types: first system software and second application software. Primary piece of system software is the operating system, such as Windows or iOS, which manages the hardware's operation. Application software is perform for specific tasks, such as handling a spreadsheet, creating a document, or designing a Web page.

#### **3. People:**

The human element is the most important component of information system and the people that are needed to run the system and the procedures they follow so that the knowledge in the huge databases and data warehouses can be turned into learning that can interpret what has happened in the past and guide future action.

#### **4. Data:**

Data is one of the most important component which is generally store in form of information in a database system and a database is a place where data is collected and from which it can be retrieved by querying it using one or more specific criteria. All types of data store in warehouse without knowing whatever form that an organization needs. The databases and data warehouses have assumed even greater importance in information systems with the emergence of "big data," a term for the truly massive amounts of data that can be collected and analyzed.

#### **5. Network:**

The network is defined as a system in which more than the system is connected through a transmission media. It provides an interface to receive a piece of information or send an information. It is also one of the best resources in the information system.

## **MANAGEMENT INFORMATION SYSTEM (MIS)**

### **MEANING**

#### **What is MIS (Management Information System)?**

A management information system (MIS) is a **computer** system of hardware and software that acts as the foundation for an organization's operations. An MIS collects data from various online systems to support management decision-making, analyses the information, and reports data.

In an organization, it is utilized for information coordination, control, analysis, and visualization. People, procedures, and technology are all involved in studying management information systems in an organizational setting. It provides businesses and organizations with technology that facilitates communication and information flow, assisting in issue-solving and giving an organization a competitive edge.

## **Role of MIS**

A management information system (MIS) is a computerized financial data database set up and designed to generate regular reports on operations for all levels of management within a firm. Additionally, specific reports can typically be easily obtained from the system. The major goal of the MIS is to provide managers with feedback on their performance so that upper management can keep an eye on the entire business. The MIS often compares "actual" data to "planned" outcomes and results from the previous year to gauge progress toward goals.

Data from corporate departments and functions are sent to the MIS. Some information is gathered automatically through computer-connected check-out counters, while other information is manually entered at regular intervals. Other reports are acquired using built-in query languages, while routine reports are preprogrammed and performed periodically or on demand. Managers use display functions integrated into the system to check progress at desk-side PCs connected to the MIS by networks. The performance of the company's stock is also tracked and shown by several sophisticated systems.

## **Evolution of MIS**

It's useful to divide the history of management information systems into four or five periods to make sense of its evolution.

### **Mid-1960s to mid-1970s:**

Information systems were centralized during the early years of computerized MIS and were only focused on management and governance requirements. Accounting departments were in charge of most information systems and their reports.

### **Mid-1970s to mid-1980s:**

Even though MIS was still primarily focused on management and oversight, additional departments were starting to take advantage of the technology. The form and scope of additional Information Systems steering groups and user-led initiatives often established projects.

### **Mid-1980s to late 1990s:**

This period saw the growth of centralized information systems and the decentralization of information. Every division has its computer network. Information

management was frequently referred to as "herding cats." A new job to handle the acquisition and operation of various information systems evolved in many businesses during this time.

### **The late 1990s to today:**

Information systems are still closely related to governance and management in the modern period, but they are extensively dispersed and accessible to almost every employee across several platforms. So that a client firm can easily access supplier information and their consumers, in turn, may access that information, many information systems are integrated amongst various companies.

### **Today forward:**

The rapid growth in internet bandwidth has resulted in a significant reliance on cloud computing. Some claim that this heralds a new era in the rise of the worker and that this is the era of management information systems. Nowadays, almost any employee can make educated judgments because of the tools that are easily accessible across several platforms. The distinction between those who create and those who use MIS information is becoming increasingly hazy.

### **Pillars of MIS**

Management, Information, and System comprise MIS's three pillars. These are described further below.



### **Management:**

Art of accomplishing goals via and in collaboration with members of formally established groups. The following are managerial responsibilities:

- Planning
- Organizing
- Staffing
- Directing
- Controlling

**Information:** Data with a context and a meaning, where data is unprocessed information about an entity (entity is the object of interest)

**System:** A group of interconnected elements with a distinct boundary cooperating to accomplish a single objective.

### **COMPONENTS OF MIS**

Five components comprise a management information system: people, business processes, data, hardware, and software. To accomplish corporate goals, each of these components must cooperate.

1. **People:** These are the system users who utilize it to keep track of daily business transactions. The users have typically educated professionals, such as human resource managers and accountants.
2. **Business procedures:** These are generally accepted best practices that instruct users and every other component on how to operate effectively. Users, consultants, and other people create business procedures.
3. **Data:** The daily business transactions that were documented. Data is gathered for banks via transactions like deposits and withdrawals.
4. **Hardware:** Computers, **printers**, networking equipment, and other items make up hardware. The hardware provides the ability to process data. Additionally, networking and printing capabilities are provided.
5. **Software:** These are applications that use hardware to function. System software and applications software are the two main divisions of the software. The operating system is referred to as system software. Applications software describes specialized software used to carry out business operations.

### **OBJECTIVE OF MIS**

The major objectives of an MIS are to assist executives in decisions that further the business's strategy and to implement the organizational structure and dynamics of the firm to manage the organization more effectively and gain a competitive advantage.

Some MIS objectives are as follows:

**Data Capturing:** Data is collected by MIS from various organizational internal and external sources. Data might be captured manually or via computer terminals.

**Processing of Data:** The recorded data is processed to create the necessary information. Data processing includes tasks including calculating, sorting, categorizing, and summarizing.

**Storage of Information:** The processed or unprocessed data is kept in the MIS for further use. Any information that is not immediately needed is preserved as a record for the organization to use later.

**Retrieval of Information:** As and when needed, the management information system gets data from its databases for various users.

**Dissemination of Information:** The organization's users receive information, a finished product of the management information system. It occurs regularly or online via a computer terminal.

### CHARACTERISTICS OF MIS

**System approach:** MIS adheres to the system approach, which denotes a step-by-step procedure for examining a system's operation in the context of the goal for which it was created. It entails having a comprehensive perspective on how organizational subsystems function.

**Management-oriented:** The management-oriented nature of MIS suggests that a top-down MIS design methodology must be used. According to a top-down approach, management needs and business objectives are decided upon at the start of system development. MIS suggests management that works dynamically with system development to reach management decision completeness.

**According to requirements:** The MIS should be designed and developed based on the data that managers need. Strategic planning, management control, and operational control are three separate levels at which the necessary design and development information is found. Accordingly, MIS should address the unique requirements of managers at various levels of an organization's hierarchy.

**Future-focused:** MIS should be designed and developed with the future in mind so that it is not limited to providing only historical data.

**Integrated:** A full MIS combines all its sub-components to deliver the pertinent data to make a wise decision. An essential element of MIS is an integrated system that combines data from several operating domains.

**Common data flows:** This idea underpins several fundamental perspectives on system analysis, including reducing duplication, merging related tasks, and streamlining processes. The increase of common data flow is a sensible and cost-effective idea.

**Long-term planning:** Since MIS entails logical planning for an organization's success, it should always be developed as a long-term plan. The analyst should consider the demands of the business and future-focused analyses when creating MIS.

**Relevant relationship between subsystem planning:** The development of the MIS should be broken down into its associated subsystems. These supporting systems must be useful with careful planning.

**Central database:** Data are presented in tabular form in the central database. This database contains data related to inventories, employees, clients, and other sources of information. The database is responsible for record insertion, deletion, and updating processes.

### **TYPES OF MANAGEMENT INFORMATION SYSTEM (MIS)**

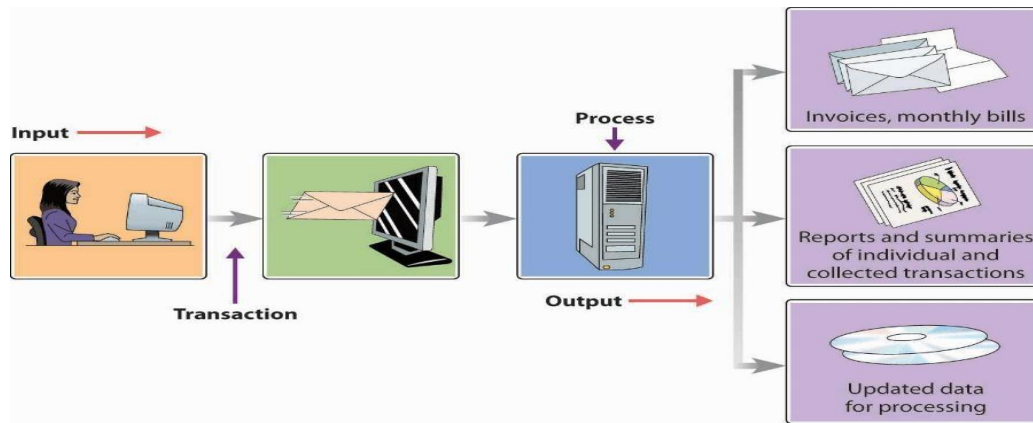
Information systems come in various forms to gather data, provide reports, and aid operational and middle-level managers in making decisions. Depending on the situation, several management information systems are used. Thus, choosing the appropriate MIS type is crucial. Here are some of the often-used MIS kinds explained:

#### **1. Management Reporting System**

It is a database that tracks all the finances and business activities at various management levels. Middle-level managers typically utilize a management reporting system to produce frequent reports by comparing past and present financial performance to assess financial growth. The intermediate-level managers can also use it to analyze their performance. The senior-level managers compare the company's present financial situation and operational effectiveness against the company's established goals using data supplied by the reporting system.

#### **2. Process Control Systems**

This system focuses on physical or industrial business activities, such as car assembly, oil refining, or metal manufacturing. The process control system continuously collects data and produces a report on the system's performance. The report helps the management assess how well the process is working and provides information on when a specific event occurred. Additionally, it reveals how frequently the production system deviates from a cyclical production process. This kind of data is useful for assessing the production system's effectiveness and maintaining control over worker and equipment safety.



### 3. Sales and marketing system

Managers can monitor a company's sales and advertising effectiveness through sales and marketing systems. Through client reviews and comments, marketing systems can generate reports that assist managers in raising the caliber of their products. Marketing managers that utilize sales systems can use reports to learn more about expected sales and assess how they compare to present earnings. They can use this to recognize patterns and develop solutions for future development. These systems can keep track of price discrepancies between products and the current promotions and advertising campaigns that specific retailers use. Managers may use this information to track a product's sales and target additional promotions or discounts.

### 4. Inventory control system

It keeps track of every inventory-related event, such as theft, spoilage, and inventory on hand, enabling management to see which products are selling out more quickly and require restocking, either in specific retail locations or the business warehouse. The movement of inventory into the warehouse, from the warehouse to the stores, sales, and returns are all tracked by the inventory control system.

### 5. Accounting and Finance systems

It keeps track of an organization's assets and investments. It compiles all the information relevant to the financial reports required by law for federal, state, and local taxes, payroll, and pension funds. If the institution publishes yearly reports, the accounting and finance system delivers the reports required for such audits. It also makes it easier to post daily transactions, such as sales revenue, returns, and bank deposits. This method is the foundation for monthly statements like the profit and loss and balance sheets. In addition, these statements assist managers in comparing the company's current financial success to its historical results and setting targets for future expansion.

### 6. Human resources

With the use of this information management system, management may regulate how information is distributed throughout the company. The office automation information system includes electronic tools that managers use to communicate with other

departmental managers, their staff, or even with other employees. Payroll, benefits, and retirement are all financial components of the accounting and financial systems that are tracked by this system. The human resource system also tracks numerous more things. Providing notices of statutory compliance required training sessions, and HR regulations facilitates communication between staff members, HR, and management.



## **7. Decision support system**

Decision support systems collect information from both internal and external sources to assist managers in making business choices. Data from other departments, such as financial data, inventory data, or current sales margins for a quarter, are examples of data from internal sources. External data sources include industry developments, interest rates, and costs with rival businesses or suppliers. When making judgments on building growth, annual work quotas, or new policy creation, a manager may employ a decision support system.

## **8. Executive information system**

The executive information system is made to help executive management oversee executives. By providing information in tables and charts, this system makes it simple for managers to analyze data and make informed judgments.

## **9. Marketing information systems**

The Marketing Information System refers to the systematic gathering, analysis, interpretation, storage, and presentation of market information to marketers regularly and continuously from internal and external sources. It gives marketers important details to decide how best to carry out marketing operations, such as pricing, packaging, new product development, distribution, media, and promotion.



## 10. Transaction system

Transaction process systems capture data during an organization's daily transactional activity. They can also keep an eye on other regular operations like queues of goods or reservations for various commodities. Payroll and other corporate operations involving deposits can be automated with transaction systems.

## 11. School Information management system

A school information system (SIMS) enables a school to operate efficiently. Many schools are utilizing this technology to handle all of the behind-the-scenes operations of a school as well as mold the brains of young people. The school information system has decreased the workload of maintaining and managing student attendance records.

## 12. Enterprise resource planning

A firm uses software or system to plan and manage daily activities like supply chain, manufacturing, services, financials, and other processes. Accounting and procurement, project management, customer relationship management, risk management, compliance, and supply chain operations are just a few tasks that enterprise resource planning software may perform to automate and streamline a company or organization.

## ADVANTAGES OF MIS

**Facilitates planning:** With the size and complexity of organizations growing, managers now work remotely rather than from the place of operations, thanks to the useful information that MIS gives for effective decision-making.

**Minimizes Information Overload:** MIS aid in segmenting data into more manageable, pertinent components for decision-making. As a result, enormous amounts of organized data are less confusing.

**MIS Encourages Decentralization:** Decentralization of power is made possible via MIS. This aids in updating organizational policies and practices. As there are minority systems at lower levels of performance measurement, this is plausible.

**Brings Coordination:** All organizational decision-making nodes are connected through MIS. This guarantees an organization's efficient operation. It helps with the absorption of specialized activity so that each area can understand the needs and difficulties of others.

**Makes Control Easier:** MIS is a crucial instrument connecting managerial planning and control. MIS uses computers to expand data processing and storage capacity while decreasing costs. It improves management's capacity to assess and raise performance.

## **Disadvantages of MIS**

- **Quite expensive to set up and configure:** The main drawback of MIS is that it is extremely expensive to deploy for a business. Numerous hardware and software components are needed for this information system to function.
- **Lack of Flexibility to Update Itself:** MIS can't automatically update itself like many other applications. The system must be manually updated by collecting raw data and putting it into it for processing and updating previously stored data.
- **Risk of fraud:** At every transaction stage, appropriate controls and checks must be made. Any breach could lead to potentially dangerous situations, such as an intruder posting unlawful transactions.
- **Takes into Account only Qualitative Factors:** MIS ignores non-qualitative aspects, including employee morale, attitude, and motivation, in favor of just considering qualitative factors.
- **Heavy reliance on technology:** In computerized information systems, technology is heavily reliant. Information cannot be accessible during any device or software failure until the necessary software or hardware has been replaced.

\*\*\*\*\* UNIT I COMPLETED \*\*\*\*\*

## UNIT-II

Systems approach: System – meaning-characteristics-components- Types - System Development Life Cycle- System Analysis- System Design -Steps in implementing systems. System analyst- Meaning-Functions..

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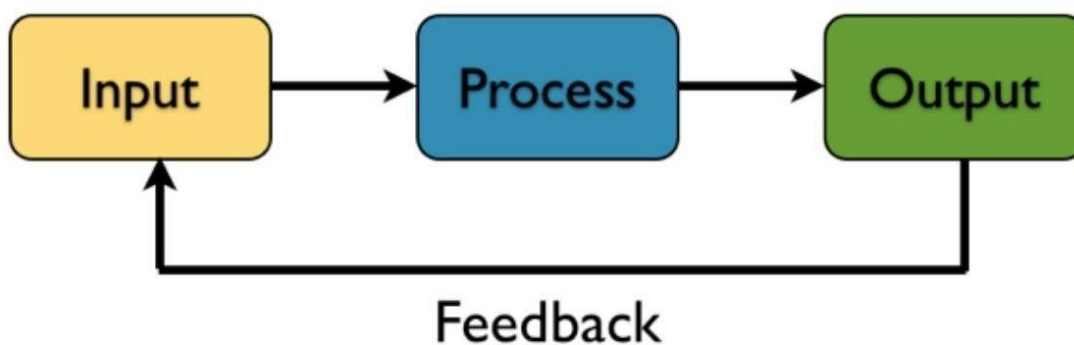
### SYSTEM APPROACH

The **system approach** is based on the generalization that all things are inter-related and inter-dependent with one another. A system is made up of related and dependent elements that form a unique system. A system is simply an assemblage of things to forming a single unit.

One of the most significant characteristics is that it consists of a subsystem hierarchy. These are the components that form the main device, and so on. For instance, it is possible to view the world as a system in which different national economies are sub-systems.

System approach as planning, Organizing and Controlling in MIS

### **System Approach/Theory To Management**



#### **System approach in planning:**

Planning is an essential feature of management. Planning involves deciding what needs to be done, who needs to do it, when to do it, and how to do it in advance. Two phases are part of the preparation process:

- Developing the strategic.
- Formulating the steps which are necessary to accomplish the plan, timing and expense.

#### **System Approach in Organizing:**

Organizing is important for managers because it leads to successful group action. It also helps to keep people working together. The following points are shows about the System Approach in Organizing

-

The good structure of the organization as outlined in the policies and procedure.

- Informal organizing.
- The individual as a device
- The method of organizational contact.
- The power chain.
- The functional method.
- The system for management process.

### **System Approach in Controlling**

- Controlling is necessary because the outcome of the desire needs to be achieved. The most popular approach consists of a three-step procedure
- Setting a performance standard requires the quality of performance we need. Quantitative or qualitative maybe these parameters.
- Performance assessment against this standard is important to assess performance against standards once a standard has been developed.
- Deviation Control-we understand that the first comparison of the norm with real results is made to calculate the deviation.

### **Systems Approach features**

- i. A system consists of elements that interact. It is a set of interrelated and inter-dependent components organized in a way that generates a cohesive whole.
- ii. In their inter-relationships, rather than in isolation from each other, the different subsystems should be examined.
- iii. There is a boundary in an organizational structure that defines which parts are internal and which are external.
- iv. In a vacuum, there is no device. It receives data, materials and energy as inputs from other systems. Inside a system, these inputs undergo a phase of transformation and exit the system as an output to other systems.
- v. As it is sensitive to its environment, an organization is a dynamic structure. In his climate, he is vulnerable to change.

### **SYSTEMS APPROACH MEANING**

Systems approach is a management perspective which advocates that any business problem should be seen as system as a whole which is made up of an hierarchy of sub-systems. So rather than seeing the problem in parts it should be seen as whole. Systems approach can be applied to all the business domains like administration, insurance, banking, hospitality etc.

Though it defines system as a whole but it keeps focus on the subsystems and components as well on their role in the entire system. It is linked closely to Systems Thinking. A defined system has a clear boundary and is separate from the environment. This makes it stand apart to look at the problem and its solution. Each subsystem contributes to making this system as a whole.

### **Features of Systems Approach:**

#### **ADVERTISEMENTS:**

- (i) 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.

(ii) The various sub-systems should be studied in their inter-relationships rather, than in isolation from each other.

(iii) An organisational system has a boundary that determines which parts are internal and which are external.

(iv) 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.

### **System:**

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

## **CHARACTERISTICS OF A SYSTEM**

### **1. Organization:**

It implies structure and order. It is the arrangement of components that helps to achieve objectives.

### **2. Interaction:**

It refers to the manner in which each component functions with other components of the system.

### **3. Interdependence:**

It means that parts of the organization or computer system depend on one another. They are coordinated and linked together according to a plan. One subsystem depends on the output of another subsystem for proper functioning.

4. **Integration:** It refers to the holism of systems. It is concerned with how a system is tied together.

### **5. Central Objective:**

A system should have a central objective. Objectives may be real or stated. Although a stated objective may be the real objective, it is not uncommon for an organization to state one objective and operate to achieve another. The important point is that users must know the central objective of a computer application early in the analysis for a successful design and conversion.

## **COMPONENTS OF SYSTEM**

The system approach envisions the organization as made up five components:

- **Inputs** - Raw Materials, Human Resources, Capital, Information, Technology
- **A Transformational Process** - Employee Work Activities, Management Activities, Operations Methods
- **Outputs** - Products or Services, Financial Results, Information, Human Results
- **Feedback** - Results from outputs influence inputs.

- **The Environment** - These components make up internal and external factors that affect the system.

### **Types Of Information Systems:**

An information system is a group of data sets that ensures that business operates smoothly, embracing change, and helping companies achieve their goal. The dictionary defines an information system as a computer system or set of components for collecting, creating, storing, processing and distributing information. The information system is incomplete without the support of **information technology (IT)** systems.

An information system is not primarily associated with technology or IT system. Instead, it is related to how technology is used to fulfil the needs of- individuals, groups or organizations. In the digital era that we are in, the importance of information systems is increasing because it standardizes the process of passing, collecting, storing, and accessing information or data for individuals or businesses.

There are different types of information systems that help individuals and companies to use the information to their benefit. In the succeeding part of the article, we will discuss various types of information systems in detail.

Although many information systems offer various benefits, typically, businesses use these five applications in their company. Whichever information system you plan to implement in your business, here are the benefits it will offer:

- It will induce innovation in business activities through its research and development.
- It will enable automation, reducing steps undertaken to complete a task.
- It helps keep the hardware, software, data storage, and networking system safe and up to date.

Now that you know the changes information systems can bring about in an organization, let's look at the application that yields the power to change the business process- types of information systems.

## **TYPES**

### **1. Knowledge Work System**

There are different knowledge management systems that an organization implements to ensure a continuous flow of new and updated knowledge into the company and its processes. A knowledge work system (KWS) is one of the knowledge management systems that ease the integration of new information or knowledge into the business process. Furthermore, KWS also offers support and resources to various knowledge creation techniques, artificial intelligence applications, and group collaboration systems for knowledge sharing, among others. It also uses graphics, visuals, etc., to disseminate new information. Below are some of the applications that work on the core fundamentals of KWS.

- Designers often use computer-aided design systems (CAD) to automate their design process.
- Financial workstations are used to analyze huge amounts of financial data with the help of new technologies.
- Virtual reality systems are found in the scientific, education, and business fields for using graphics and different systems to present data.

## **2. Management Information System**

The management information system provides aid to managers by automating different processes that were initially done manually. Business activities like business performance tracking and analysis, making business decisions, making a business plan, and defining workflow. It also provides feedback to the managers by analyzing the roles and responsibilities. A management information system is considered a significant application that helps managers immensely. Here are some of the advantages of the information system:

- It enhances the efficiency and productivity of the company
- It provides a clear picture of the organization's performance
- It adds value to the existing products, introduces innovation and improves product development
- It assists in communication and planning for business processes
- It helps the organization provide a competitive advantage

## **3. Decision Support System**

A decision support system is an information system that analyses business data and other information related to the enterprise to offer automation in decision-making or problem-solving. A manager uses it in times of adversities arising during the operation of the business. Generally, the decision support system is used to collect information regarding revenue, sales figures or inventory. It is used across different industries, and the decision support system is a popular information system.

## **4. Office Automation System**

An office automation system is an information system that automates different administrative processes like documenting, recording data, and office transactions, among others. The office automation system is divided into managerial and clerical activities. Here are some of the business activities that are done under this type of information system:

- Email
- Voice mail
- Word processing

## **5. Transaction Processing System**

The transaction processing system automates the transaction collection, modification, and retrieval process. The peculiar characteristic of this type of information system is that it increases the performance, reliability and consistency of business transactions. It helps businesses perform daily operations smoothly without hassle. Once you are well-versed with different types of information systems, understanding the application of these systems becomes easy to comprehend. Therefore, in the last part of the article, we will look into applying information systems.

## **6. Executive Support System**

An Executive Support System or ESS helps top-level executives to plan and control workflow and make business decisions. It is very similar to Management Information System or MIS. Here are some of the unique characteristics of ESS:

- It provides great telecommunication, better computing capabilities, and effective display options to executives.
- It enables them with information through static reports, graphs, and textual information on demand.

- It helps monitor performances, track competitors' strategies, and forecast future trends, among others.

### SYSTEMS DEVELOPMENT LIFE CYCLE (SDLC)

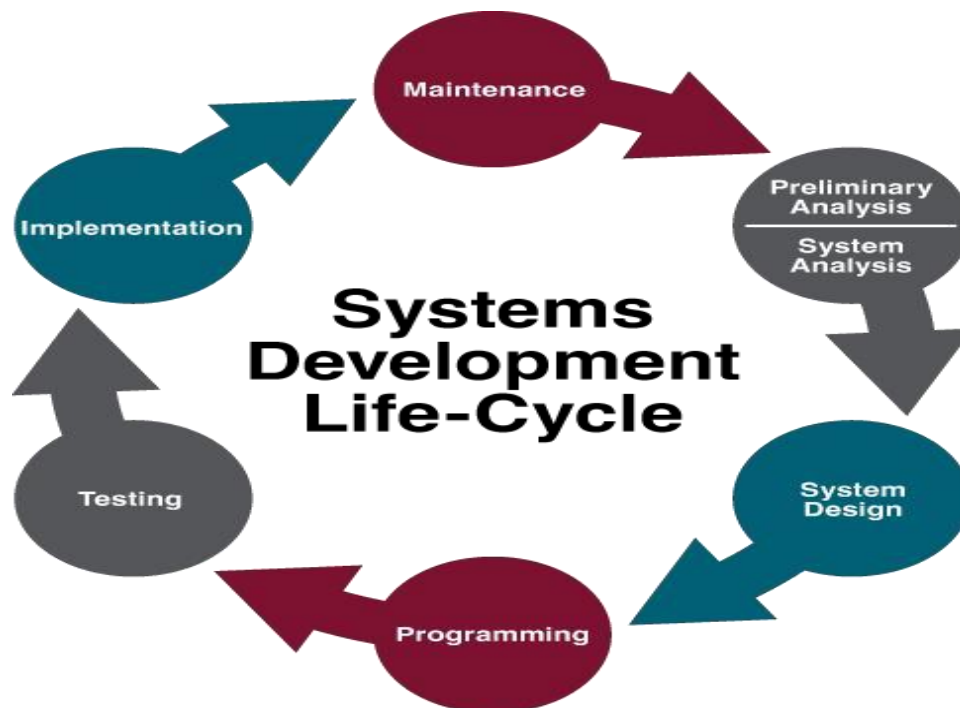
**SDLC** stands for "**Systems Development Life Cycle**". **SDLC** refers to some steps/phases. As its name implies, if an expert develops a system through **SDLC phases** then the life of a developed system will be long.

It's a common phenomenon that any organization who wants to create a new system like machine, tool, logical or physical system, they create the system in such a way so that it will have its long life. To create a new system with its long life, an expert member (system analyst) follows some phases, these phases are known as **SDLC phases**.

The **SDLC phases** are as follows

1. Problem identification
2. Requirement analysis
3. System design
4. Implementation
5. Testing
6. Deployment
7. Maintenance

Following figure shows the phases architecture of system development life cycle –







**The detailed description of the SDLC phases is as follows**

### **1) Problem identification**

This is the first and initial **phase of SDLC**. In this phase, the analyst, identify the actual problem for which they want a solution or create a system. The main concern of this phase is to recognize the real problem, if the problem is significant then the solution will be useful otherwise the solution will not be fruitful or it will be useless. If the experts work on the unrealistic problem then the solution is a waste of time, efforts, costs, etc. So, the problem must be realistic. To identify the problem, the analyst pays more attention to it.

### **2) Requirement analysis**

After getting the problem identification, the next step is to work on requirement analysis. In requirement gathering, the analyst thinks about the solution to a problem. The requirement analysis is a detailed analysis which includes the answer to different questions like –

- What is the problem?
- What is the solution?
- Is solution feasible?
- How much time required solving the problem?
- How it will be resolved?
- How many resources will be required?
- Do we have sufficient resources to solve the problem?
- What kind of environment required by solution?

These are the few key questions for which an analyst finds real solutions. It shows the proper planning to get all solutions in our hands before solving the actual problem. Without proper planning or without knowing the actual problem to work upon its solution or implement a system always fails.

### **3) System design**

System design is a blueprint of the solution. It is similar to before making a car the designers make a sketch of the car and then connect all parts of the car according to its predefined design.

The process follows the steps i.e. first creates logical design and gets design confirmation by top management or decision-makers of the company. During the designing process, if any changes required, analysts redesign it. The changes are easily done because the logical design reflects on papers. So, it is good to make the required changes on papers rather than the physical system. Changes in the physical system always make losses to the company in terms of wastage of time, resources, money, etc. So, logical design is the most important concept of designing. Once they confirm the logical design then the analyst looks after on its physical design.

Physical designing shows the proper connection of different components of the system according to its logical system.

### **4) Implementation**

The implementation shows the final integration of the system. Implementation describes how the product will get converted it into its final form. There are different components associated with the system and during the implementation process, all parts of the system are linked with one another according to a proper plan so that they can work properly and fulfill the objective of the system.

### **5) Testing**

Testing is a process to validate the objective of the system through various steps. It is a mechanism that makes sure that the system is working properly or not. After the implementation of the system, it is tested on different aspects. Different inputs are given and test the output accuracy. The system is also tested on different parameters like accuracy rate, system feasibility, system performance, load balancing, etc.

The testing phase is one of the most important phases of SDLC. Once, experts are 100% sure about the system's smooth-running process, performance, accuracy, etc then only they forward it on the next phase.

### **6) Deployment**

After successful testing of the developed system, it is deployed to the concern candidate or company for which it has designed. Deployment is a process to deploy the new one designed system at clients/customers end.

### **7) Maintenance**

Maintenance is the last and one of the most important phases of SDLC. Maintenance of the system gives long life to the new system. After the successful deployment of the system at clients end, it is compulsory to maintain it from time to time. As, if any system maintains properly then the life cycle of the system increases and the organization can utilize the system for a long time which will be profitable to the companies.

## SYSTEMS ANALYSIS & SYSTEMS DESIGN

Systems development is systematic process which includes phases such as planning, analysis, design, deployment, and maintenance. Here, in this tutorial, we will primarily focus on

- Systems analysis
- Systems design

### **Systems Analysis**

It is a process of collecting and interpreting facts, identifying the problems, and decomposition of a system into its components.

System analysis is conducted for the purpose of studying a system or its parts in order to identify its objectives. It is a problem solving technique that improves the system and ensures that all the components of the system work efficiently to accomplish their purpose.

Analysis specifies **what the system should do**.

### **Systems Design**

It is a process of planning a new business system or replacing an existing system by defining its components or modules to satisfy the specific requirements. Before planning, you need to understand the old system thoroughly and determine how computers can best be used in order to operate efficiently.

System Design focuses on **how to accomplish the objective of the system**. System Analysis and Design (SAD) mainly focuses on –

- Systems
- Processes
- Technology

### **System:**

The word System is derived from Greek word Systema, which means an organized relationship between any set of components to achieve some common cause or objective.

*A system is “an orderly grouping of interdependent components linked together according to a plan to achieve a specific goal.”*

### **Constraints of a System**

A system must have three basic constraints

- A system must have some **structure and behavior** which is designed to achieve a predefined objective.
- **Interconnectivity** and **interdependence** must exist among the system components.
- The **objectives of the organization** have a **higher priority** than the objectives of its subsystems.

For example, traffic management system, payroll system, automatic library system, human resources information system.

**Before implementing an MIS, MIS system must be designed using some certain steps which are as follows**

1. **Preparing organizational plans** - Organizational plan is a process of defining a company's objectives or goal, to prepare companies to plan to aim to find the potential areas and how to do

the task in a strategic manner so that company's objectives can be achieved. After finding desired goals, tasks need to recognize to accomplish these goals. following stages

- Strategic
  - Tactical
  - Operational, and
  - Contingency
2. **Workflow Planning** - Workflow preparation can be divided into two parts:
- Identifying or designing the workflow
  - Executing or scheduling it.

A workflow can be planned using some set of organized activities.

3. **Training of personnel** - It refers to the process of trained staff about operating procedures and standards. It also boosts the efficiency and awareness of employees. Employee training, according to the proposed MIS system, boosts performance, effectiveness, and productivity, as well as morale and work satisfaction.
4. **Application Development** - Application development is an implementation plan which designs as per the system's need.
5. **Acquiring computer hardware** - Acquiring computer hardware is a process to acquire hardware resources.
6. **Designing the format for data collection** - It gives a direction to plan a blueprint of data storage.
7. **Construction of data files** - Data files are the documents that store data into them and can be used for analysis whenever required.
8. **Operation of old and new systems in parallel** - Existing system always gives fruitful direction to implement new ones with good strategies so that beneficial results can be achieved.
9. **Phasing out the old and inducting the new system** - As time goes, new techniques and technology come into existence, due to this change old one system needs to replace to enhance work efficiency and accuracy.
10. **Evaluation, maintenance, and control of the new system** - after implementation system needs to evaluate and can be validated to check whether the system is fulfilling all the necessary systems objectives or not.

**The implementation of MIS involves the following steps,**

1. **Information needs** - It can be examined using information need as per the organization.
2. **MIS Objectives** - MIS Objectives should be transparent in terms of what one wants to do with the information he/she receives. The planning, management control, and continuous flow of information are all related to the scale of the goals.
3. **Determine Sources of information** - Information should be determined at the right time and right place. It may be internal or external.
4. **Information classification** - Accounts, files, statistical articles, and other internal sources, as well as commercial and government journals, are external sources.
5. **Method of giving information** - as its name implies that the method of giving information tells us about the information, its quantity, and formation as per our need.
6. **Cost profit analysis** - It is used to find out the specific profit for the organization.
7. **Evaluation** - Evaluation of MIS is a process in which the performance of an organizational MIS is determined.

### **System Analyst:**

The system analyst is overall responsible for the development of a software. He is the crucial interface between users, programmers and MIS managers. He conducts a system's study, identifies activities and objectives and determines a procedure to achieve the objective. He has a very important role in the development of a system.

A Systems analyst is a person who is overall responsible for development of a software. He is the computer professional charged with analyzing, designing and implementing computer based information systems. He is the crucial interface among users, programmers and MIS managers. A Systems analyst can be defined as follows:

A Systems analyst is a computer specialist who translates business problems and requirements into information systems and acts as liaison between IS (Information Systems) department and rest of the organization.

The analyst conducts a systems study, identifies activities and objectives and determines a procedure to achieve the objectives. He is the key member of both MIS organization and the software project team. He is a person with unique skills, experience, personality and common sense. His role has been emerging with advances in technology.

### **Roles of a Systems Analyst**

The Systems analyst performs the following roles during various phases of SDLC. He works as a:

- **Problem Investigator:** The analyst studies the problems and needs of an organization during feasibility and requirements analysis phases of SDLC. He visits the various departments of the organization and interviews the users. He analyses the problems of the current system and collects their new requirements. The analyst initially works as an investigator by extracting the real problems of the users.
- **Problem Solver:** The analyst solves the problems of the current system faced by the users. He determines how people, method and technology can improve the current system. After feasibility analysis, he presents the system proposal to the management.
- **Systems Designer:** The analyst creates a detailed physical (current) and logical (proposed) design of the system.
- **Motivator:** The analyst motivates users to participate in development and implementation of the proposed system. This helps to understand user's feelings about the proposed system. The analyst interprets the thoughts of users and hence, draws conclusions. He appeals management and users for getting the support in development and implementation of the proposed system.
- **Project Manager:** The analyst monitors the development and implementation of software in relation to quality, cost and time. He works with the project leader for managing the project properly. For development of small systems, the Systems analyst is generally the project leader.

### **Functions:**

- **Qualified:** The analyst must be highly qualified in software technology. Besides software, he should have a good knowledge of hardware and latest communication and networking technology. He must have a thorough awareness about the working (manual and computerized) of financial accounting, sales and marketing, invoicing, inventory control, production and other information systems of different organization.
- **Analytical Thinker:** The analyst must be capable to extract real problems of the users by analyzing the existing system. He is expected to provide the best solutions to the problems. He should be able to provide more than one solution to a single problem so that the users can select the best one. The systems analyst must be capable of tackling any problem of the user. He must be a problem solver and not a problem creator.
- **Good Communicator:** The analyst must have a good communication and presentation skills. He must have an excellent command on the language which the user can understand. There should not be any communication gap between the systems analyst and users.
- **Experienced:** The analyst should be experienced in both information and management technologies. He should be associated with all types of business concerns ( viz., Manufacturing, Trading, Financial,

etc.). The present day systems analysts are expected to possess a good experience in development of software using 4GLS (such as Oracle, Sybase, etc.) and object-oriented languages (such as C++).

- **Creator:** The analyst should possess excellent creativity skills that help to convert ideas of the users into concrete plans. He/she should be capable of creating plans and designing systems by drawing diagrams, charts and other illustrations.
- **Trainer:** The analyst should be a good teacher for educating and training users in computer based information systems.

\*\*\*\*\* UNIT II COMPLETED \*\*\*\*\*

### UNIT III

Transaction Processing System- Meaning – Importance- Components. Decision Making – Meaning - Types – Decision Support System (DSS) – Characteristics – Components – Expert System (ES) – Components – Applications – Introduction to Artificial Intelligence

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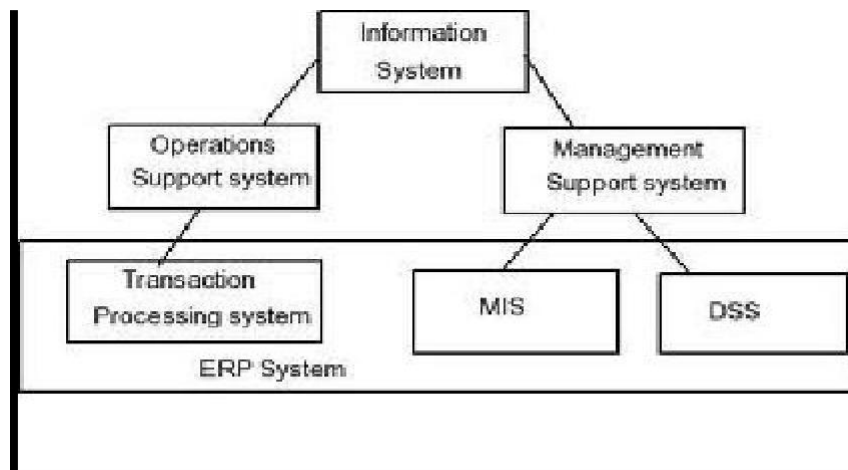
#### TRANSACTION PROCESSING SYSTEM

##### Meaning:

It is an information processing system that captures and processes every single transaction that takes place within the organization. These transactions include activities involving collection, retrieval, modification, and all other sets of activities that trigger the retrieval of all transactions. A transaction processing system is highly reliable, consistent, and efficient. Transaction processing systems may also be referred to as real-time processing systems.

Transaction processing is often compared with batch processing. These two are fundamentally different processing systems that vary in their speed, processing manner, and accuracy of the events.

Since a TPS is a real-time processing system, all the events and transactions that occur in the organization or over the system are processed immediately causing no delay. It is one of the most used technologies in all online transactions and is called an Online Transaction Processing System (OLTP).



Transaction Processing System (TPS) An Information system that processes data arising from the occurrence of business transactions.

Transaction processing systems (TPS) are aimed at improving the routine business activities on which all organizations depend. A transaction is any event or activity that affects the organization which occur as part of doing business, such as sales, purchases, deposit, withdrawals, refunds and payments.

Common transactions include placing orders, billing customers, hiring, employees, and depositing cheque. The types of transactions that occur vary from organization to organization.

Transaction processing, the set of procedures for handling the transactions,— often includes the activities like calculation, storage and retrieval, classification, summarization, sorting. Transaction processing procedures are often called standard operating— procedures.

Example: The routines associated with general banking transactions typify the use of standard operating procedures for the handling of deposits and withdraws, cashing of cheques, and other processes

### **IMPORTANCE OF TRANSACTION PROCESSING SYSTEM**

An ideal TPS is crucial in taking care of the following two aspects:

#### **1 Handling and Managing Operations**

TPS is an excellent technology in handling and managing the everyday operations of any given organization. It allows multitasking at a wider level with an unmatched ability to process thousands of transactions at the same time without any delay or break-down.

#### **2 Tapping the Raw Markets**

TPS is a carrier tool for any business since it gives businesses the freedom to operate in different segments of society by working remotely. This operability gives the businesses an opportunity to tap, exist and grow in newer markets that are raw and full of opportunities.

### **Different Types of Transaction Processing System**

There are basically two types of transaction processing:

#### **1 Batch Processing**

As the name suggests, the processing of transactions takes place over batches. These batches can be customized as per organization requirements. For example, a company may want to process the payroll of its employees in a weekly or bi-weekly manner, thus the batches of employee salaries will be processed over a span of one and two weeks respectively. There is generally a time delay in this type of processing.



## 2 Real-time Processing

Under real-time processing, every single transaction is processed with immediate effect. There is no time delay in the real-time processing system.

### **COMPONENTS OF A TRANSACTION PROCESSING SYSTEM (TPS)**

Following are the **4 major components** of an ideal TPS:

1. **Inputs:** The source documents fetched from the transactions made by customers or organizations and contain information regarding money. These may be bills, invoices, coupons, customer orders, etc.
2. **Outputs:** The documents generated after the complete processing of the inputs are called outputs.
3. **Processing units:** Processing refers to the step where the information provided at the input step is broken down into segments to be processed into relevant output.
4. **Storage:** The location in the memory where all the desired information is stored is called memory. Generally, the information is stored in the form of ledgers.

### **Functions of a TPS(Transaction Processing System):**

The main functions of a TPS are conducted by the above-mentioned primary components. These include:

1. **Input functions:** Securing and inputting the data of the transactions that have taken place
2. **Output functions:** Producing the report and record of the input data to be used for future references and validating the transaction
3. **Storage functions:** Storing the data from both input and output operations and ensuring the availability of data for operations like information access, retrieval, sorting, and updating.
4. **Processing functions:** Computing, calculating, sorting, and defining the input data to get the desired results.

### **DECISION-MAKING**

- Decision-making is a cognitive process that results in the selection of a course of action among several alternative scenarios.
- Decision-making is a daily activity for any human being. There is no exception about that. When it comes to business organizations, decision-making is a habit and a process as well.
- Effective and successful decisions result in profits, while unsuccessful ones cause losses. Therefore, corporate decision-making is the most critical process in any organization.

- In a decision-making process, we choose one course of action from a few possible alternatives. In the process of decision-making, we may use many tools, techniques, and perceptions.
- In addition, we may make our own private decisions or may prefer a collective decision.
- Usually, decision-making is hard. Majority of corporate decisions involve some level of dissatisfaction or conflict with another party. Let's have a look at the decision-making process in detail.

## Decision-Making Process

Following are the important steps of the decision-making process. Each step may be supported by different tools and techniques.



### Step 1 – Identification of the Purpose of the Decision

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

- What exactly is the problem?
- Why the problem should be solved?
- Who are the affected parties of the problem?

- Does the problem have a deadline or a specific time-line

## **Step 2 – Information Gathering**

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

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

## **Step 3 – Principles for Judging the Alternatives**

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

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

## **Step 4 – Brainstorm and Analyze the Choices**

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

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

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

## **Step 5 – Evaluation of Alternatives**

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

## **Step 6 – Select the Best Alternative**

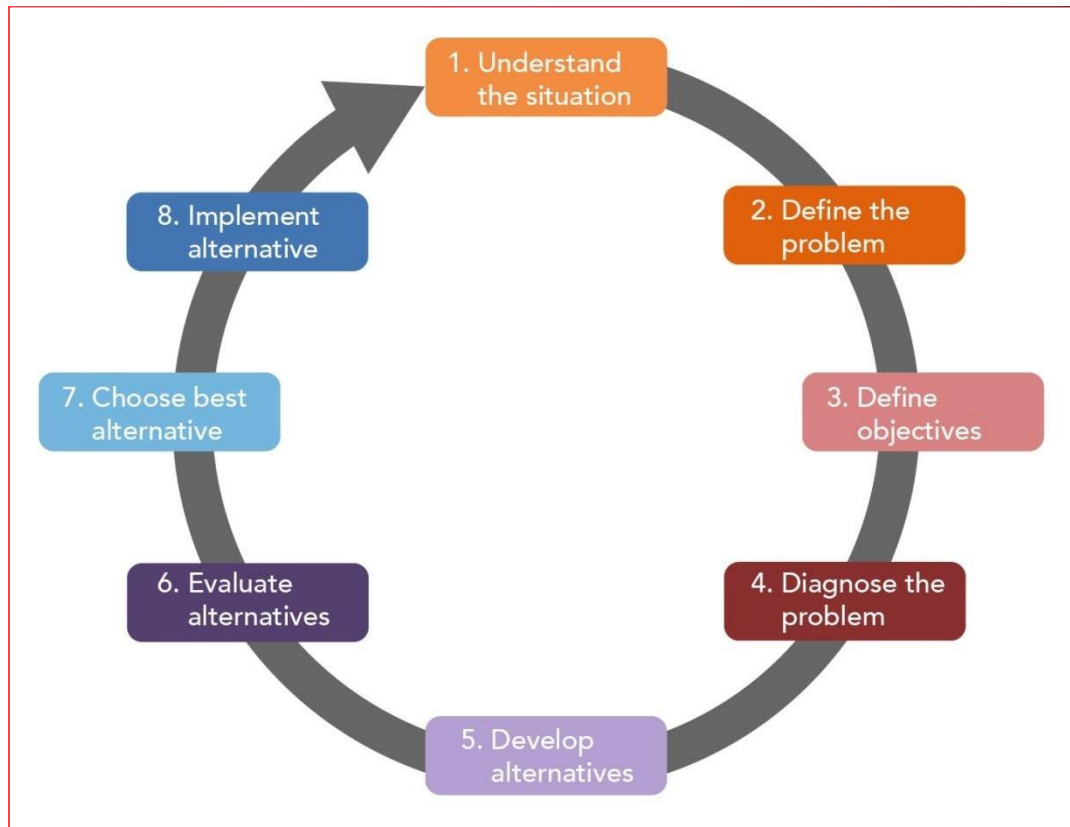
Once you go through from Step 1 to Step 5, this step is easy. In addition, the selection of the best alternative is an informed decision since you have already followed a methodology to derive and select the best alternative.

## Step 7 – Execute the decision

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

## Step 8 – Evaluate the Results

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



## Process and Modeling in Decision-Making

There are two basic models in decision-making –

- Rational models
- Normative model

The rational models are based on cognitive judgments and help in selecting the most logical and sensible alternative. Examples of such models include - decision matrix analysis, Pugh matrix, SWOT analysis, Pareto analysis and decision trees, selection matrix, etc.

A rational decision making model takes the following steps –

- Identifying the problem,
- Identifying the important criteria for the process and the result,
- Considering all possible solutions,

- Calculating the consequences of all solutions and comparing the probability of satisfying the criteria,
- Selecting the best option.

The normative model of decision-making considers constraints that may arise in making decisions, such as time, complexity, uncertainty, and inadequacy of resources. According to this model, decision-making is characterized by –

- Limited information processing - A person can manage only a limited amount of information.
- Judgmental heuristics - A person may use shortcuts to simplify the decision making process.
- Satisfying - A person may choose a solution that is just "good enough".

### **Dynamic Decision-Making**

- ❖ Dynamic decision-making (DDM) is synergetic decision-making involving interdependent systems, in an environment that changes over time either due to the previous actions of the decision-maker or due to events that are outside of the control of the decision-maker.
- ❖ These decision-makings are more complex and real-time.
- ❖ Dynamic decision-making involves observing how people used their experience to control the system's dynamics and noting down the best decisions taken thereon.

### **Sensitivity Analysis**

- ❖ Sensitivity analysis is a technique used for distributing the uncertainty in the output of a mathematical model or a system to different sources of uncertainty in its inputs.
- ❖ From business decision perspective, the sensitivity analysis helps an analyst to identify cost drivers as well as other quantities to make an informed decision.
- ❖ If a particular quantity has no bearing on a decision or prediction, then the conditions relating to quantity could be eliminated, thus simplifying the decision making process.

Sensitivity analysis also helps in some other situations, like –

- Resource optimization
- Future data collections
- Identifying critical assumptions
- To optimize the tolerance of manufactured parts

## Static and Dynamic Models

### Static models:

- Show the value of various attributes in a balanced system.
- Work best in static systems.
- Do not take into consideration the time-based variances.
- Do not work well in real-time systems however, it may work in a dynamic system being in equilibrium
- Involve less data.
- Are easy to analyze.
- Produce faster results.

### Dynamic models :

- Consider the change in data values over time.
- Consider effect of system behavior over time.
- Re-calculate equations as time changes.
- Can be applied only in dynamic systems.

## Group Decision-Making

- ❖ In group decision-making, various individuals in a group take part in collaborative decision-making.
- ❖ Group Decision Support System (GDSS) is a decision support system that provides support in decision making by a group of people. It facilitates the free flow and exchange of ideas and information among the group members. Decisions are made with a higher degree of consensus and agreement resulting in a dramatically higher likelihood of implementation.

Following are the available types of computer based GDSSs

- **Decision Network** – This type helps the participants to communicate with each other through a network or through a central database. Application software may use commonly shared models to provide support.
- **Decision Room** – Participants are located at one place, i.e. the decision room. The purpose of this is to enhance participant's interactions and decision-making within a fixed period of time using a facilitator.
- **Teleconferencing** – Groups are composed of members or sub groups that are geographically dispersed; teleconferencing provides interactive connection between two or more decision rooms. This interaction will involve transmission of computerized and audio visual information.

## DECISION SUPPORT SYSTEM

- ❖ Decision support systems (DSS) are interactive software-based systems intended to help managers in decision-making by accessing large volumes of information generated from various related information systems involved in organizational business processes, such as office automation system, transaction processing system, etc.
- ❖ DSS uses the summary information, exceptions, patterns, and trends using the analytical models. A decision support system helps in decision-making but does not necessarily give a decision itself. The decision makers compile useful information from raw data, documents, personal knowledge, and/or business models to identify and solve problems and make decisions.

### **Programmed and Non-programmed Decisions**

There are two types of decisions - programmed and non-programmed decisions.

#### **Programmed decisions are basically automated processes, general routine work, where –**

- These decisions have been taken several times.
- These decisions follow some guidelines or rules.

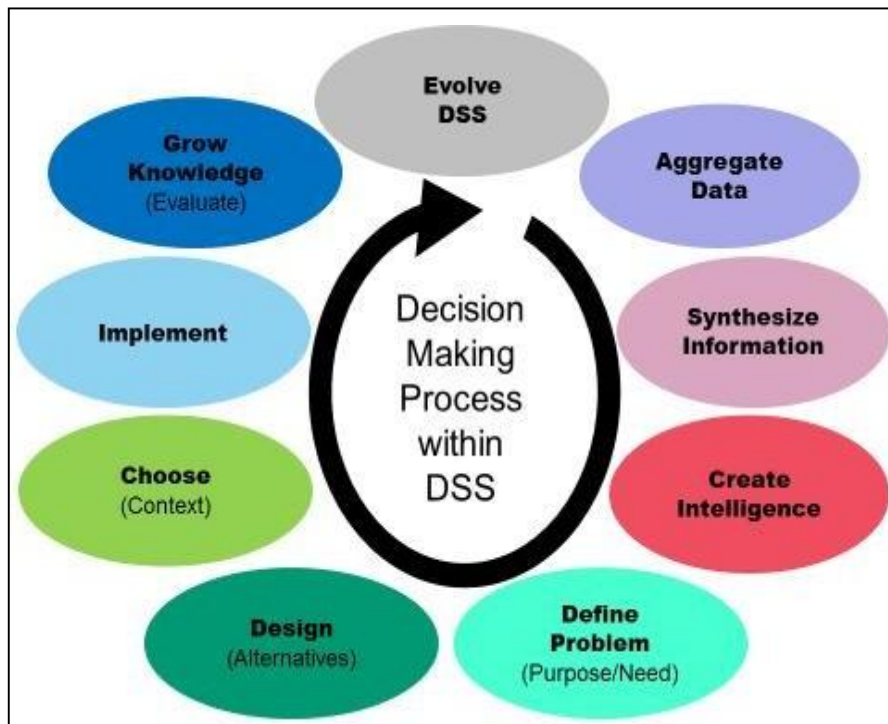
For example, selecting a reorder level for inventories, is a programmed decision.

#### **Non-programmed decisions occur in unusual and non-addressed situations, so –**

- It would be a new decision.
- There will not be any rules to follow.
- These decisions are made based on the available information.
- These decisions are based on the manager's discretion, instinct, perception and judgment.

For example, investing in a new technology is a non-programmed decision.

Decision support systems generally involve non-programmed decisions. Therefore, there will be no exact report, content, or format for these systems. Reports are generated on the fly.



### Attributes of a DSS

- Adaptability and flexibility
- High level of Interactivity
- Ease of use
- Efficiency and effectiveness
- Complete control by decision-makers
- Ease of development
- Extendibility
- Support for modeling and analysis
- Support for data access
- Standalone, integrated, and Web-based

### CHARACTERISTICS OF A DSS

- ❖ Support for decision-makers in semi-structured and unstructured problems.
- ❖ Support for managers at various managerial levels, ranging from top executive to line managers.
- ❖ Support for individuals and groups. Less structured problems often requires the involvement of several individuals from different departments and organization level.
- ❖ Support for interdependent or sequential decisions.
- ❖ Support for intelligence, design, choice, and implementation.
- ❖ Support for variety of decision processes and styles.
- ❖ DSSs are adaptive over time.



## **Benefits of DSS**

- Improves efficiency and speed of decision-making activities.
- Increases the control, competitiveness and capability of futuristic decision-making of the organization.
- Facilitates interpersonal communication.
- Encourages learning or training.
- Since it is mostly used in non-programmed decisions, it reveals new approaches and sets up new evidences for an unusual decision.
- Helps automate managerial processes.

## **COMPONENTS OF A DSS**

Following are the components of the Decision Support System –

- **Database Management System (DBMS)** – To solve a problem the necessary data may come from internal or external database. In an organization, internal data are generated by a system such as TPS and MIS. External data come from a variety of sources such as newspapers, online data services, databases (financial, marketing, human resources).
  - **Model Management System** – It stores and accesses models that managers use to make decisions. Such models are used for designing manufacturing facility, analyzing the financial health of an organization, forecasting demand of a product or service, etc.
- Support Tools** – Support tools like online help; pulls down menus, user interfaces, graphical analysis, error correction mechanism, facilitates the user interactions with the system.

## **Types of DSS**

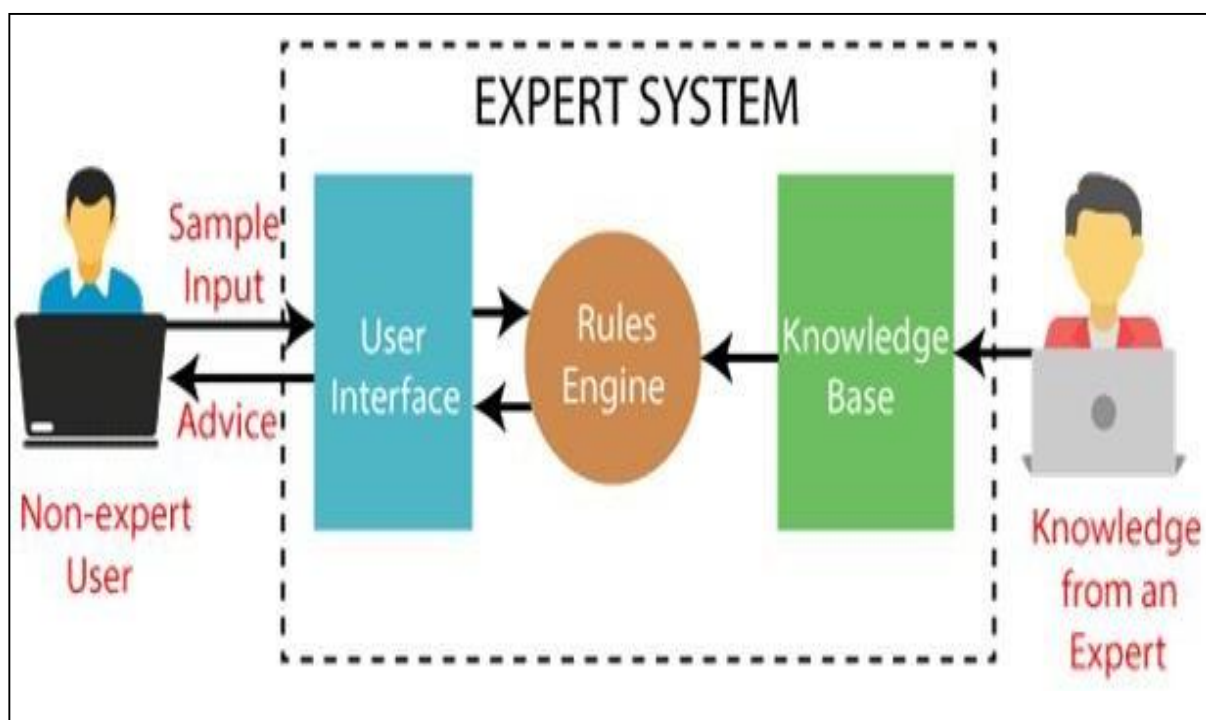
Following are some typical DSSs –

- **Status Inquiry System** – It helps in taking operational, management level, or middle level management decisions, for example daily schedules of jobs to machines or machines to operators.
- **Data Analysis System** – It needs comparative analysis and makes use of formula or an algorithm, for example cash flow analysis, inventory analysis etc.
- **Information Analysis System** – In this system data is analyzed and the information report is generated. For example, sales analysis, accounts receivable systems, market analysis etc.
- **Accounting System** – It keeps track of accounting and finance related information, for example, final account, accounts receivables, accounts payables, etc. that keep track of the major aspects of the business.

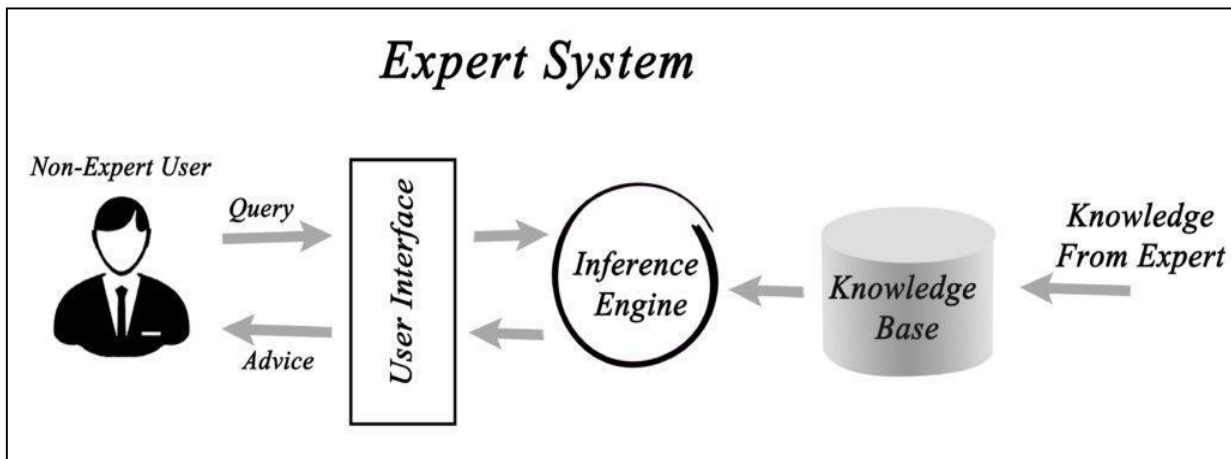
- **Model Based System** – Simulation models or optimization models used for decision-making are used infrequently and creates general guidelines for operation or management.

### EXPERT SYSTEM

An **expert system** is the highest form of automation of the management computing office which allows document communication and manipulation. Decision support systems help with problem-solving by allowing data and model manipulation. **Expert systems** go beyond conventional manipulation of this kind, as they allow experts to 'teach' computers about their fields so that fewer expert decision-makers can support the system more of the decision-making process.



**Expert systems** are one of the most cutting-edge information technology facts. That is, in some of the most complex and least-understood human information handling tasks, i.e. decision-making, problem-solving, diagnosis and learning, they help people. We do this by holding a large amount of factual information on a subject area, along with lines of reasoning employed in that field by human experts.



### Expert System Components

The key components of Expert System are as followings,

◆ **UserInterface:**

It contains a computerized system between the user and the machine for friendly communication. This system provides an interface to the user in a graphical way.

◆ **InterferenceEngine:**

It regains & determines the data process. It performs this task to deduce new facts which are subsequently used to draw further conclusions. This component is associated with an expert system as the brain of the expert system.

◆ **KnowledgeBase:**

This is the most important element of an expert system because it holds the expert's knowledge of problem-solving. It is here that the expert's elicited knowledge is stored. It contains the rules, facts and object descriptions, etc. The knowledge base is always stored in the data with the newest expert system products. The knowledgebase information is all that is needed to understand & formulate the problem, and then solve it.

◆ **DataAcquisitionSubsystem:**

The specialist has to learn the information reflected in the knowledge base. Information acquisition software is used by a person who has problem experience to build, incorporate or modify the base of knowledge. Potential knowledge sources include human experts, research reports, textbooks, databases and the experience of the user himself.

## EXPERT SYSTEM APPLICATIONS

outlines the generic areas of ES applications where ES can be applied. Application areas include classification, diagnosis, monitoring, process control, design, scheduling and planning, and generation of options.

- ◆ **Classification** - identify an object based on stated characteristics
- ◆ **Diagnosis Systems** - infer malfunction or disease from observable data
- ◆ **Monitoring** - compare data from a continually observed system to prescribe behaviour
- ◆ **Process Control** - control a physical process based on monitoring
- ◆ **Design** - configure a system according to specifications
- ◆ **Scheduling & Planning** - develop or modify a plan of action
- ◆ **Generation of Options** - generate alternative solutions to a problem

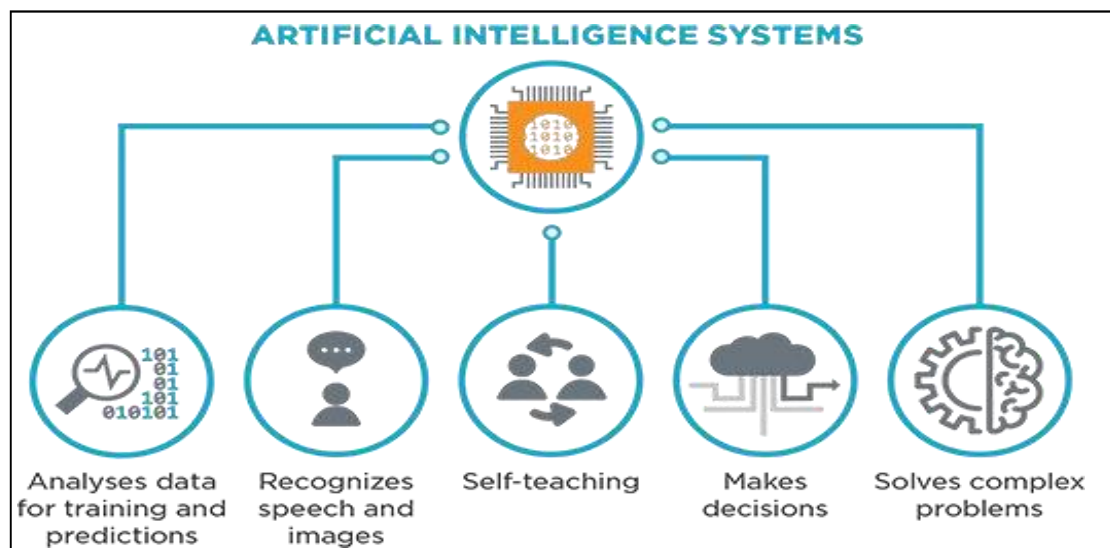
### INTRODUCTION TO ARTIFICIAL INTELLIGENCE (AI):

- The Artificial Intelligence tutorial provides an introduction to AI which will help you to understand the concepts behind Artificial Intelligence. In this tutorial, we have also discussed various popular topics such as History of AI, applications of AI, deep learning, machine learning, natural language processing, Reinforcement learning, Q-learning, Intelligent agents, Various search algorithms, etc.
- Our AI tutorial is prepared from an elementary level so you can easily understand the complete tutorial from basic concepts to the high-level concepts.

### Artificial Intelligence

- ❖ In today's world, technology is growing very fast, and we are getting in touch with different new technologies day by day.
- ❖ Here, one of the booming technologies of computer science is Artificial Intelligence which is ready to create a new revolution in the world by making intelligent machines. The Artificial Intelligence is now all around us. It is currently working with a variety of subfields, ranging from general to specific, such as self-driving cars, playing chess, proving theorems, playing music, Painting, etc.
- ❖ AI is one of the fascinating and universal fields of Computer science which has a great scope in future. AI holds a tendency to cause a machine to work as a human.
- ❖ Artificial Intelligence is composed of two words **Artificial** and **Intelligence**, where Artificial defines "*man-made,*" and intelligence defines "*thinking power*", hence AI means "*a man-made thinking power.*"

- ❖ "It is a branch of computer science by which we can create intelligent machines which can behave like a human, think like humans, and able to make decisions."
- ❖ Artificial Intelligence exists when a machine can have human based skills such as learning, reasoning, and solving problems
- ❖ With Artificial Intelligence you do not need to preprogram a machine to do some work, despite that you can create a machine with programmed algorithms which can work with own intelligence, and that is the awesomeness of AI.
- ❖ It is believed that AI is not a new technology, and some people says that as per Greek myth, there were Mechanical men in early days which can work and behave like humans.



## Artificial Intelligence

Before Learning about Artificial Intelligence, we should know that what is the importance of AI and why should we learn it. Following are some main reasons to learn about AI:

- ❖ With the help of AI, you can create such software or devices which can solve real-world problems very easily and with accuracy such as health issues, marketing, traffic issues, etc.
- ❖ With the help of AI, you can create your personal virtual Assistant, such as Cortana, Google Assistant, Siri, etc.
- ❖ With the help of AI, you can build such Robots which can work in an environment where survival of humans can be at risk.
- ❖ AI opens a path for other new technologies, new devices, and new Opportunities.

## Goals of Artificial Intelligence

Following are the main goals of Artificial Intelligence:

1. Replicate human intelligence
2. Solve Knowledge-intensive tasks
3. An intelligent connection of perception and action
4. Building a machine which can perform tasks that requires human intelligence such as:
  - Proving a theorem
  - Playing chess
  - Plan some surgical operation
  - Driving a car in traffic
5. Creating some system which can exhibit intelligent behavior, learn new things by itself, demonstrate, explain, and can advise to its user.

\*\*\*\*\* UNIT III COMPLETED \*\*\*\*\*

## UNIT -IV

Office Automation System (OAS) – Meaning-Benefits. Executive Information Systems (EIS) – Components – Advantages. Functional Information System for Business – Marketing Information System – Human Resource Information System – Production / Manufacturing Information System – Accounting Information System. Finance Information System.

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### OFFICE AUTOMATION SYSTEM

First things first, let's define what office automation means. Office automation is a general term that describes the different types of computer systems and software that are used to collect digitally, store, transfer, alter and utilise office information to execute tasks. In essence, office automation helps to manage data.

Office automation allows data to move without human intervention. Since humans are left out of the equation, there is no risk of manual error. What once began with a typewriter has evolved into a myriad of automation and electronic tools that have changed how people work.

#### **Office Automation basics:**

There are a lot of different aspects of office automation, but they can be easily divided into the following categories:

- **Information storage:** This includes the recording of information, like forms, documents, files, images and spreadsheets. Information storage generally exists in formats of word processors or spreadsheets, but it can also be more sophisticated like records in a CMS or automation software tool like SolveXia.
- **Data exchange:** Systems allow for the real-time exchange of information, such as fax machines or emails. Automation software tools also fit into this category as you can easily share information and send reports between people.
- **Data management:** Office automation must also be easily manageable between different parties and relevant information. As such, office automation systems can handle short-term and long-term data, including financial plans, marketing expenditures, inventory management, etc.

### OFFICE AUTOMATION BENEFITS

Businesses rely on a little or a lot of office automation tools. Regardless of the extent, the benefits are expansive, namely:

- Reduction of manual effort to achieve tasks
- Minimization of human and manual errors
- Decreased processing time for task completion
- Enhanced transparency and process improvement abilities
- Better decision-making based on data and forecasts
- Enhanced metrics and KPI monitoring
- Increased employee satisfaction and communication
- Results in better customer service

## The necessary pieces to automate:

When bringing automation into your organisation, you will face two big decisions. For starters, what do you want to automate? Secondly, what tool is the right tool to do the trick?

There are primary important change management considerations that should be addressed when introducing a new technology tool which includes: an understanding of the tool itself/its purpose, adequate training / a positive mindset on behalf of those who will use it.

Let's take a look at how to accomplish all of this.

### 1. Choosing the Right Tool

The best automation tools have a lot of necessary attributes. Here is how automation tools can assist your business, such as Solvexia, a human analytical automation tool.

- **Easy workflow design:** Automation tools should make your employees' lives easier and not more complicated. This means that workflows and their design should be intuitive to use. The tool can complete your internal processes like account reconciliation, for example, without requiring an IT team or anyone to code the procedure. Instead, you can choose from a library of commands and put together any process easily.
- **Mobile compatibility:** These days, employees and business leaders are always on the go. Having a tool that is mobile compatible and accessible means that you don't miss any exchange of information when you are out of the office or away from your computer.
- **Software integration:** You probably already have office automation tools working for your business. Whether it be Slack, Google Sheets, Dropbox, Salesforce, Mailchimp or any other software, it's best when these tools can speak to one another.
- **Reports and analytics:** You'll want to be able to measure if your tools are working in your favour consistently. Software solutions with reports and analytics can take care of this management aspect for you. Not only will these tools provide analytics based on your data and day-to-day business, but you can also create internal reports that show how many hours have been spent on one task, for example.
- **Access control:** With any software that touches data, one of the most critical considerations is control and security. Tools like SolveXia allow for access control, meaning that you can restrict and grant access to only those who should have it. You are also able to see who made any change to data and when so that audit trails are valid and accurate.

### 2. Providing Proper Training

The right tool works only when people are on board. For those in your organisation who manage different processes, automation tools will help alleviate the burden of any manual and repetitive tasks. It first requires proper training and understanding of how the tool works. The best software on the market not only design for easy to use interfaces, but they also provide training and support.

Proper training works best for those who are open to it. As a business leader, you can help to support a culture that is open to change and constant improvement. One way to do this is to practice continuous process improvement.



## **Types of office automation tools:**

Office automation spans all aspects of a business' operations virtually. There are tools to support:

### **Facility Management:**

Gain the ability to grant or deny access to your facilities remotely. Example: Kisi

- Access management
- Visitor management
- Service
- Membership
- Room scheduling

### **Staffing:**

Use automation to onboard employees and approve contracts. Example: Workable

- Contracts
- Hiring
- Rostering
- Onboarding

### **Productivity:**

Store, share and collaborate regarding notes and essential information. Zapier can connect various productivity apps to talk to one another.

- Notes
- Office supplies
- Events catering

### **Communication:**

Try Google's suite for emails and document sharing.

- Responding to enquiries
- Writing fewer emails

### **Administrative:**

Use software tools like SolveXia to manage repetitive tasks, consolidate data from all legacy systems in one place, automate accounting and real-time analysis plus more.

- Collect and organise data
- Streamline repetitive tasks
- Less time on paperwork
- On top of billing, expenses and invoicing

## **Appointments and Scheduling:**

Avoid back and forth, emailing for scheduling. Instead, try a tool like Calendly that can help automate schedules.

- Schedule appointments automatically
- Emails before and after appointments

## **EXECUTIVE INFORMATION SYSTEM (EIS)**

An **Executive Information System (EIS)** is a kind of decision support system (DSS) used in organizations to help executives in decision making. It does so by providing easy access to important data needed in an organization to achieve strategic goals. An **EIS** usually has graphical displays on a user-friendly interface.

Executive information systems can be used for monitoring company performance in many different types of organizations as well as for identifying opportunities and problems.

Early executive information systems were developed on mainframe computers as computer-based programs to provide the description, sales performance and/or market research data for senior executives of a company. Executives, however, were not all literate or confident about the computers. Also, **EIS** data endorsed only executive-level decisions that did not necessarily support the entire company or enterprise.

Current **EIS** data is available on local area networks (LANs) throughout the company or enterprise, facilitated by personal computers and workstations. Employees can access company data to help make decisions in their workplaces, departments, divisions, etc. This enables employees to provide relevant information and ideas above and below the level of their company.

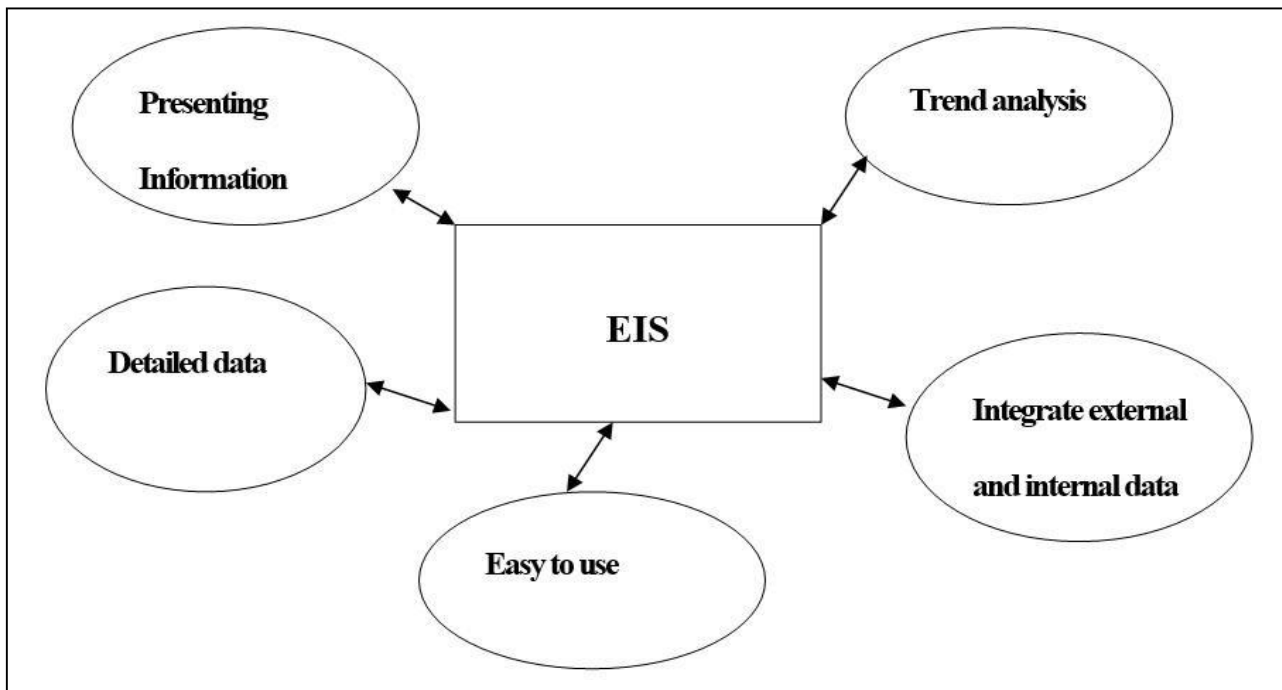
Executive support systems are intended to be used directly by senior managers to support unscheduled strategic management decisions. Often such information is external, unstructured and even uncertain. Often, the exact scope and context of such information are not known in advance.

This information is based on data,

- Business intelligence
- Financial intelligence
- Data with technology support to analyze

Executive Information System-Key Characteristics

The below mentioned figure describes about **key characteristics of EIS**,



- ❖ **Detailed data** – EIS provides absolute data from its existing database.
- ❖ **Integrate external and internal data** – EIS integrates external and internal data. The external data collected from various sources.
- ❖ **Presenting information** – EIS represents available data in graphical form which helps to analyze it easily.
- ❖ **Trend analysis** – EIS helps executives of the organizations to data prediction based on trend data.
- ❖ **Easy to use** – It is a very simplest system to use.

### Advantages of EIS

- Trend Analysis
- Improvement of corporate performance in the marketplace
- Development of managerial leadership skills
- Improves decision-making
- Simple to use by senior executives
- Better reporting method
- Improved office efficiency

### Disadvantage of EIS

- Due to technical functions, not to easy to use by everyone
- Executives may encounter overload of information
- Difficult to manage database due to the large size of data
- Excessive costs for small business organizations

### COMPONENTS

EIS components can typically be classified as:

- Hardware
- Software
- User interface
- Telecommunications

## **Hardware**

When talking about computer hardware for an EIS environment, we should focus on the hardware that meets the executive's need. The executive must be put first and the executive's needs must be defined before the hardware can be selected. The basic hardware needed for a typical EIS includes four components:

1. Input data-entry devices. These devices allow the executive to enter, verify, and update data immediately
2. The central processing unit (CPU), which is the most important because it controls the other computer system components
3. Data storage files. The executive can use this part to save useful business information, and this part also helps the executive to search historical business information easily
4. Output devices, which provide a visual or permanent record for the executive to save or read. This device refers to the visual output device such as monitor or printer

In addition, with the advent of local area networks (LAN), several EIS products for networked workstations became available. These systems require less support and less expensive computer hardware. They also increase EIS information access to more company users.

## **Software**

Choosing the appropriate software is vital to an effective EIS.<sup>[citation needed]</sup> Therefore, the software components and how they integrate the data into one system are important. A typical EIS includes four software components:

1. Text: handling software—documents are typically text-based
2. Database: heterogeneous databases on a range of vendor-specific and open computer platforms help executives access both internal and external data
3. Graphic base: graphics can turn volumes of text and statistics into visual information for executives. Typical graphic types are: time series charts, scatter diagrams, maps, motion graphics, sequence charts, and comparison-oriented graphs (i.e., bar charts)
4. Model base—EIS models contain routine and special statistical, financial, and other quantitative analysis

## **User interface**

An EIS must be efficient to retrieve relevant data for decision makers, so the user interface is very important. Several types of interfaces can be available to the EIS structure, such as scheduled reports, questions/answers, menu driven, command language, natural language, and input/output.

## **Telecommunication**

As decentralizing is becoming a trend in companies, telecommunications plays a pivotal role in networked information systems. Transmitting data from one place to another has become crucial for establishing a reliable network. In addition, telecommunications within an EIS can accelerate the need for access to distributed data. It can be both by scientific and business means.

## **FUNCTIONAL INFORMATION SYSTEMS**

FIS is based on the various business functions such as Production , Marketing , Finance and HR etc. 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.

The popular functional areas of the business organizations are :-

- Financial information system
- Marketing information system
- Production/ Marketing information system
- Human resource information system

1. **Financial information system:-** FIS is a sub-system of organizational management information system. This sub-system supports the decision-making process of financial functions at the level of an organization .

2. **Marketing information system:-** This sub system of MIS provides information about various functions of the marketing system of an organization. Marketing is By: Ms Gaurvi Shukla another functional area of the business organization ,which is engaged in marketing (selling)of its products to its customers.

Important functions of the marketing process include the following :-

- The marketing identification function
- The purchase motivation function
- The product adjustment function
- The physical distribution function
- The communication function
- The post –transaction function

3. **Production/ Marketing information system :-** manufacturing or production information system provides information on production / operation activities of an organization and thus facilitates the decision –making process of production manage process of an organization . The main decision to be taken in manufacturing system is product design.

4. **Human Resource Information System:-** this functional information system supports the functions of human resource management of an organization . The human resource management function ,in its narrow sense , it also known as personnel management .

**The function involves :**

- Manpower planning
- Staffing
- Training and development
- Performance evaluation, and
- Separation activites

## **EQUIPMENTS REQUIREMENTS OF FUNCTIONAL INFORMATION SYSTEMS**

- Large auxiliary storage
- Dual use files
- Moderate input / output requirements
- Flexible printing capacity
- Offline data entry
- Often difficult to define the problem
- Needs fast random access to large storage capacity
- Organization of computer storage is difficult
- Versatile inquiry stations desirable

### **Characteristics of Functional Information System**

#### **CHARACTERISTICS**

- Many small changes in a large database
- Systematic records ( mostly numerical )
- Routine actions & updating .
- Data preparation is a large & important effort

### **MARKETING INFORMATION SYSTEM**

**Definition:** The **Marketing Information System** refers to the systematic collection, analysis, interpretation, storage and dissemination of the market information, from both the internal and external sources, to the marketers on a regular, continuous basis.

The marketing information system distributes the relevant information to the marketers who can make the efficient decisions related to the marketing operations viz. Pricing, packaging, new product development, distribution, media, promotion, etc.

Every marketing operation works in unison with the conditions prevailing both inside and outside the organization, and, therefore, there are several sources ( viz. Internal, Marketing Intelligence, Marketing Research) through which the relevant information about the market can be obtained.

## Components of Marketing Information System



1. **Internal Records:** The Company can collect information through its internal records comprising of sales data, customer database, product database, financial data, operations data, etc. The detailed explanation of the internal sources of data is given below:

- ❖ The information can be collected from the documents such as invoices, transmit copies, billing documents prepared by the firms once they receive the order for the goods and services from the customers, dealers or the sales representatives.
- ❖ The current sales data should be maintained on a regular basis that serves as an aide to a the Marketing Information System. The reports on current sales and the inventory levels help the management to decide on its objectives, and the marketers can make use of this information to design their future sales strategy.
- ❖ The Companies maintain several databases such as \*Customer Database- wherein the complete information about the customer's name, address, phone number, the frequency of purchase, financial position, etc. is saved.

\*Product Database- wherein the complete information about the product's price, features, variants, is stored.

\*Salesperson database, wherein the complete information about the salesperson, his name, address, phone number, sales target, etc. is saved.

- ❖ The companies store their data in the data warehouse from where the data can be retrieved anytime the need arises. Once the data is stored, the statistical experts mine it by applying several computer software and techniques to convert it into meaningful information that gives facts and figures.

2. **Marketing Intelligence System:** The marketing intelligence system provides the data about the happenings in the market, i.e. data related to the marketing environment which is external to the organization. It includes the information about the changing market trends, competitor's pricing strategy, change in the customer's tastes and preferences, new products launched in the market, promotion strategy of the competitor, etc.

In order to have an efficient marketing Information System, the companies should work aggressively to improve the marketing intelligence system by taking the following steps:

- ❖ Providing the proper training and motivating the sales force to keep a check on the market trends, i.e. the change in the tastes and preferences of customers and give suggestions on the improvements, if any.
  - ❖ Motivating the channel partners viz. Dealer, distributors, retailers who are in the actual market to provide the relevant and necessary information about the customers and the competitors.
  - ❖ The companies can also improve their marketing intelligence system by getting more and more information about the competitors. This can be done either by purchasing the competitor's product, attending the trade shows, reading the competitor's published articles in magazines, journals, financial reports.
  - ❖ The companies can have an efficient marketing information system by involving the loyal customers in the customer advisory panel who can share their experiences and give advice to the new potential customers.
  - ❖ The companies can make use of the government data to improve its marketing Information system. The data can be related to the population trends, demographic characteristics, agricultural production, etc. that help an organization to plan its marketing operations accordingly.
  - ❖ Also, the companies can purchase the information about the marketing environment from the research companies who carry out the researches on all the players in the market.
  - ❖ The Marketing Intelligence system can be further improved by asking the customers directly about their experience with the product or service via feedback forms that can be filled online.
3. **Marketing Research:** The Marketing Research is the systematic collection, organization, analysis and interpretation of the primary or the secondary data to find out the solutions to the marketing problems. Several Companies conduct marketing research to analyze the marketing environment comprising of changes in the customer's tastes and preferences, competitor's strategies, the scope of new product launch, etc. by applying several statistical tools. In order to conduct the market research, the data is to be collected that can be either primary data (the first-hand data) or the secondary data (second-hand data, available in books, magazines, research reports, journals, etc.)

The secondary data are publicly available, but the primary data is to be collected by the researcher through certain methods such as questionnaires, personal interviews, surveys, seminars, etc.

A marketing research contributes a lot in the marketing information system as it provides the factual data that has been tested several times by the researchers.

4. **Marketing Decision Support System:** It includes several software programs that can be used by the marketers to analyze the data, collected so far, to take better marketing decisions. With the use of computers, the marketing managers can save the huge data in a tabular form and can apply statistical programs to analyze the data and make the decisions in line with the findings.

### **HUMAN RESOURCES INFORMATION SYSTEM**

- ❖ HRIS stands for Human Resources Information System. The HRIS is a system that is used to collect and store data on an organization's employees. In most cases, an HRIS encompasses the basic functionalities needed for end-to-end Human Resources Management (HRM). It is a system for recruitment, performance management, learning & development, and more.



- ❖ An HRIS is also known as HRIS software. This is a bit confusing as it implies that different systems can have different software running on them. However, this is not the case. The HRIS is, in essence, an HR software package.
- ❖ The HRIS can either run on the company's own technical infrastructure, or, more common nowadays, be cloud-based. This means that the HR software is running outside of the company's premises, making it much easier to update.
- ❖ Other commonly used names are *HRIS system* and *HRMS*, or Human Resources Management system. These are all different words for the same thing. Collectively, these systems are also called Human Capital Management systems, or HCM. In this article, we will use the terms HRIS and HRIS systems interchangeably.

## Benefits of an HRIS

As we discuss in our [Digital HR Certificate Program](#), using an HRIS has a number of clear benefits. That's why companies of all sizes implement this tool to support their [people operations](#). Centrally, the HRIS holds employee information. A wide range of employee data is then easily accessible, in one system.

- **Record-keeping.** An HRIS is a record-keeping system that keeps track of changes to anything related to employees. The HRIS can be seen as the single source of truth when it comes to personnel data.
- **Compliance.** Some data is collected and stored for compliance reasons. This includes material for the identification of employees in case of theft, fraud, or other misbehaviors, first contact information in case of accidents, citizens identification information for the tax office, and expiration dates for mandatory certification. All this information can be stored in the HRIS. It is essential that data is stored safely and securely, in line with [GDPR regulations](#).
- **Efficiency.** Having all this information stored in one place not only benefits accuracy but also saves time. Some companies still keep a lot of data about employees as physical paperwork. Finding the right folder, and locating the right sheet, can take up a lot of staff time.
- **HR strategy.** The HRIS permits the tracking of [data required to advance the HR and business strategy](#). Depending on the priorities of the organization, different data will be essential to track. This is where the HRIS shines.
- **Self-Service HR.** A final benefit is the ability to offer self-service HR to employees and managers. This enables employees to manage their own affairs. When done right, the HRIS can offer a good employee experience. Keep in mind that not all HRIS systems offer this in a user-friendly manner!

Working with an HRIS has multiple benefits for the organization, HR, and the employee. Using an HRIS becomes interesting when you have between 30 to 50 employees.

At this time, managing this basic information in Excel becomes cumbersome and simple procedures like approving employee holidays need to be standardized.

Using an HRIS is especially beneficial for large organizations which typically use more advanced HRIS systems to support different HR functions. Small businesses would suit a more basic HRIS.

## HRIS functions

There are different kinds of HRIS systems and software. Because an HRIS encompasses all the functionalities for HR, all separate functionalities are part of the system. These functionalities include:

- **Applicant Tracking System (ATS).** This software handles all the company's recruiting needs. It tracks candidate information and resumes, enables recruiters to match job openings to suitable candidates from the company's application pool, and helps in guiding the hiring process.
- **Payroll.** Payroll automates the pay process of employees. Contractual data and information on new hires is often entered into this system – sometimes combined with time & attendance data – and at the end of the month, payments orders are created.
- **Benefits administration.** Another functionality of the HRIS is benefits management. Employee benefits are an important aspect of compensation and are also managed in this system. More advanced systems offer an employee self-service model for employee benefits. In this case, employees can select the benefits they are looking for themselves. One may want more paternity leave, the other one a more expensive company car. This self-service approach to benefits is also called a *cafeteria model*.

## HRIS Functions



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- **Time & Attendance.** This module gathers time and attendance data from employees. These are especially relevant for shift workers where employees clock in and out. Back in the day, employees often wrote down their working hours on a piece of paper. Then, the manager would manually enter the data into a time tracking system. Based on this data, payment orders were generated and paid to all employees. Nowadays, workers often check into work by fingerprint or a card that is synced with an HRIS. This gives an exact time for arrival and departure. Any issues with lateness are easily detected.
- **Training.** Learning and development is a key element when it comes to employee management. This module allows HR to track qualification, certification, and skills of the employees, as well as an outline of available courses for company employees. This module is often referred to as an LMS, or Learning Management System, when it's a stand-alone. An LMS usually includes available e-learning and other courses to be followed by employees.
- **Performance management.** Performance management is a key part of managing people. Performance ratings are generated once or multiple times a year by the direct manager or peers of the employee.
- **Succession planning.** Creating a talent pipeline and having replacements available for key roles in the organization is another key component of an HRIS.

- **Employee self-service.** Employee self-service has already been mentioned. Organizations are focusing increasingly on having employees and their direct supervisors manage their own data. Requests like holidays can be asked for by the employee him/herself. After approval, these are then immediately saved into the system (and registered to track for payroll and benefits purposes).
- **Reporting & Analytics.** A much rarer module in HRIS systems is reporting and analytics. Modern systems enable the creation of automated HR reports on various topics like employee turnover, absence, performance, and more. Analytics involves the analysis of these insights for better-informed decision making. We'll explain more about this in the section below.

## Reporting and analytics in an HRIS

The common characteristic for all HRIS systems is that they have been designed as **transactional systems**. They are databases that record a company's transactions. An example of a transaction is when new employees join the company.

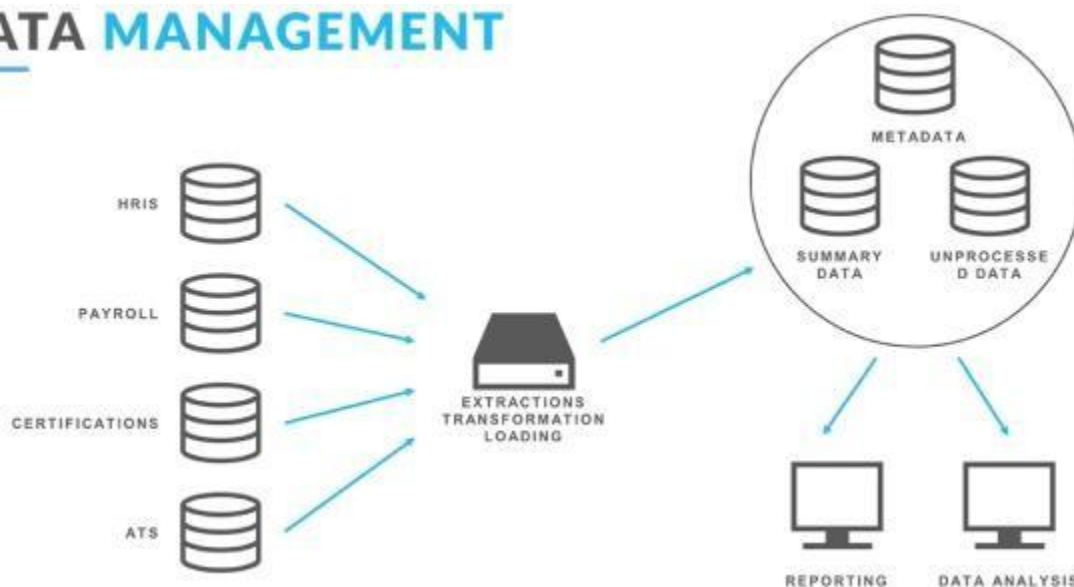
A new employee record is entered, and the person is considered 'active'. If a person leaves the company three months later, a new transaction is recorded, setting the person's status to 'terminated'.

The fact that these systems are designed as transactional systems, makes them bad at data reporting and analytics. They simply haven't been designed for this. In addition, not all HRIS systems have all the above capabilities built-in.

Some functionalities, like payroll, LMS, or ATS could also be recorded in external systems. This makes HR reporting even more challenging, as it means that data is dispersed into multiple systems. In order to report data, a new layer needs to be added on top of all HR systems to report and analyze the HR data.

This is the second reason why the practical use of reporting and analytics for these systems is limited. Be aware of this when you are talking to HRIS providers, as they often tout their systems to be excellent in data reporting and analytics.

## DATA MANAGEMENT



## HRIS implementation in 6 steps

We could write multiple articles when it comes to HRIS implementation. For this article, we will provide a high-level overview. Software implementation can be divided into multiple stages.

1. **Search.** Start your implementation by finding out what your different stakeholders need from an HRIS. Based on these requirements, you can create a list of potential providers. You can then invite these providers to make proposals. Ideally, at the end of this phase, you've chosen a suitable HRIS provider.
2. **Plan and align.** In this phase, you choose an implementation partner, create a steering committee and an implementation team. The steering committee usually consists of senior delegates from your chosen HRIS provider, the HR director from your organization, the internal project manager, and preferably a senior user from your business (optional). The implementation team's main responsibility is working on the day-to-day tasks that come out of the implementation.
3. **Define and design.** At this point, you need to specify your user groups and map out your processes and workflows. Define the functional and technical requirements for your HRIS infrastructure, system, and security. Also, note that you might need to build integration between your HRIS with other existing systems during this phase.
4. **Configure and test.** In this phase, you need to create a core test team to test your new HRIS and provide feedback for potential improvements. After this, you should also create a user acceptance test, where you can bring in a number of users to provide final feedback.
5. **Train and communicate.** Before the Go-live moment, you will need to prepare a training program for your technical staff, a communication plan, a Frequently Asked Questions page, as well as other support documents.
6. **Deploy and sustain.** Once all your support processes are in place, you can officially launch your HRIS. Remember to constantly collect feedback and to update your training material in line with the evolving systems. Constant, accurate communication is key here.

## MANUFACTURING INFORMATION SYSTEM

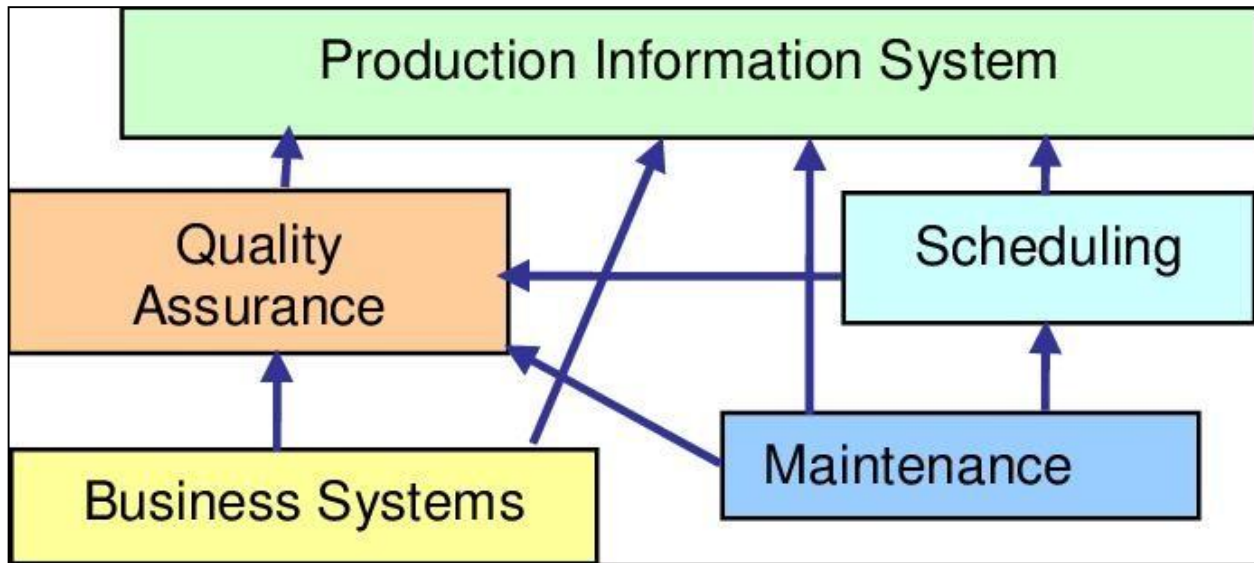
Manufacturing information systems are integral to the modern manufacturing facility. They are computer software platforms used to track to and document the transformation of raw materials to finished goods. With the implementation of a manufacturing and production information system, facility managers and decision makers can understand how conditions in the production process can be optimized and improved for increased output. The manufacturing information system operates in real-time, covering the full range of production elements in the process, including machines, inputs, personnel, and more.

With comprehensive manufacturing information system software, facility managers have a complete view into the entire production process, providing them with real data, instead of guesswork and wasting time trying to pinpoint a problem. In addition, the manufacturing execution system can also play a key role in automation and ensuring the proper sequencing of both manufacturing and business processes.

### **Advantages of a Manufacturing Information System**

With a production information system model in place, plant operators have an entirely different view of their facilities. The system can operate across multiple areas, including product definitions across the product life cycle, resource scheduling, order execution, and production analysis. The system creates a real-time record, capturing relevant data throughout the manufacturing process. This enables optimization of the process, increasing efficiency and potentially reducing errors and downtime. In today's competitive landscape, this is a key advantage of a smart manufacturing system. In addition,

the documentation and record keeping that the system provides is especially useful in heavily regulated sectors, such as pharmaceuticals or food and beverage.



## Understanding Accounting Information Systems (AIS)

An accounting information system is a way of tracking all accounting and business activity for a company. Accounting information systems generally consist of six primary components: people, procedures and instructions, data, software, information technology infrastructure, and internal controls. Below is a breakdown of each component in detail.<sup>2</sup>

### 1. AIS People

The people in an AIS are the system users. An AIS helps the different departments within a company work together. Professionals who may need to use an organization's AIS include:

- Accountants
- Consultants
- Business analysts
- Managers
- Chief financial officers
- Auditors

For example, management can establish sales goals for which staff can then order the appropriate amount of inventory. The inventory order notifies the accounting department of a new payable. When sales are made in a business, the people and departments involved in the sales process could include the following:

1. Salespeople enter the customer orders into the AIS.
2. Accounting bills or sends an invoice to the customer.
3. The warehouse assembles the order.
4. The shipping department sends the order out to the customer.
5. The accounting department gets notified of a new accounts receivable, which is an IOU from the customer that's typically paid within 30, 60, or 90 days.
6. The customer service department tracks the order and customer shipments.

7. Management uses AIS to create sales reports and perform cost analysis, which can include inventory, shipping, and manufacturing costs.

With a well-designed AIS, everyone within an organization can access the same system and retrieve the same information. An AIS also simplifies the process of reporting information to people outside of the organization, when necessary.

For example, consultants might use the information in an AIS to analyze the effectiveness of the company's pricing structure by looking at cost data, sales data, and revenue. Also, auditors can use the data to assess a company's internal controls, financial condition, and compliance with regulations such as the Sarbanes-Oxley Act (SOX).<sup>3</sup>

The AIS should be designed to meet the needs of the people who will be using it. The system should also be easy to use and should improve, not hinder efficiency.

## **2. Procedures and Instructions**

The procedure and instructions of an AIS are the methods it uses for collecting, storing, retrieving, and processing data. These methods are both manual and automated. The data can come from both internal sources (e.g., employees) and external sources (e.g., customers' online orders). Procedures and instructions will be coded into the AIS software. However, the procedures and instructions should also be "coded" into employees through documentation and training. The procedures and instructions must be followed consistently in order to be effective.

## **3. AIS Data**

An AIS must have a database structure to store information, such as structured query language (SQL), which is a computer language commonly used for databases. SQL allows the data that's in the AIS to be manipulated and retrieved for reporting purposes.<sup>4</sup> The AIS will also need various input screens for the different types of system users and data entry, as well as different output formats to meet the needs of different users and various types of information.

The data contained in an AIS is all of the financial information pertinent to the organization's business practices. Any business data that impacts the company's finances should go into an AIS.

The type of data included in an AIS depends on the nature of the business, but it may consist of the following:

- Sales orders
- Customer billing statements
- Sales analysis reports
- Purchase requisitions
- Vendor invoices
- Check registers
- General ledger
- Inventory data
- Payroll information
- Timekeeping
- Tax information

The data can be used to prepare accounting statements and financial reports, including accounts receivable aging, depreciation or amortization schedules, a trial balance, and a profit and loss statement. Having all of this data in one place—in the AIS—facilitates a business's record-keeping, reporting,

analysis, auditing, and decision-making activities. For the data to be useful, it must be complete, accurate, and relevant.

On the other hand, examples of data that would not go into an AIS include memos, correspondence, presentations, and manuals. These documents might have a tangential relationship to the company's finances, but, excluding the standard footnotes, they are not really part of the company's financial record-keeping.

#### 4. AIS Software

The software component of an AIS is the computer programs used to store, retrieve, process, and analyze the company's financial data. Before there were computers, an AIS was a manual, paper-based system, but today, most companies are using computer software as the basis of the AIS. Small businesses might use Intuit's Quickbooks or Sage's Sage 50 Accounting, but there are others.<sup>56</sup> Small to mid-sized businesses might use SAP's Business One.<sup>7</sup> Mid-sized and large businesses might use Microsoft's Dynamics GP,<sup>8</sup> Sage Group's MAS 90,<sup>9</sup>

Quality, reliability, and security are key components of effective AIS software. Managers rely on the information it outputs to make decisions for the company, and they need high-quality information to make sound decisions.

AIS software programs can be customized to meet the unique needs of different types of businesses. If an existing program does not meet a company's needs, the software can also be developed in-house with substantial input from end-users or can be developed by a third-party company specifically for the organization. The system could even be outsourced to a specialized company.

For publicly-traded companies, no matter what software program and customization options the business chooses, Sarbanes-Oxley regulations will dictate the structure of the AIS to some extent. This is because SOX regulations establish internal controls and auditing procedures with which public companies must comply.<sup>12</sup>

#### 5. IT Infrastructure

Information technology infrastructure is just a fancy name for the hardware used to operate the accounting information system. Most of these hardware items a business would need to have anyway and can include the following:

- Computers
- Mobile devices
- Servers
- Printers
- Surge protectors
- Routers
- Storage media
- A back-up power supply

Perhaps most importantly, the hardware selected for an AIS must be compatible with the intended software. Ideally, it would be not just compatible, but optimal—a clunky system will be much less helpful than a speedy one. One way businesses can easily meet hardware and software compatibility requirements is by purchasing a turnkey system that includes both the hardware and the software that the business needs. Purchasing a turnkey system means, theoretically, that the business will get an optimal combination of hardware and software for its AIS.

## **6. Internal Controls**

The internal controls of an AIS are the security measures it contains to protect sensitive data. These can be as simple as passwords or as complex as biometric identification. Biometric security protocols might include storing human characteristics that don't change over time, such as fingerprints, voice, and facial recognition.

An AIS must have internal controls to protect against unauthorized computer access and to limit access to authorized users, which includes some users inside the company. It must also prevent unauthorized file access by individuals who are allowed to access only select parts of the system.

An AIS contains confidential information belonging not just to the company but also to its employees and customers. This data may include:

- Social Security numbers
- Salary and personnel information
- Credit card numbers
- Customer information
- Company financial data
- Financial information of suppliers and vendors

### **FINANCIAL INFORMATION SYSTEM**

A Financial Information System is a computer-based information system, that gathers, stores, and analyses the financial information which is further useful for the decision making. Financial is also useful for the financial planning. It helps in the decision making and it is also work in conjunction with the decision support system. It also reduces the paperwork and maintains all the records up to date.

**There are various activities under the financial management are:**

- Cash management
- Investment Management
- Financial Planning
- Capital budgeting

All these activities require decisions which are taken with the help of financial information systems. FIS analyses whole finance related activities in the business and takes optimum decision which is helpful in achieving the goals of the organization.

A financial information system provides information to all the parties of the firm either internal or external in the form of reports and any other documents. It is useful system in the organization. As we all know finance plays most important role in the organization without finance no firm can survive for a long run. Finance is like a blood. If finance is the significant element then the information also plays most important role. It not only provides information to the executives but also useful for the public.

### **Principles of Financial Information System**

**Following are the principles of Financial Information System**



### 1. Cost effectiveness:

This system must be cost effective. It must outweigh information cost. It can provide desired output and flexible structure

### 2. Useful output:

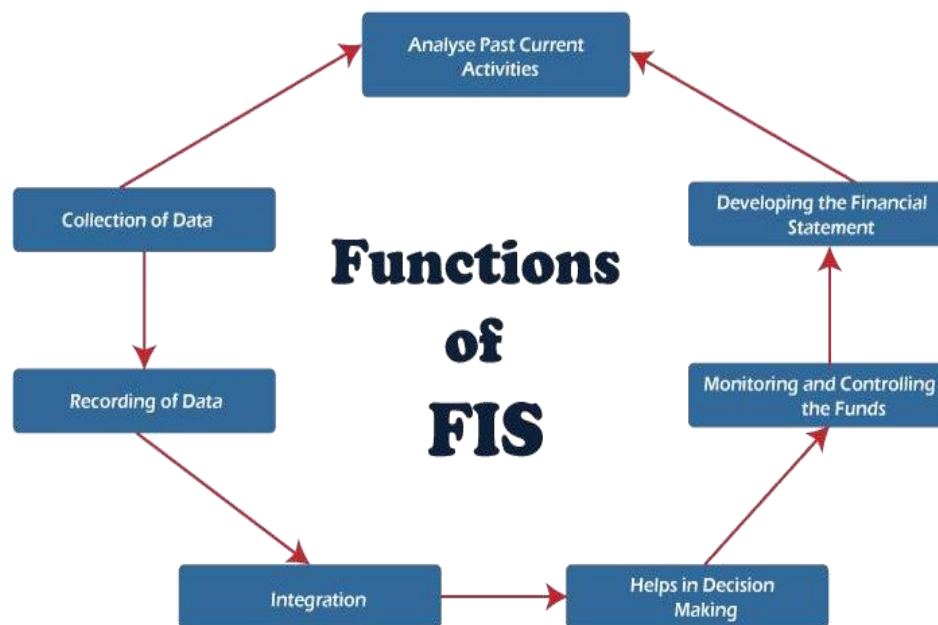
Financial information system must be able to provide necessary result The information must be understandable, relevant, reliable, timely and accurate.

### 3. Flexible:

In accounting information system there must be provision of inclusion of changed information needed by different users. It must be able to meet the changed demand.

Functions of Financial Information System

The various functions of the financial information system are explained as under:



## Functions of FIS

### 1. Collection of Data:

Under the financial information system, the first main element is the collection of data On the basis of data, the best decision is to be taken Under this various activities are performed like collection, analyzing, maintaining the information.

### 2. Monitoring and Controlling the funds:

Financial information system helps in controlling the funds. It tracks the revenue and expenditure is the organization. As FIS is computer based system which keeps record of the whole activities in it

### **3. Analyze Past and Current Activities:**

Financial information system analyse whole activities. It checks the current as well as past activities so that future decisions can be easily taken. The main aim of the FIS a to maintain record of all the finance related operations in the organization.

### **4. Helps in Decision Making:**

As we know, the DSS supports FIS with the help of financial information the optimal decision is to be taken. All the financial related decision, budgeting, investment are taken with the help at financial information system.

### **5. Generating Financial Statement:**

Financial information system, collects whole finance related information and after proper analysing the financial statement is to be generated so that which is useful for the management for decision making.

### **6. Recording of Data:**

Financial information system records whole data in the system which can be retrieved at any time when required. So whole data is saved or maintained under it which can be used at anytime.

Components of Financial Information System:

The various Components of Financial Information System are:

#### **1. Financial Accounting:**

Financial accounting records all the financial transactions in accounts. It records all assets, liabilities , revenue and expenditure. Financial accounting is useful for the maintenance of the statements.

#### **2. Fund Management:**

Under the financial information system, fund management plays an active role in the organization. It is a crucial aspect of financial management, the main aim of fund management is to maximize the profits from its investment.

#### **3. Controlling:**

Controlling component is useful for the maintenance of whole activities in the organization. It records the revenue and expenditure of all the departments and lead desirable change by controlling the activities.

\*\*\*\*\* UNIT IV COMPLETED \*\*\*\*\*

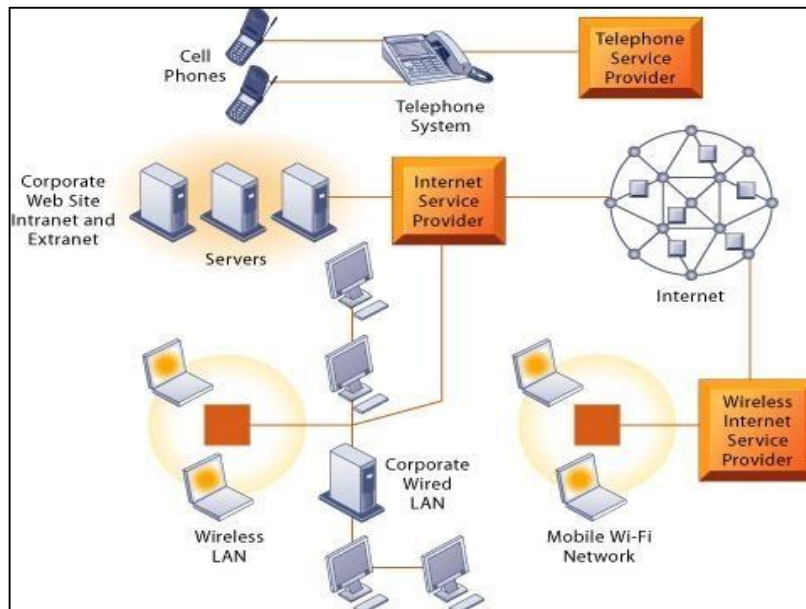
## UNIT-V

Telecommunication revolution – Introduction to Email, Internet, Intranet, Extranet, Teleconferencing, video conferencing, Virtual office, ERP – Benefits and challenges - Electronic payments. Introduction to cloud computing –concept of Big data

### TELECOMMUNICATION REVOLUTION

#### The Business Telecommunications Environment

Understanding the telecommunications environment for business turns out to be a very complicated task. The purpose of business telecommunications is to make it possible for employees, customers, and suppliers to communicate whenever necessary to accomplish their work.



A telecommunications environment provides connectivity on demand by providing communication channels for text, voice, and video images. In practice this is not so simple. illustrates the complexity of providing text, voice, and video connectivity to business firms.

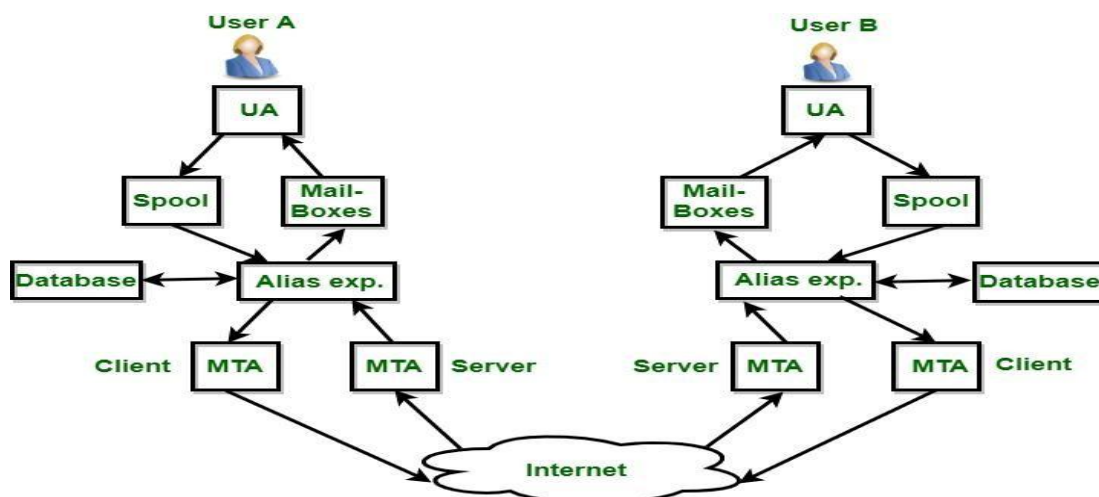
#### **To send an email:**

Compose a new message in your email client. Enter the recipient's email address in the "To" field. Add a subject line to summarize the content of the message. Write the body of the message. Attach any relevant files if needed. Click "Send" to deliver the message to the recipient's email server. Emails can also include features such as cc (carbon copy) and bcc (blind carbon copy) to send copies of the message to multiple recipients, and reply, reply all, and forward options to manage the conversation.

**Electronic Mail (e-mail)** is one of most widely used services of Internet. This service allows an Internet user to send a **message in formatted manner (mail)** to the other Internet user in any part of world. Message in mail not only contain text, but it also contains images, audio and videos data. The person who is sending mail is called **sender** and person who receives mail is called **recipient**. It is just like postal mail service. **Components of E-Mail System** : The basic components of an email system are : User Agent (UA), Message Transfer Agent (MTA), Mail Box, and Spool file. These are explained as following below.

**User Agent (UA)** : The UA is normally a program which is used to send and receive mail. Sometimes, it is called as mail reader. It accepts variety of commands for composing, receiving and replying to messages as well as for manipulation of the mailboxes.

**Message Transfer Agent (MTA)** : MTA is actually responsible for transfer of mail from one system to another. To send a mail, a system must have client MTA and system MTA. It transfer mail to mailboxes of recipients if they are connected in the same machine. It delivers mail to peer MTA if destination mailbox is in another machine. The delivery from one MTA to another MTA is done by Simple Mail Transfer Protocol.



**Mailbox** : It is a file on local hard drive to collect mails. Delivered mails are present in this file. The user can read it delete it according to his/her requirement. To use e-mail system each user must have a mailbox . Access to mailbox is only to owner of mailbox.

**Spool file** : This file contains mails that are to be sent. User agent appends outgoing mails in this file using SMTP. MTA extracts pending mail from spool file for their delivery. E-mail allows one name, an **alias**, to represent several different e-mail addresses. It is known as **mailing list**, Whenever user have to sent a message, system checks recipient's name against alias database. If mailing list is present for defined alias, separate messages, one for each entry in the list, must be prepared and

handed to MTA. If for defined alias, there is no such mailing list is present, name itself becomes naming address and a single message is delivered to mail transfer entity.

### **Services provided by E-mail system :**

**Composition** – The composition refer to process that creates messages and answers. For composition any kind of text editor can be used.

**Transfer** – Transfer means sending procedure of mail i.e. from the sender to recipient.

**Reporting** – Reporting refers to confirmation for delivery of mail. It help user to check whether their mail is delivered, lost or rejected.

**Displaying** – It refers to present mail in form that is understand by the user.

**Disposition** – This step concern with recipient that what will recipient do after receiving mail i.e save mail, delete before reading or delete after reading.

### **Advantages Or Disadvantages:**

#### **Advantages of email:**

Convenient and fast communication with individuals or groups globally. Easy to store and search for past messages. Ability to send and receive attachments such as documents, images, and videos. Cost-effective compared to traditional mail and fax.

#### **Disadvantages of email:**

Risk of spam and phishing attacks. Overwhelming amount of emails can lead to information overload. Can lead to decreased face-to-face communication and loss of personal touch. Potential for miscommunication due to lack of tone and body language in written messages. Technical issues, such as server outages, can disrupt email service. It is important to use email responsibly and effectively, for example, by keeping the subject line clear and concise, using proper etiquette, and protecting against security threats.

### **INTERNET**

It is a worldwide/global system of interconnected computer networks. It uses the standard Internet Protocol (TCP/IP). Every computer in Internet is identified by a unique IP address. IP Address is a unique set of numbers (such as 110.22.33.114) which identifies a computer's location.

A special computer DNS (Domain Name Server) is used to provide a name to the IP Address so that the user can locate a computer by a name. For example, a DNS server will resolve a name <https://www.tutorialspoint.com> to a particular IP address to uniquely identify the computer on which this website is hosted. Internet is accessible to every user all over the world. Some of the essential applications of the

Internet are listed below:

Play Video File sharing Downloading media files and software Sending and receiving emails Browsing any information Using social media platforms, forums, and communities

E-Commerce, bill payments, online purchasing of food and medicines

Voice Calls, Video Conferencing, and Chatting with friends, family members, and colleagues



### **Internet work:**

The internet is a network created by connecting a large number of computers or computer networks. It is a type of network that cannot be owned by an entity. It is formed using networks of networks configured using complex standards and rules (such as protocols). The Internet works through a packet routing network following the protocols, where the packet routing is the technique of routing data packets from source computer to a destination computer.

However, there are several protocols; the transmission and internet protocols are the primary impelling agents that help build the Internet network. The other common protocols used by the connected networks are HTTP, FTP, and SMTP. Besides, the protocols and applications like Telnet, Gopher, WWW, Usenet News, Internet Relay Chat, etc. are also used throughout the working of the Internet.

### **Advantages of Internet**

Few advantages of the Internet are listed below:

The Internet establishes a network of devices from different locations all around the world.

- It allows people to communicate easily from any location worldwide.
- The Internet is helping people to get information easily on different topics.
- It keeps the people updated on what's happening worldwide with the latest news and technologies.
- It connects people through communities, forums, social networking sites and helps them work together digitally.
- The Internet has made selling and purchasing of products and services easier.

- The Internet is the best platform for people to show their talent, such as singing, dancing, drawing, etc.

### **Intranet**

An Intranet is a part of the Internet and is owned and used privately by an organization. It is mainly used to connect all the computers and establish a private network of an organization to provide employees the ability to collaborate on projects, manage or update information, share calendars, and to-do list, etc. Organizations prefer using Intranet to keep their data inaccessible from outsiders, making their suspicious data and project information secure. Intranet includes a firewall to prevent unauthorized users from accessing the network.

The websites created over Intranet look almost similar and act like any other website on the Internet. However, these websites are much more task-oriented than promotional design websites on the Internet. Like the Internet, the intranet's websites can also provide the interface to form communication in the shape of chatting, image sharing, audio-video conferencing, etc. All these activities can only be used by authorized users who have permission to access the Intranet network.

- Some other essential applications of the Intranet are listed below:
- Sharing the updates regarding the company's rules and regulations
- Accessing employees details
- Onboarding of employees and customer details
- Sharing project details
- Submission of projects and reports
- Submitting feedback or complaints
- Corporate telephone directories

### **Intranet work**

Intranet usually runs in a client/server environment where the computers are connected using local area networks. Each computer is identified by the MAC address or an IP address, which remains unique for every computer. As an Internet, the Intranet also uses the client-server model based on the TCP / IP protocol suite. Because web browsers do not depend on the platform, they are also used on Intranet to access and retrieve information from the server within the organization. Besides, there is no need to install any special kind of software on the systems on the Intranet. But most companies use customized software designed purposely for company-specific tasks.

In addition to the protocols, Intranet uses a firewall to filter unwanted elements to the network and protects it from external intruders. It also includes network connectivity and the public telecommunication system, which help access and share the company's data, projects, and operations securely with the staff.

## **Intranet**

Intranet is the system in which multiple PCs are connected to each other. PCs in intranet are not available to the world outside the intranet. Usually each organization has its own Intranet network and members/employees of that organization can access the computers in their intranet.

Each computer in Intranet is also identified by an IP Address which is unique among the computers in that Intranet.

### **Similarities between Internet and Intranet**

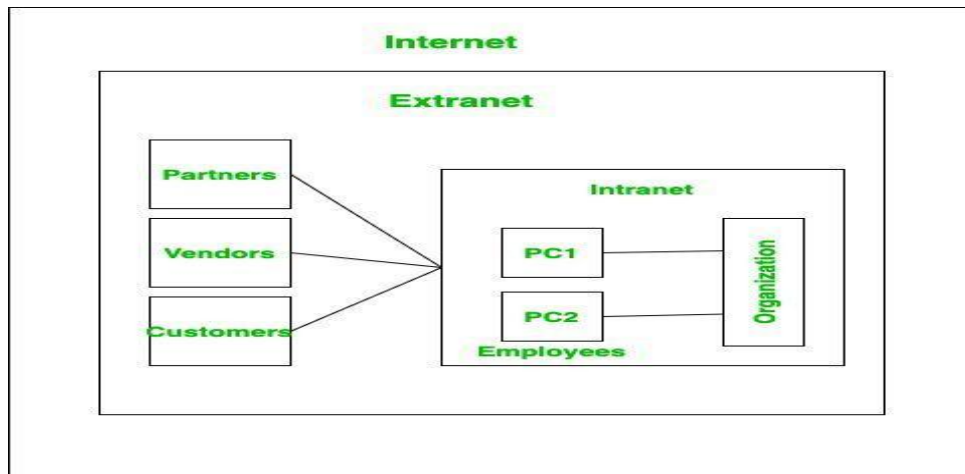
- Intranet uses the internet protocols such as TCP/IP and FTP.
- Intranet sites are accessible via the web browser in a similar way as websites in the internet. However, only members of Intranet network can access intranet hosted sites.
- In Intranet, own instant messengers can be used as similar to yahoo messenger/gtalk over the internet.
- Differences between Internet and Intranet
- Internet is general to PCs all over the world whereas Intranet is specific to few PCs.
- Internet provides a wider and better access to websites to a large population, whereas Intranet is restricted.
- Internet is not as safe as Intranet. Intranet can be safely privatized as per the need.



### **Extranet:**

An extranet is an organization's private network and its available only for selected users. It's a way to connect to third parties like vendors, customers, and partners in a secure and controlled way. The users typically have a login mechanism such as username and password to access the network. Extranet in simple terms provides a secure network for an organization to share information with relevant people outside the organization. It is part of an organization's intranet divided via a firewall.





### Examples:

An e-commerce site exchanges information with its retailers, a supplier's through an extranet network.

Multinational organizations handle their project information, clients and communicate with another organization over an extranet network. University provides an e-learning platform for their students over the extranet network.

### Implementation of extranet

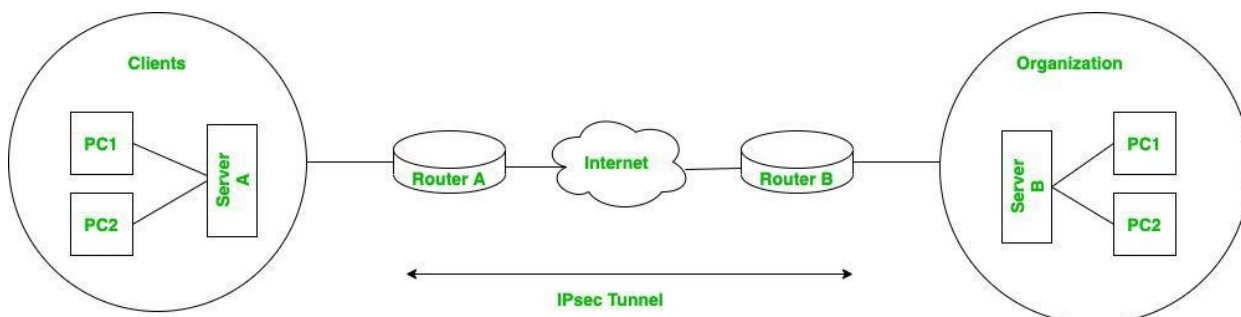
An extranet is implemented as a Virtual private network (VPN) that provides secure communication between the organizations. VPN creates a secure connection over a public network such as the internet. The VPN is formed on Internet Protocol security (IPsec) which provides an extra layer on the already present TCP/IP i.e. Transmission Control Protocol/ Internet Protocol.

The IPsec connection (tunneling) provides:

**Privacy:** To maintain confidentiality between the sources.

**Integrity:** To protect and share the data securely between the resources.

**Authentication:** To allow only authorized users on the network.



**IPsec Protocols:** It makes use of two protocols Authentication Header (AH) or Encapsulating Security Payload (ESP). One or both of them could be used to protect the IP packet. Which protocol to used depends on the security needs of the network.

**Authentication Header (AH):** It is used only for authentication and does not provide encryption. Data origin authentication, integrity, and anti-replay services are provided.

**Encapsulating Security Payload (ESP):** It provides authentication, data integrity, anti-replay, and encryption. Both authentication and encryption services can be used or only one of them could be used while using these protocols.

### **Features of extranet**

Following are the features of the extranet:

**Data security:** Sharing confidential data is of utmost priority and the extranet provides a safe environment for data sharing between the organizations. This decreases the chance of loss of confidential data and increases productivity.

**Faster communication:** Extranet allows to connect multiple organizations and escalate the communication between them.

**Flexibility:** Extranet provides a flexible and scalable environment to work on for everyone involved, which also increases the productivity of the organization.

**Cost:** It may decrease the cost of paperwork and travel to some extent.

**Authentication:** It provides authentication mechanisms like username and password. Therefore, only authorized users can access the network.

### **Advantages**

**Security:** Extranet is formed as a Virtual private network (VPN) as it assures a protected and secure communication across the network. The information shared between the organizations could be highly confidential and an extra level of security makes sure that none of it is lost or accessed by anyone else other than the parties involved.

**Data:** Sometimes there could be a large amount of data to be transferred between organizations. An extranet allows a large amount of data transfer across the network in a secure fashion.

**Network Sharing:** One or multiple organizations could connect via the extranet. For example, three organizations collaboratively working on the same project could make use of an extranet or an e-commerce site sharing its network with various small businesses.

**Communication:** It is a medium for internal and external members to connect or organizations to connect to third parties. Instead of allowing third parties in the company's intranet network and giving access to the internal resources, the extranet provides a lot more flexibility and security for everyone to communicate.

### **Disadvantage**

**Complex Security:** Extranet needs an additional firewall if hosted on its own server which expands workload and complex security mechanism.

**Hosting:** Hosting could be an issue as it requires a high bandwidth internet connection. A High bandwidth internet connection may not be possible for everyone, which would lead to inefficiency in work.

**Expensive:** It is costly compared to intranet due to the extra layer of security and hosting charges.

**limited:** It can only be accessed through the internet. So, the work would come to halt or slow down if the internet goes down.

## TELECONFERENCING

A teleconference is a live audio or audiovisual meeting with two or more participants. With the ability to teleconference, remote teams in an organization can collaborate and communicate, even when geographically dispersed. The process involves technology more sophisticated than a simple two-way phone connection.

At its simplest, a teleconference can be an interactive audio conference with people at two or more locations communicating over a speakerphone. With more equipment and special arrangements, a teleconference also can be a video conference, in which the participants can see each other.

Telecommunication systems support teleconferences by providing audio, video and data services. Participants communicate with teleconference platforms using devices such as desktop computers, tablets, smartphones and laptops. Teleconferences were initially conducted through telephone lines and were limited to audio; however, now it is more common for teleconferences to be conducted online or using voice over IP (VoIP).

### **Types of teleconferencing**

Teams in an organization have the option to conduct teleconferencing through multiple means, including the following:

**Audio teleconferencing.** These voice-only calls are conducted similar to normal telephone calls but can support up to 100 participants.

**Video teleconferencing.** This form of teleconferencing combines live visual and audio mediums. Depending on the vendor, video conferencing can support over 100 participants. Users in the meeting can use features such as screen sharing or file sharing.

**Web teleconferencing.** A web teleconference is an umbrella term that describes teleconference services or mediums provided online, which includes web meetings, webinars and webcasts. A video conference is, therefore, a type of teleconference.

## **Teleconferencing Work**

Teleconferencing works differently depending on the type of teleconference used:

In audio teleconferencing, participants dial a designated phone number to connect to a call that is conducted over telephone lines or the internet. VoIP is a key component of internet audio conferences. An organization can choose to have its own bridge or have a telephone service provider host conference calls.

Video conferences use VoIP for real-time communication over the internet. Participants can join using a combination of video, audio and audiovisual options. Users also can join and participate in video calls using their phones, tablets, laptops or PCs.

Because web teleconferencing is an umbrella term, it works similar to other forms of internet-based conference systems. Users can communicate using video, audio and instant messaging. Most web conferencing platforms also have features designed for file sharing and screen sharing.

## **Advantages and disadvantages of teleconferencing**

Potential advantages of teleconferencing include the following:

**Is cost-effective.** Teleconferencing saves remote employees the cost of transportation.

**Enables users to communicate over long distances.** Teams can be geographically dispersed and still hold meetings.

**Offers flexibility.** Employees can attend a teleconference call from almost any device from any location.

**Helps users collaborate.** Group chat functions can enable users to further communicate and collaborate on projects while remote.

**Enables users to keep records.** Attendees can record calls for reference or for other employees who cannot make it to a meeting.

**Offers scheduling.** Scheduling and calendar tools can simplify setting up meetings.

**Provides security.** Participant access codes can help ensure unauthorized users do not join meetings.

## **VIDEO CONFERENCING**

Video conferencing is live, visual connection between two or more remote parties over the internet that simulates a face-to-face meeting. Video conferencing is important because it joins people who would not normally be able to form a face-to-face connection.

At its simplest, video conferencing provides transmission of static images and text between two locations. At its most sophisticated, it provides transmission of full-motion video images and high-quality audio between multiple locations.

In the business world, desktop video conferencing is a core component of unified communications platforms that also include calling and messaging capabilities. Standalone on-premises and cloud-based video conferencing platforms are also available from numerous vendors who support desktop- and room-based video, as well as the ability to embed video conferencing into business applications, such as Telehealth, customer service and distance learning.

The widespread availability of cloud-based services enables organizations to implement video conferencing with minimal upfront investment and to take advantage of rapidly emerging AI-powered features to improve audio and video performance.

### **Video conferencing works:**

The video conferencing process can be split into two steps: compression and transfer. During compression, the camera and microphone capture analog audiovisual (AV) input. The data collected is in the form of continuous waves of frequencies and amplitudes. These represent the captured sounds, colors, brightness, depth and shades. Once captured, codecs convert data into digital packets, typically with compression to minimize bandwidth usage.

During the transfer phase, packets are sent over the network, typically to the cloud service provider, which then transmits them to other conference participants (and combines voice and video from multiple participants).

Once packets reach the endpoint, the codecs decompress the data. The codecs convert it back into analog audio and video. This enables the receiving screen and speakers to correctly view and hear the AV data.

### **Components of video conferencing systems**

- ❖ The components of a video conferencing system include the following:
- ❖ A network for data transfer, such as wired/wireless local area network, wide area network, cellular wireless and residential broadband.
- ❖ Two or more video cameras or webcams that provide video input.
- ❖ Two or more microphones -- either an external microphone or one built into the accessing device.
- ❖ A computer screen, monitor, TV or projector that can broadcast video output.

Headphones, laptop speakers or external speakers that can be used for audio output. Codecs, which can be hardware- or software-based, to reduce bandwidth by compressing and decompressing AV data.

They typically include acoustic echo cancellation capabilities, which reduce audio delays to support real-time communication. Codecs may also include features like noise cancellation and acoustic fencing to minimize background noise during conferences.

## **Benefits of video conferencing**

Video conferencing services carry many benefits. In businesses, they can increase productivity among employees, as well as provide an improved way of communicating and interacting with colleagues, partners and customers.

For businesses, the tangible benefits of video conferencing include lower travel costs -- especially, for employee training -- and shortened meeting and project times as a result of improved communications among team members. Businesses can also increase revenue through higher quality virtual sales meetings.

The intangible benefits of video conferencing include more efficient meetings with the exchange of nonverbal communications and a stronger sense of community among business contacts, both within and between companies, as well as with customers.

On a personal level, the face-to-face connection enables participants to develop a stronger sense of familiarity with individuals they may never actually meet in person. Since the start of the COVID-19 pandemic, many companies now use video conferencing for community-building activities and social gatherings, including lunch and learns, health and wellness activities, happy hours and games.

## **Virtual Office**

A virtual office gives businesses a physical address and office-related services without the overhead of a long lease and administrative staff. With a virtual office, employees can work from anywhere but still have things like a mailing address, phone answering services, meeting rooms, and videoconferencing.

## **Virtual Offices Work**

Virtual offices operate as one unit to serve customers but do not exist in a fixed location. This type of setup is especially popular with startups and small businesses that want to minimize overhead. The creation of web-based office productivity software and services, such as videoconferencing, has helped drive the growth in virtual offices.

### **KEY TAKEAWAYS**

- A virtual office is a company that operates as one unit and has a physical mailing address, but does not exist in one specific location.
- The development of tools such as videoconferencing and messaging services has led to the increased usage of the virtual office.
- The costs of operating a virtual office are much less than a traditional office, and that's why this type of setup is popular among small businesses and startups.

- A virtual office arrangement expands job options for employees and hiring options for businesses.
- While the virtual office is typically a less expensive option for business, some services, like phone answering and videoconferencing, might have limited accessibility.

A virtual office can also lead to greater productivity, as its services free workers from administrative tasks, as well as commutes. Each employee can work from the location that is most convenient, and the business is not restricted to hiring employees who live locally.

As more people find ways to work remotely, the benefits of a virtual office are immediately noticeable. However, not everything is as easy as it seems. Some may find scheduling of virtual office space no different than the time-consuming scheduling conflicts inherent in a physical office.

### **Advantages and Disadvantages of a Virtual Office**

The appeal of a virtual office to users is twofold. First, the monthly cost of a virtual office is far less than that of a traditional office. After all, it has none of the maintenance and upkeep costs, nor does it need to be staffed. A virtual office can also be secured via a month-to-month lease, so there is greater flexibility if a user's business changes (no waiting for a lease to expire or incurring the cost of a broken lease).

### **ENTERPRISE RESOURCE PLANNING (ERP)**

Enterprise resource planning (ERP) refers to a type of software that organizations use to manage day-to-day business activities such as accounting, procurement, project management, risk management and compliance, and supply chain operations. A complete ERP suite also includes enterprise performance management, software that helps plan, budget, predict, and report on an organization's financial results.

ERP systems tie together a multitude of business processes and enable the flow of data between them. By collecting an organization's shared transactional data from multiple sources, ERP systems eliminate data duplication and provide data integrity with a single source of truth.

Today, ERP systems are critical for managing thousands of businesses of all sizes and in all industries. To these companies, ERP is as indispensable as the electricity that keeps the lights on.

### **ERP system**

How can these solutions manage organizations day-to-day business activities, such as accounting, finance, procurement, project management, supply chain, and manufacturing.

Enterprise resource planning systems are complete, integrated platforms, either on-premises or in the cloud, managing all aspects of a production-based or distribution business. Furthermore, ERP

systems support all aspects of financial management, human resources, supply chain management, and manufacturing with your core accounting function.

ERP systems will also provide transparency into your complete business process by tracking all aspects of production, logistics, and financials. These integrated systems act as a business's central hub for end-to-end workflow and data, allowing a variety of departments to access.

ERP Systems and software support multiple functions across the enterprise, mid-sized, or small businesses, including customizations for your industry.

#### ERP fundamentals

ERP systems are designed around a single, defined data structure (schema) that typically has a common database. This helps ensure that the information used across the enterprise is normalized and based on common definitions and user experiences. These core constructs are then interconnected with business processes driven by workflows across business departments (e.g. finance, human resources, engineering, marketing, and operations), connecting systems and the people who use them. Simply put, ERP is the vehicle for integrating people, processes, and technologies across a modern enterprise.

For example: consider a company that builds cars by procuring parts and components from multiple suppliers. It could use an ERP system to track the requisition and purchase of these goods and ensure that each component across the entire procure-to-pay process uses uniform and clean data connected to enterprise workflows, business processes, reporting, and analytics.

When ERP is properly deployed at this automotive manufacturing company, a component, for example, “front brake pads,” is uniformly identified by part name, size, material, source, lot number, supplier part number, serial number, cost, and specification, along with a plethora of other descriptive and data-driven items.

Since data is the lifeblood of every modern company, ERP makes it easier to collect, organize, analyze, and distribute this information to every individual and system that needs it to best fulfill their role and responsibility.

ERP also ensures that these data fields and attributes roll up to the correct account in the company’s general ledger so that all costs are properly tracked and represented. If the front brake pads were called “front brakes” in one software system (or maybe a set of spreadsheets), “brake pads” in another, and “front pads” in a third, it would be tough for the automotive manufacturing company to figure out how much is spent annually on front brake pads, and whether it should switch suppliers or negotiate for better pricing.

#### **The business value of ERP**

It’s impossible to ignore the impact of ERP in today’s business world. As enterprise data and processes are corralled into ERP systems, businesses can align separate departments and improve workflows, resulting in significant bottom-line savings. Examples of specific business benefits include:

**Improved business insight** from real-time information generated by reports



**Lower operational costs** through streamlined business processes and best practices

**Enhanced collaboration** from users sharing data in contracts, requisitions, and purchase orders

**Improved efficiency** through a common user experience across many business functions and well-defined business processes

**Consistent infrastructure** from the back office to the front office, with all business activities having the same look and feel

**Higher user-adoption rates** from a common user experience and design

**Reduced risk** through improved data integrity and financial controls

**Lower management and operational costs** through uniform and integrated systems

## 7 Key ERP Implementation Challenges

An ERP implementation involves people as well as technology. Accordingly, it may face people-related challenges, such as resistance to change, as well as technical obstacles. Common ERP implementation challenges include:

### **Project management:**

ERP implementations entail multiple phases: discovery and planning, design, development, data migration, testing, deployment, support and post-launch updates. Each phase brings critical tasks, and all elements need to stay on track, which requires meticulous project management. Additionally, successful ERP implementations require participation from all the groups that will be involved in developing and using the system. That can be incredibly challenging, because each department is juggling its ERP project responsibilities with multiple other priorities.

Strong project and people management, which includes setting realistic expectations, time frames and milestones, along with timely two-way communication, is critical to success. As with change management, backing from executives and other top leaders is essential to conquering this challenge, as well.

### **Project planning:**

Organizations often underestimate the time and budget necessary for a successful implementation. One of the most common causes of budget overruns is scope creep—when a business adds capabilities or features to the system that weren't part of the original plan—and another is underestimating staffing needs, according to Statista.

Developing a clear and realistic plan from the start can help to avoid those issues. A realistic project plan that acknowledges possible speed bumps and minor cost overruns and addresses them in advance will simplify that decision-making process and keep the project on track.

### **Data integration:**

One of the key advantages of ERP is that it provides a single, accurate source of data for the whole organization. A key step in ERP implementation is data migration, which typically involves

moving data from multiple older systems into the ERP database. But first, you have to find all of your data. This may be much more challenging than you expect. The information may be spread far and wide across the organization, buried in accounting systems, department-specific applications, spreadsheets and perhaps on paper.

Well-planned data migration can help to keep the entire ERP implementation project on time and on budget. It's also an opportunity to winnow out obsolete and redundant data lurking in the organization's older systems. In contrast, underprioritizing data migration can cause issues such as inaccurate or duplicate data and challenges to your go-live date.

#### **Data quality:**

Once the organization has located all data sources, it can start thinking about migrating it to the ERP system. But that may involve a serious data hygiene exercise. Because multiple departments interact with the same customers, products and orders, organizations often have duplicate versions of the same information in their systems. The information may be stored in different formats; there may be inconsistencies, like in addresses or name spellings; some information may be inaccurate; and it may include obsolete information such as customers or suppliers that have since gone out of business.

Ensuring data quality can become a sizable project on its own, involving validating the data, cleaning out duplicates and adding missing values before migrating data to the ERP system. The new data should also be thoroughly tested before going live with the ERP system. Make sure your team understands the importance of cleaning up data, and assign clear responsibilities in doing so. For example, the accounting team will handle all financial data and the customer service group will clean up customer data.

#### **Change management.**

An ERP implementation involves more than just switching to a new software system. It typically means overhauling business processes to take advantage of the efficiency and productivity improvements possible with the new solution. This requires a shift in mindset and a change in everyday work processes for many employees, which presents typical change management challenges.

Resistance to change can be a formidable roadblock; getting buy-in from leadership and stakeholders across departments very early in the implementation process is crucial to a successful implementation. Communicate the features and advantages of the new ERP to all stakeholders throughout the implementation process, especially end users on the front lines. And make sure all users receive comprehensive training and support to help smooth their paths to adoption of the system.

#### **Cost overruns:**

ERP projects are infamous for sailing past budgets after the implementation kicks off. Many organizations underestimate the amount of work required to move to a new business system, and that results in spending more money than expected. These cost overruns often show up in a few different areas.

### **Continuous improvement:**

An ERP implementation is not a one-off effort that ends when the new system goes live. The solution must continue to evolve to support new business demands and technology. The project team needs to continue to manage the project after deployment, fixing issues and supporting new requirements as they come up.

### **ELECTRONIC PAYMENT**

E-commerce sites use electronic payment, where electronic payment refers to paperless monetary transactions. Electronic payment has revolutionized the business processing by reducing the paperwork, transaction costs, and labor cost. Being user friendly and less time-consuming than manual processing, it helps business organization to expand its market reach/expansion. Listed below are some of the modes of electronic payments –

- Credit Card
- Debit Card
- Smart Card
- E-Money
- Electronic Fund Transfer (EFT)

#### **Credit Card**

Payment using credit card is one of most common mode of electronic payment. Credit card is small plastic card with a unique number attached with an account. It has also a magnetic strip embedded in it which is used to read credit card via card readers. When a customer purchases a product via credit card, credit card issuer bank pays on behalf of the customer and customer has a certain time period after which he/she can pay the credit card bill. It is usually credit card monthly payment cycle. Following are the actors in the credit card system.

- **The card holder** – Customer
- **The merchant** – seller of product who can accept credit card payments.
- **The card issuer bank** – card holder's bank
- **The acquirer bank** – the merchant's bank
- **The card brand** – for example , visa or Mastercard.

## Credit Card Payment Process

Step	Description
Step 1	Bank issues and activates a credit card to the customer on his/her request.
Step 2	The customer presents the credit card information to the merchant site or to the merchant from whom he/she wants to purchase a product/service.
Step 3	Merchant validates the customer's identity by asking for approval from the card brand company.
Step 4	Card brand company authenticates the credit card and pays the transaction by credit. Merchant keeps the sales slip.
Step 5	Merchant submits the sales slip to acquirer banks and gets the service charges paid to him/her.
Step 6	Acquirer bank requests the card brand company to clear the credit amount and gets the payment.
Step 6	Now the card brand company asks to clear the amount from the issuer bank and the amount gets transferred to the card brand company.

## Debit Card

Debit card, like credit card, is a small plastic card with a unique number mapped with the bank account number. It is required to have a bank account before getting a debit card from the bank. The major difference between a debit card and a credit card is that in case of payment through debit card, the amount gets deducted from the card's bank account immediately and there should be sufficient balance in the bank account for the transaction to get completed; whereas in case of a credit card transaction, there is no such compulsion.

Debit cards free the customer to carry cash and cheques. Even merchants accept a debit card readily. Having a restriction on the amount that can be withdrawn in a day using a debit card helps the customer to keep a check on his/her spending.

## Smart Card

Smart card is again similar to a credit card or a debit card in appearance, but it has a small microprocessor chip embedded in it. It has the capacity to store a customer's work-related and/or

personal information. Smart cards are also used to store money and the amount gets deducted after every transaction.

Smart cards can only be accessed using a PIN that every customer is assigned with. Smart cards are secure, as they store information in encrypted format and are less expensive/provides faster processing. Mondex and Visa Cash cards are examples of smart cards.

### **E-Money**

E-Money transactions refer to situation where payment is done over the network and the amount gets transferred from one financial body to another financial body without any involvement of a middleman. E-money transactions are faster, convenient, and saves a lot of time.

Online payments done via credit cards, debit cards, or smart cards are examples of emoney transactions. Another popular example is e-cash. In case of e-cash, both customer and merchant have to sign up with the bank or company issuing e-cash.

### **Electronic Fund Transfer**

It is a very popular electronic payment method to transfer money from one bank account to another bank account. Accounts can be in the same bank or different banks. Fund transfer can be done using ATM (Automated Teller Machine) or using a computer.

Nowadays, internet-based EFT is getting popular. In this case, a customer uses the website provided by the bank, logs in to the bank's website and registers another bank account. He/she then places a request to transfer certain amount to that account. Customer's bank transfers the amount to other account if it is in the same bank, otherwise the transfer request is forwarded to an ACH (Automated Clearing House) to transfer the amount to other account and the amount is deducted from the customer's account. Once the amount is transferred to other account, the customer is notified of the fund transfer by the bank.

Security is an essential part of any transaction that takes place over the internet. Customers will lose his/her faith in e-business if its security is compromised. Following are the essential requirements for safe e-payments/transactions –

- **Confidentiality** – Information should not be accessible to an unauthorized person. It should not be intercepted during the transmission.
- **Integrity** – Information should not be altered during its transmission over the network.
- **Availability** – Information should be available wherever and whenever required within a time limit specified.
- **Authenticity** – There should be a mechanism to authenticate a user before giving him/her an access to the required information.

- **Non-Repudiability** – It is the protection against the denial of order or denial of payment. Once a sender sends a message, the sender should not be able to deny sending the message. Similarly, the recipient of message should not be able to deny the receipt.
- **Encryption** – Information should be encrypted and decrypted only by an authorized user.
- **Auditability** – Data should be recorded in such a way that it can be audited for integrity requirements.

### **Measures to ensure Security**

Major security measures are following –

#### **Encryption –**

It is a very effective and practical way to safeguard the data being transmitted over the network. Sender of the information encrypts the data using a secret code and only the specified receiver can decrypt the data using the same or a different secret code.

#### **Digital Signature –**

Digital signature ensures the authenticity of the information. A digital signature is an e-signature authenticated through encryption and password.

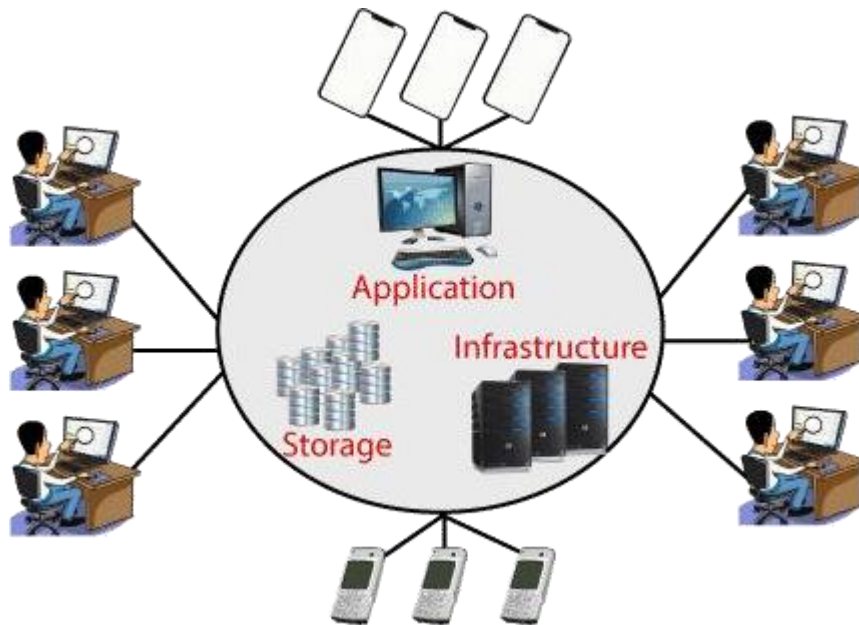
#### **Security Certificates –**

Security certificate is a unique digital id used to verify the identity of an individual website or user.

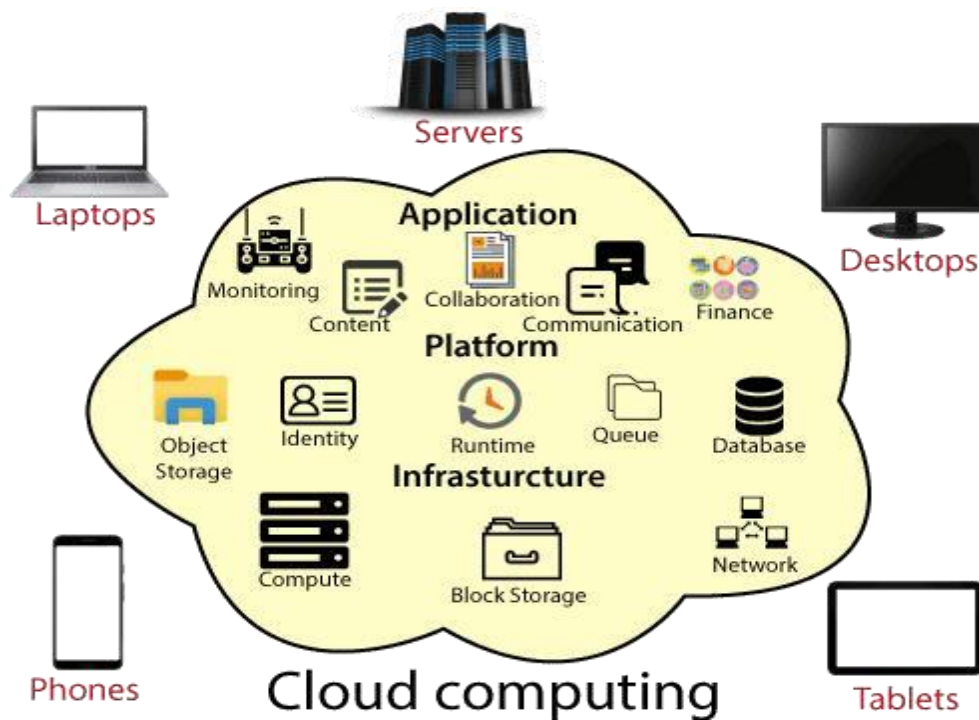
## **INTRODUCTION TO CLOUD COMPUTING**

Cloud Computing is the delivery of computing services such as servers, storage, databases, networking, software, analytics, intelligence, and more, over the Cloud (Internet).

Cloud Computing provides an alternative to the on-premises datacentre. With an on-premises datacentre, we have to manage everything, such as purchasing and installing hardware, virtualization, installing the operating system, and any other required applications, setting up the network, configuring the firewall, and setting up storage for data. After doing all the set-up, we become responsible for maintaining it through its entire lifecycle.



But if we choose Cloud Computing, a cloud vendor is responsible for the hardware purchase and maintenance. They also provide a wide variety of software and platform as a service. We can take any required services on rent. The cloud computing services will be charged based on usage.



The cloud environment provides an easily accessible online portal that makes handy for the user to manage the compute, storage, network, and application resources. Some cloud service providers are in the following figure.

### Advantages of cloud computing

- **Cost:** It reduces the huge capital costs of buying hardware and software.
- **Speed:** Resources can be accessed in minutes, typically within a few clicks.
- **Scalability:** We can increase or decrease the requirement of resources according to the business requirements.

- **Productivity:** While using cloud computing, we put less operational effort. We do not need to apply patching, as well as no need to maintain hardware and software. So, in this way, the IT team can be more productive and focus on achieving business goals.
- **Reliability:** Backup and recovery of data are less expensive and very fast for business continuity.
- **Security:** Many cloud vendors offer a broad set of policies, technologies, and controls that strengthen our data security.

### **Types of Cloud Computing:**

**Public Cloud:** The cloud resources that are owned and operated by a third-party cloud service provider are termed as public clouds. It delivers computing resources such as servers, software, and storage over the internet

**Private Cloud:** The cloud computing resources that are exclusively used inside a single business or organization are termed as a private cloud. A private cloud may physically be located on the company's on-site datacentre or hosted by a third-party service provider.

**Hybrid Cloud:** It is the combination of public and private clouds, which is bounded together by technology that allows data applications to be shared between them. Hybrid cloud provides flexibility and more deployment options to the business.

## **BIG DATA**

The definition of big data is data that contains greater variety, arriving in increasing volumes and with more velocity. This is also known as the three Vs. Put simply, big data is larger, more complex data sets, especially from new data sources. These data sets are so voluminous that traditional data processing software just can't manage them. But these massive volumes of data can be used to address business problems you wouldn't have been able to tackle before.

### **Types Of Big Data**

Following are the types of Big Data:

- **Structured**
- **Unstructured**
- **Semi-structured**

### **Structured**

Any data that can be stored, accessed and processed in the form of fixed format is termed as a 'structured' data. Over the period of time, talent in computer science has achieved greater success in developing techniques for working with such kind of data (where the format is well known in advance) and also deriving value out of it. However, nowadays, we are foreseeing issues when a size of such data grows to a huge extent, typical sizes are being in the rage of multiple zettabytes.



**Volume** The amount of data matters. With big data, you'll have to process high volumes of low- density, unstructured data. This can be data of unknown value, such as Twitter data feeds, clickstreams on a web page or a mobile app, or sensor-enabled equipment. For some organizations, this might be tens of terabytes of data. For others, it may behundreds of petabytes.

**Velocity** Velocity is the fast rate at which data is received and (perhaps) acted on. Normally, the highest velocity of data streams directly into memory versus being written to disk. Some internet-enabled smart products operate in real time or near real time and will require real-time evaluation and action.

**Variety** Variety refers to the many types of data that are available. Traditional data types were structured and fit neatly in a relational database. With the rise of big data, data comes in new unstructured data types. Unstructured and semistructured data types, such as text, audio, and video, require additional preprocessing to derive meaning and support metadata.

### **Unstructured**

Any data with unknown form or the structure is classified as unstructured data. In addition to the size being huge, un-structured data poses multiple challenges in terms of its processing for deriving value out of it. A typical example of unstructured data is a heterogeneous data source containing a combination of simple text files, images, videos etc. Now day organizations have wealth of data available with them but unfortunately, they don't know how to derive value out of it since this data is in its raw form or unstructured format.

### **Semi-structured**

Semi-structured data can contain both the forms of data. We can see semi-structured data as a structured in form but it is actually not defined with e.g. a table definition in relational DBMS. Example of semi-structured data is a data represented in an XML file.

\*\*\*\*\* UNIT V COMPLETED \*\*\*\*\*

## Management Information System MCQ

1. The first step in the systems development life cycle (SDLC) is\_\_\_\_\_.

1. Design
2. Analysis
3. Problem/Opportunity Identification
4. Development and Documentation

Answer: Problem/Opportunity Identification

2. The\_\_\_\_\_will make the automated inventory system understandable to everyone.

1. programs
2. statement
3. document
4. blocks

Answer: document

3. processing is considered as the classical method of processing data.

1. Group
2. Batch
3. Sequence
4. Real

Answer: Batch

4. The art of getting things done through people, with the people\_\_\_\_\_.

1. Management
2. System
3. Management Information System
4. Entity

Answer: Management

5. In compilation process the program is placed in the memory in the form \_\_\_\_

1. binary
2. octal
3. hexadecimal
4. decimal

Answer: binary

**6. CASE Tool is\_\_\_\_\_.**

1. Component Aided Software Engineering
2. Computer Aided Software Engineering
3. Constructive Aided Software Engineering
4. Computer Analysis Software Engineering

**Answer: Computer Aided Software Engineering**

**7. In the system concepts, the term integration is\_\_\_\_\_.**

1. refers to the manner in which each component functions with other components of the system
2. means that parts of computer system depends on one another
3. implies structure and order
4. refers to the holism of systems

**Answer: refers to the holism of systems**

**8. The starting point of MIS planning is general\_\_\_\_\_planning.**

1. business
2. managers
3. objective
4. firms

**Answer: business**

**9. \_\_\_\_\_is the information about data.**

1. Meta-Data
2. Data
3. Entity
4. Relations

**Answer: Meta-Data**

**10. \_\_\_\_planning systems deals with the projections of the future.**

1. Strategic
2. Operational
3. Statistical
4. Processing

**Answer: Strategic**

**11. The major drawbacks in decision making by MIS is difficult due \_\_\_\_\_ for business problems.**

1. rules
2. structure
3. conditions
4. strategy

**Answer: rules**

**12. Top down approach is used for \_\_\_\_\_.**

1. identification of faults
2. development
3. testing and validation
4. reverse engineering

**Answer: development**

**13. To become an effective MIS department must state its \_\_\_\_\_.**

1. objective
2. goals
3. mission
4. profit

**Answer: mission**

**14. Which of the following is a computer based system that stores and, manipulates data that are viewed from a geographical point or reference?**

1. Database System (DS)
2. Geographical information System (GIS)
3. Geographic System (GS)
4. Software System (SS)

**Answer: Geographical information System (GIS)**

**15. The most rapidly growing application for computer assisted decision making is called**

- 
1. validation
  2. simulation
  3. attribute
  4. entity

Answer: simulation

16. The \_\_\_\_ component plays a decision rule for the computer

1. statements
2. program
3. input data
4. conditions

Answer: program

17. Accounting, finance, marketing, and human resources are known as\_\_\_\_\_.

1. Functional business areas
2. Geographic information system
3. Executive information systems
4. Local information system

Answer: Functional business areas

18. Which of the following is not an attribute of software engineering?

1. Scalability
2. Efficiency
3. Dependability
4. Usability

Answer: Dependability

19. \_\_\_\_ is an overall performance summary to date and compared with the previous periods, budgets.

1. Sales recap
2. Sales list
3. Sales data
4. Sales objective

Answer: Sales recap

20. The \_\_\_\_ language is used to solve the numeric problems.

1. Cobol
2. C
3. Fortran
4. Basic

Answer: Fortran

**21. The effectiveness of marketing information system depends to a larger extent of \_\_\_\_\_ from market place to the firm.**

1. advertising
2. feedback
3. marketing
4. promoting

Answer: feedback

**22. Expand TPS.**

1. Technology processing systems
2. Transfer point of sales
3. Transaction processing systems
4. None of the above

Answer: Transaction processing systems

**23. The tools that support different stages of software development life cycle are called \_\_\_\_\_.**

1. CAQE tool
2. CAME tools
3. CASE Tools
4. CARE tools

Answer: CASE Tools

**24. Which phase is not available in software life cycle?**

1. Testing
2. Maintenance
3. Coding
4. Abstraction

Answer: Abstraction

**25. EDP means\_\_\_\_\_.**

1. electronic data processing
2. electronic data projection
3. electronic data process
4. electronic data predict

Answer: electronic data processing

**26. The \_\_\_\_\_ information system deals with the flow of information about people working in the organization.**

1. transaction
2. record
3. Personnel
4. Blocked

Answer: Personnel

**27. System Development process is also called as \_\_\_\_\_.**

1. System Life Cycle
2. System Development Life Cycle
3. System Process Cycle
4. None of above

Answer: System Development Life Cycle

**28. SDLC stands for \_\_\_\_\_**

1. Software development life cycle
2. Software design life cycle
3. System design life cycle
4. System development life cycle

Answer: Software development life cycle

**29. A sequence of instructions that works together to perform a task is called a \_\_\_\_\_**

1. statements
2. block
3. Program
4. grouping

Answer: Program

**30. Which of the following individuals typically have less formal, advanced educational degrees and tend to process rather than create information?**

1. Executives
2. System analysts
3. Knowledge workers
4. Data workers

Answer: Data workers

31. \_\_\_\_\_ is the real world object, such as a person, place etc.

1. Entity
2. Attribute
3. Records
4. All of above

Answer: Entity

32. In computer the number system of 0 and 1 is called as \_\_\_\_\_

1. hexadecimal
2. octal
3. decimal
4. binary

Answer: binary

33. Prototype is a \_\_\_\_\_.

1. Mini model of existing system
2. Working model of existing system
3. Mini model of processed system
4. None of above

Answer: Working model of existing system

34. \_\_\_\_\_ System can be any organized combination of people, hardware, software, communications networks and data resources that collects, transforms and disseminates information in an organization

1. Integrated
2. Horizontal
3. Information
4. Vertical

Answer: Information

35. Information systems that monitor the elementary activities and transactions of the organizations are \_\_\_\_\_

1. Operational level system
2. Management level system
3. Strategic level system



4. Knowledge level system

**Answer:** Operational level system

**36. The most creative and challenging phase of system life cycle is \_\_\_\_\_**

1. Maintenance
2. Design
3. Feasibility study
4. None of the above

**Answer:** Design

**37. Summary transaction data, high-volume data, and simple models are information inputs characteristic of \_\_\_\_\_**

1. Executive Support System (ESS)
2. Decision Support System (DSS)
3. Transaction Processing System (TPS)
4. Management Information System (MIS)

**Answer:** Management Information System (MIS)

**38. System development is a \_\_\_\_\_.**

1. It is a development of SRS of a system
2. Process of successive changes of system from new and changed requirement
3. All of above
4. None of the above

**Answer:** All of above

**39. The advantages of creating a prototype are \_\_\_\_\_**

1. It can serve as means of communication between developers and customers
2. It allows developers to experiment with number of different design options
3. None of above
4. All of above

**Answer:** All of above

**40. Projections and responses to queries are Information output characteristics associated with \_\_\_\_\_**

1. Management Information System (MIS)
2. Executive Support System (ESS)

3. Decision Support System (DSS)
4. Transaction Processing System (TPS)

**Answer:** Executive Support System (ESS)

## QUESTION BANK

### UNIT - I

#### 5 MARK

1. Explain data and information
2. Explain importance of information system.
3. Explain components of information System.

#### 10 MARK

2. write shorts note on MIS.
3. Explain importance of MIS.

### UNIT - II

#### 5 MARK

1. Explain characteristics of system approach.
2. Write short notes on types of system approach.
3. Explain about on system analyst.

#### 10 MARK

1. Elaborate on system development life cycle.
2. Discuss about on implementing system approach and design.

### UNIT - III

#### 5 MARK

1. Explain transaction processing system.
2. Discuss about on components of Transaction processing system.
3. Write short notes on Decision support system.
4. Explain on Expert system applications.

#### 10 MARK

1. Write shorts notes on Artificial intelligence.
2. Write shorts notes on Decision Support System and characteristics of DSS.

## UNIT - IV

### 5 MARK

1. Explain about on Office automation system.
2. Meaning Office automation system. And benefits of OAS.
3. Explain about on EIS.

### 10 MARK

1. Write short notes on information system for business.
2. Briefly explain about on accounting information system.
3. Difference between accounting information system and finance information system.

## UNIT - V

### 5 MARK

1. Explain Telecommunication revolution .
2. Explain :
  - (i) Intranet
  - (ii) Email
  - (iii) Extra net
  - (iv) Teleconferencing
  - (v) Video conferencing
3. Explain benefits and challenges of ERP.

### 10 MARK

1. Write short notes on cloud computing.
2. Wirte short notes on Big data.
3. Explain e-payments and example.

