

Information System Concepts

2.1 INTRODUCTION:

Organizations offer products to customers to make money. These products can be goods or services. In most organizations, huge volumes of data accumulate: data of products, data of customers, data of employees, data of the delivery of products, and data of other sources. These data therefore play an important role in contemporary organizations and must be stored, managed, and processed, which is where Information systems come into play.

2.2 Overview of Information Systems and Practical Aspects of their Applications in Enterprise Processes:

2.2.1 Information:

1. Information means processed Data. Data is facts or values of results
2. Information is the relations between data and other relations. e.g. in spread sheet student name, roll number and marks obtained in science and arts subjects represents data whereas the graph that shows the percentage of students acquire more than 80% in science subjects and 65% in arts subjects represents information.
3. Information may be represented in the form of text, graph, pictures, voice, videos etc.

Attributes or Characteristics of Good Information:

Some of the important attributes of useful and effective information are given as follows:

1. **Availability:** It is a very important aspect of information. Information is useless if it is not available at the time of need. Database is a collection of files which is collection of records and data from where the required information is derived for useful purpose.
2. **Purpose/Objective:** Information must have purposes/objective at the time it is transmitted to a person or machine, otherwise it is simple data. The basic objective of information is to inform, evaluate, persuade, and organize.
3. **Mode and format:** The modes of communicating information to humans should be in such a way that it can be easily understandable by the people. The mode may be in the form of voice, text and combination of these two. Format also plays an important role in communicating the idea. It should be designed in such a way that it assists in decision making, solving problems, initiating planning, controlling and searching.
4. **Current/Updated:** The information should be refreshed from time to time as it usually rots with time and usage. For example, the running score sheet of a cricket match available in Internet sites should be refreshed at fixed interval of time so that the current score will be available

5. **Rate:** The rate of transmission/reception of information may be represented by the time required to understand a particular situation. Useful information is the one which is transmitted at a rate which matches with the rate at which the recipient wants to receive. For example- the information available from internet site should be available at a click of mouse.
6. **Frequency:** The frequency with which information is transmitted or received affects its value. For example- the weekly reports of sales shows little change as compared to the quarterly and contribute less for accessing salesman capability.
7. **Completeness and Adequacy:** The information provided should be complete and adequate in itself because only complete information can be used in policy making. For example-the position of student in a class can be find out only after having the information of the marks of all students and the total number of students in a class.
8. **Reliability:** It is a measure of failure or success of using information for decision-making. If information leads to correct decision on many occasions, we say the information is reliable.
9. **Validity:** It measures how close the information is to the purpose for which it asserts to serve. For example, the experience of employee supports in evaluating his performance.
10. **Quality:** It means the correctness of information. For example, an over-optimistic manager may give too high estimates of the profit of product which may create problem in inventory and marketing.
11. **Transparency:** It is essential in decision and policy making. For example, total amount of advance does not give true picture of utilization of fund for decision about future course of action; rather deposit-advance ratio is perhaps more transparent information in this matter.
12. **Value of Information:** It is defined as difference between the value of the change in decision behavior caused by the information and the cost of the information. In other words, given a set of possible decisions, a decision-maker may select one on basis of the information at hand. If new information causes a different decision to be made, the value of the new information is the difference in value between the outcome of the old decision and that of the new decision, less the cost of obtaining the information.

2.2.2 System:

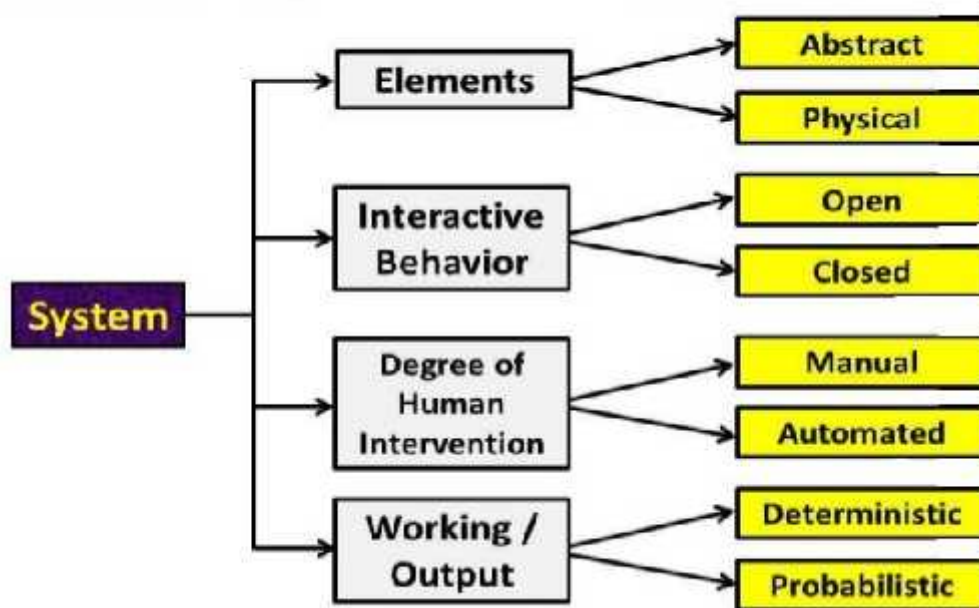
1. A system is a group of inter connected components working towards the accomplishment of a common goal by accepting inputs and producing outputs in an ordered transformation process.
2. A system generally consists of input, processing, storage and output.



3. Input is the data entering the system. Processing is the manipulation of the input data. Output is the data/instruction given by the system after processing and storage refers to the storage of data for current or future use.
4. For example; a business is said to be system because it contains input e.g. people, machine, money, materials etc., which are process ed by means of different processes such as production, marketing, finance etc. and produces output i.e. services and goods.

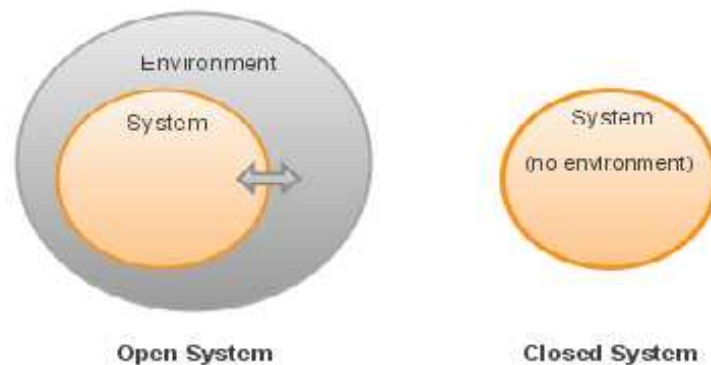
2.2.3 Classification of system:

System can be classified on the basis of various parameters like elements, interactive behavior, degree of human intervention and working output.



1. **On the basis of Elements:** System may be categorized as **Abstract** or **Physical System** on the basis of the elements used in the system.
 - **Abstract System** also known as **Conceptual System or Model** can be defined as an orderly arrangement of interdependent ideas or constructs. For example, a system of theology is an orderly arrangement of ideas about God and the relationship of humans to God.
 - **Physical System**, on the other hand, is a set of tangible elements, which operated together to accomplish an objective e.g. Computer system, University system etc.
2. **On the basis of Interactive behavior:** Systems may be classified as **Open Systems** or **Closed System** based on 'how the system interacts with environment'.
 - An **Open System** interacts with other systems in its environment. For example; Information system is an open system because it takes input from the environment and produces output to the environment, which changes as per the changes in the environment.

- **Closed System** does not interact with the environment and does not change with the changes in environment. Consider a 'throw-away' type sealed digital watch, which is a system, composed of a number of components that work in a cooperative fashion designed to perform some specific task. This watch is a closed system as it is completely isolated from its environment for its operation.



3. **On the basis of Degree of Human intervention:** According to the degree of human intervention, the system may be classified as **Manual** or **Automated System**.
 - In a **Manual System**, the activities like data collection, maintenance and final reporting are done by human.
 - In an **Automated System**, the activities like data collection, maintenance and final reporting are carried out by computer system or say machine itself.
4. **On the basis of Working/Output:** On the basis of working style and the output, the systems can be classified as **Deterministic** and **Probabilistic System**.
 - A **Deterministic System** operates in a predictable manner. For example - software that performs on a set of instructions is a deterministic system.
 - A **Probabilistic System** can be defined in terms of probable behavior. For example - inventory system is a probabilistic system where the average demand, average time for replenishment, etc may be defined, but the exact value at any given time is not known.

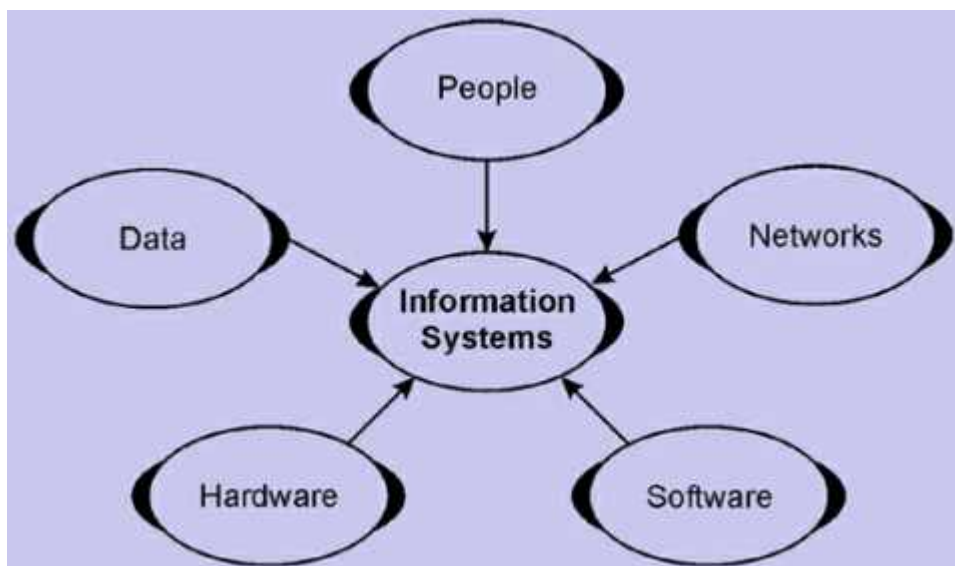
2.2.4 Information System & its Components:

1. An **Information System** is termed as a system that comprises of people, computer systems, data and network that helps to collect, store and analyze data to produce the desired information for the functioning, betterment and expansion of business.
2. With the help of information systems, enterprises and individuals are able to use computers to collect, store, process, analyze, and distribute information.
3. There are different types of information systems, i.e. Manual (paper and pencil) information system, Informal (word to mouth) information system, Formal (written procedures) information system and Computer based information system.

Components of Information System:

An Information System comprise of **People, Hardware, Software, Data** and **Network**.

1. People mean the IT professionals i.e. system administrator, programmers and end users i.e. the persons, who can use hardware and software for retrieving the desired information.
2. The hardware means the physical components of the computers.
3. Software means the system software (different types of operating systems e.g. UNIX, LINUX, WINDOWS etc.), application software (different type of computer programs designed to perform specific task) and utility software (e.g. tools).
4. The data is the raw fact, which may be in the form of database. The data may be alphanumeric, text, image, video, audio, and other forms.
5. The network means communication media (Internet, Intranet, Extranet etc.).



Components of Information System

An IS model comprises of following steps:

Input - Data is collected from an organization or from external environments and converted into suitable format required for processing.

Processing - This is converted into information (more meaningful form) obtained after manipulation of these collected data and

Output - Then information is stored for future use or communicated to user after application of respective procedure on it.

These three basics activities of an information system, helps enterprise in making decisions, control operations, analyze problems and create new products or services as an output.

Computer Based Information System:

A Computer Based Information system is a combination of people, IT and business processes that helps management in taking important decisions to carry out the business successfully.

Important characteristics of Computer Based Information Systems:

1. All systems work for predetermined objectives and the system is designed and developed accordingly.
2. In general, a system has a number of interrelated and interdependent subsystems or components. No subsystem can function in isolation; it depends on other subsystems for its inputs.
3. If one subsystem or component of a system fails ; in most of the cases, the whole system does not work. However, it depends on 'how the subsystems are interrelated'.
4. The way a subsystem works with another subsystem is called interaction. The different subsystems interact with each other to achieve the goal of the system.
5. The work done by individual subsystems is integrated to achieve the central goal of the system. The goal of individual subsystem is of lower priority than the goal of the entire system.

Major Areas of Computer based Applications:

Major areas of computer based applications are finance and accounting, marketing and sales, manufacturing, inventory/stock management, human resource management etc. , which are given as follows:

1. Inventory /Stores Management:

- a) The inventory management system is designed with a view to keeping the track of materials in the stores.
- b) The system is used to:
 - ✓ Regulate the maximum and minimum level of stocks.
 - ✓ Raise alarm at danger level stock of any material.
 - ✓ Give timely alert for re-ordering of materials with optimal re-order quantity.
 - ✓ Facilitate various queries about inventory like total inventory value at any time.
 - ✓ Identification of important items in terms stock value (ABC analysis).
 - ✓ Identification most frequently moving items (XYZ analysis) etc.
- c) A Well-designed inventory management system for finished goods and semi-finished goods provides important information for production schedule and marketing/sales strategy.

2. Production or Manufacturing:

- a) The objective of this subsystem is to optimally deploy man, machine and material to maximize production or service.
- b) The system generates production schedules and schedules of material requirements, monitors the product quality, plans for replacement or overhauling the machinery and also helps in overhead cost control and waste control.

3. Marketing and Sales:

- a) Marketing and sales activities have a key role for running a business successfully in a competitive environment.
- b) The objective of this subsystem is to maximize the sales and ensure customer satisfaction.

- c) The marketing system facilitates the chances of order procurement by marketing the products of the company, creating new customers and advertising the products.
- d) The sales department may use an order processing system to keep the status and track of orders, generate bills for the orders executed and delivered to the customer, strategies for rendering services during warranty period and beyond, analyzing the sales data by category such as by region, product, sales manor sales value.

4. Finance and Accounting:

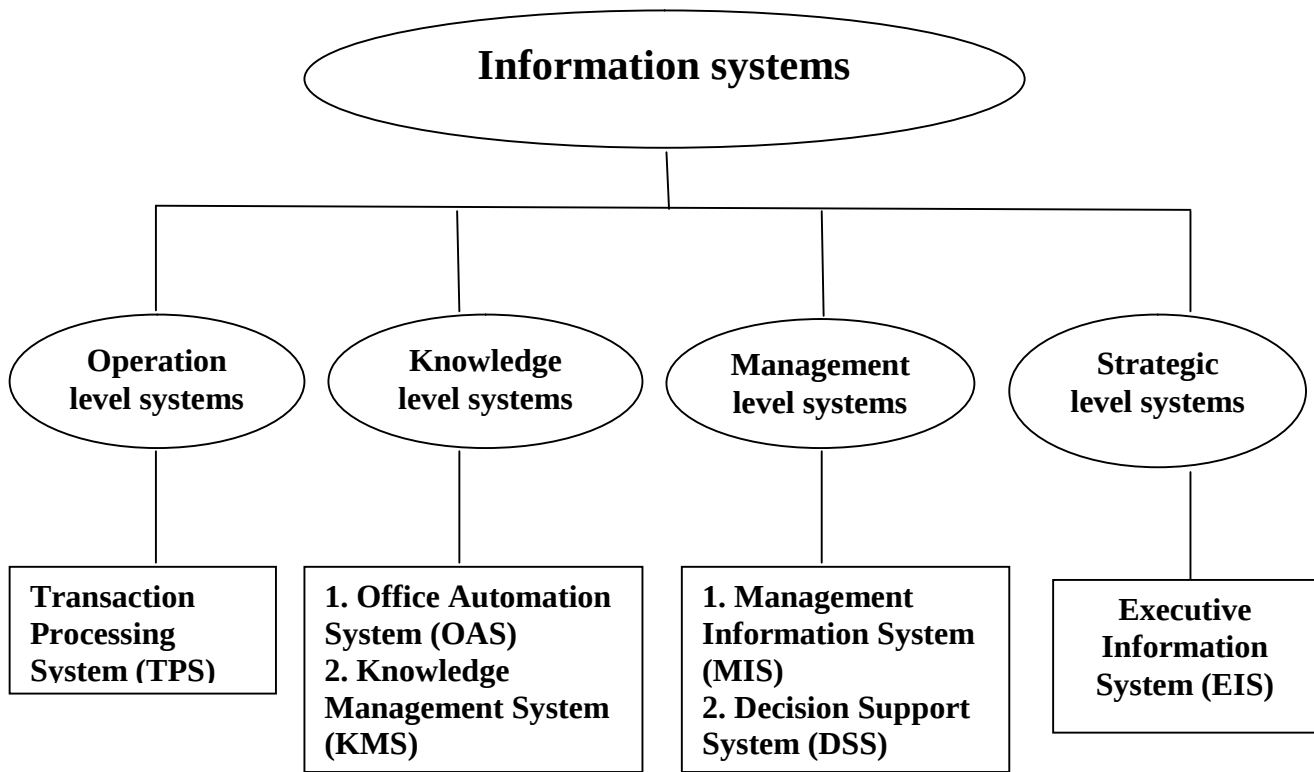
- a) The main goal of this subsystem is to ensure the financial viability of the organization, enforce financial discipline and plan and monitor the financial budget.
- b) It also helps in forecasting revenues, determining the best resources and uses of funds and managing other financial resources.
- c) Typical sub-application areas in finance and accounting are - Financial accounting; General ledger; Accounts receivable/payable; Asset accounting; Investment management; Cash management; Treasury management; Fund management and Balance sheet.

5. Human Resource Management:

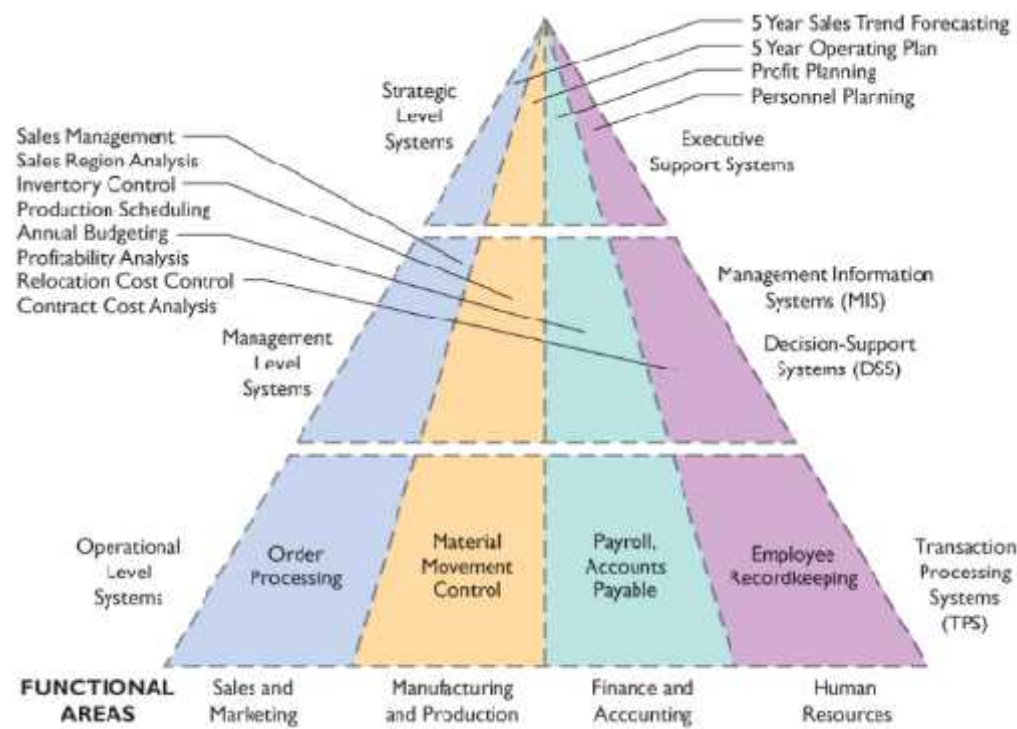
- a) Human resource is the most valuable asset for an organization.
- b) Utilization of this resource in the most effective and efficient way is an important function for any enterprise.
- c) Skill database maintained in HRM system helps management for allocating manpower to right activity.
- d) An HRM system may have the following modules:
 - ✓ Personnel administration;
 - ✓ Recruitment management;
 - ✓ Travel management;
 - ✓ Benefit administration;
 - ✓ Salary administration;
 - ✓ Promotion management etc.

2.2.5 Types of Information Systems:

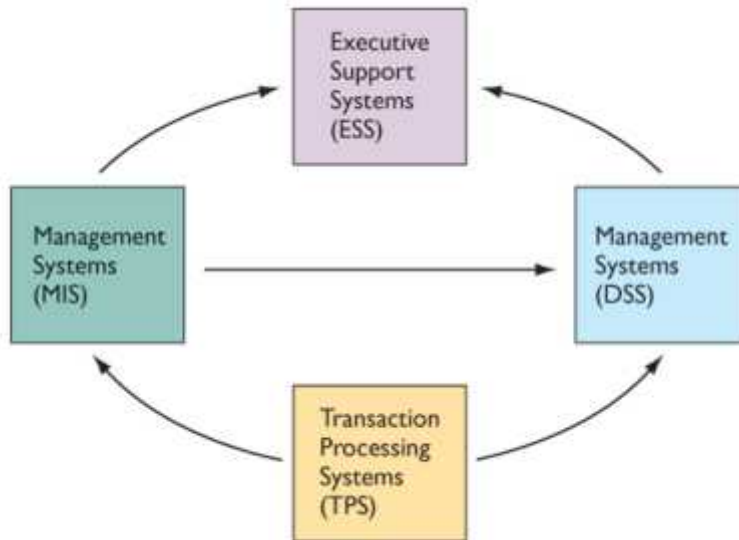
Information system performs important operational and managerial support roles in businesses and other enterprises. Conceptually, information systems are categorized as follows:



The Hierarchy of Information Systems in an organization is understood with the below diagram.



- ✓ In Brief –
- ✓ TPS generally feed all other system
- ✓ MIS generally indicate when a DSS is needed and provide input for them.
- ✓ EIS/ESS takes all internal data but usually only summary data form MIS and DSS level.
- ✓ **Output data from one is input data for others to process.**
See the below diagram



I. Operational-Level Systems:

1. Operation Level Systems or Operation Support System supports **day to day data processing activities** of the organization.
2. The main objective of OSS is to improve the operational efficiency of the enterprise.
3. OSS produces a variety of information for internal and external use.
4. Its role is to:
 - ✓ Effectively process business transactions.
 - ✓ Control industrial processes.
 - ✓ Support enterprise communications and collaborations and
 - ✓ Update corporate database.
5. This primarily include the TPS.

Transaction Processing Systems (TPS):

Transaction Processing Systems are used to record day to day business transactions of the organization. They are used by users at the operational management level. The main objective of the TPS is to answer routine questions such as:

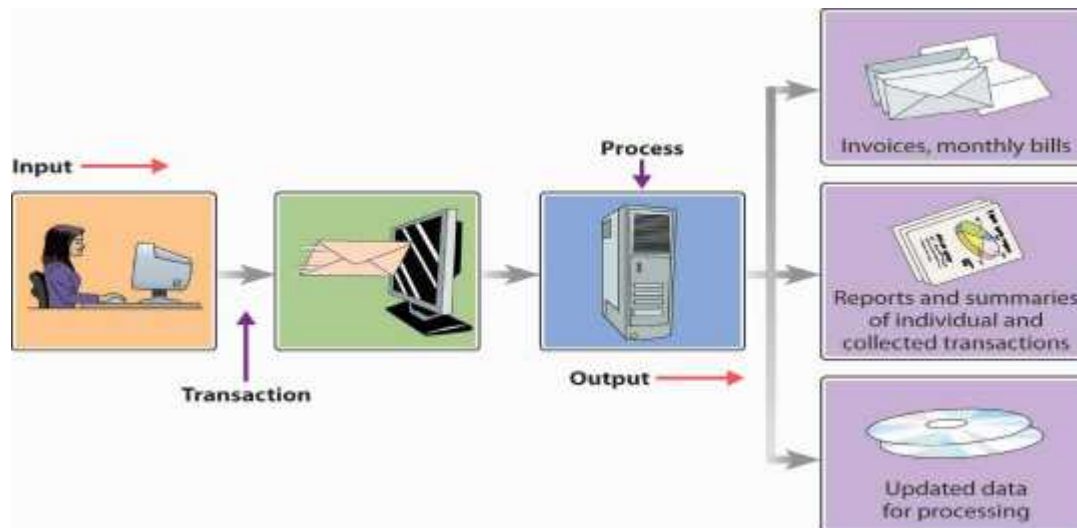
- How printers were sold today?
- How much inventory do we have at hand?
- What is the outstanding due for John Doe?

By recording the day to day business transactions, TPS system provides answer to the above questions in a timely manner.

In simple language TPS is an Information System that-

- ❖ Record data or transactions.
- ❖ Process the data and
- ❖ Generate usable information in the form of reports.

This can be more understood with the following diagram:



1. TPS operates at the lowest level of management in an Information System that manipulates data from business transaction.
2. Any business activity such as sales, purchase, production, delivery, payments or receipts involves transaction and these transactions are to be organized and manipulated to generate various information products for external use.
3. For example, selling of a product to a customer will give rise to the need of further information like customer billing, inventory status and increase in account receivable balance.
4. Typically TPS involves the following activities:
 - Capturing data to organize in files or databases;
 - Processing of files/databases using application software;
 - Generating information in the form of reports; and
 - Processing of queries from various quarters of the organization.
5. A TPS may follow the periodic data preparation and batch processing or on-line processing.
 - Batch Processing: All transactions for a determined time is accumulated and then processed together. E.g. Cheque deposit in bank
 - Online/Real-time Processing: Transaction is processed immediately after its occurrence. E.g. Cash deposit in bank
6. The people involved in TPS usually are not in a position to take any management decision.

TPS Components:

The principal components of a TPS include **inputs, processing, storage and outputs.**

1. **Inputs:** Source documents, such as customer orders, sales, slips, invoices, purchase orders, and employee time cards, are the physical evidence of inputs in to the Transaction Processing System.
2. **Processing:** This involves the use of journals and registers to provide a permanent and chronological record of inputs. Journals are used to record financial accounting transactions, and registers are used to record other types of data. Some of the common journals are sales journal, purchase journal, cash receipts journal etc.

3. **Storage:** Ledgers and files provide storage of data on both manual and computerized systems. The general ledger, the accounts/vouchers payable ledgers, and the accounts receivable ledger are the records of final account that provide summaries of a firm's financial accounting transactions.
4. **Outputs:** Any document generated in the system is output. Some documents are both output and input. For example; a customer invoice is an output from the order-entry application system and also an input document to the customer.

Features of TPS:

1. **Large volume of data:** As TPS is transaction oriented and generally consists of large volumes of data, it requires greater storage capacity. Their primary objective is to ensure that the data regarding the economic events in the enterprises are captured quickly and correctly.
2. **Automation of basic operations:** Any TPS aims at automating the basic operations of a business enterprise and plays a critical role in the day-to-day functioning of the enterprise. Any failure in the TPS for a short period of time can play havoc with the functioning of the enterprise. Thus, TPS is an important source of up-to-date information regarding the operations in the enterprise.
3. **Benefits are easily measurable:** TPS reduces the workload of the people associated with the operations and improves their efficiency by automating some of the operations. Most of these benefits of the TPS are tangible and easily measurable.
4. **Source of input for other systems:** TPS is the basic source of internal information for other information systems. Heavy reliance by other information systems on TPS for this purpose makes TPS important for tactical and strategic decisions as well.

II. Knowledge-Level Systems:

1. These systems support discovery, processing and storage of knowledge and data workers.
2. These support the business to integrate new knowledge into the business and control the flow of paperwork and enable group working.
3. It helps the organization's knowledge and data workers and is especially in the form of workstations.
4. It is the fastest growing application in business today.
5. We will study the following systems under this category.

A. Office Automation System (OAS)

B. Knowledge Management System (KMS)

A. Office Automation Systems (OAS):

Office automation refers to automating information or procedures. Most typically, it relates to storage, transmission and management of information through computers and software. Automation optimizes office performance and offers the following advantages:

- Less storage is required for storing office work (i.e., digital storage instead of paper storage)
- Less manual labor/hours for information management
- Easier and simultaneous access of data

Perhaps the best known type of office automation device is the computer, which automates many traditional office tasks.

1. It is most rapidly expanding computer based information systems.
2. Different office activities can be broadly grouped into the following types of operations:

All these activities can be automated by using computer applications such as MS Word, MS Excel, Email etc.,

- ✓ **Document Capture:** Documents originating from outside sources like incoming mails, notes, handouts, charts, graphs etc. need to be preserved.
- ✓ **Document Creation:** This consists of preparation of documents, dictation, editing of texts etc. and takes up major part of the secretary's time.
- ✓ **Receipts and Distribution:** This basically includes distribution of correspondence to designated recipients.
- ✓ **Filing, Search, Retrieval and Follow up :** This is related to filing, indexing, searching of documents, which takes up significant time.
- ✓ **Calculations:** These include the usual calculator functions like routine arithmetic, operations for bill passing, interest calculations, working out the percentages and the like.
- ✓ **Recording Utilization of Resources:** This includes, where necessary, record keeping in respect to specific resources utilized by office personnel.

3. All the activities mentioned have been made very simple, efficient and effective by the use of computers.
4. The application of computers to handle the office activities is also termed as office automation.

Benefits of Office Automation Systems:

1. Office Automation Systems improve communication within an organization and between enterprises.
2. They reduce the cycle time between preparation of messages and receipt of messages at the recipients' end.
3. They also reduce the costs of office communication both in terms of time spent by executives and cost of communication links.
4. Office Automation Systems ensure accuracy of information and smooth flow of communication.

Computer Based Office Automation Systems:

Major computer based OAS are:

1. **Text Processing System**
2. **Electronic Document Management System**
3. **Electronic Message Communication System**
4. **Teleconferencing or Video-Conferencing System**

1. Text Processing Systems:

- ❖ Text processing systems are the most commonly used components of the OAS. This is so because a large proportion of the office communication takes place in writing using words of a natural language.
- ❖ Text processing systems automate the process of development of documents such as letters, reports, memos etc. They permit use of standard stored information to produce personalized documents. Such automation reduces keying effort and minimizes the chances of errors in the document.
- ❖ The text processor may be simple word processing systems or desktop publishing systems. The desktop publishing systems help in quick production of multiple copies of the document with quality printing.
- ❖ The desktop publishing systems are often supported with laser printers, inkjet printers, scanners and other such devices for producing good quality documents.

2. Electronic Document Management System:

- ❖ In this type of systems, the office documents are captured(scanned) and stored in the computer for efficient management.
- ❖ This type of system provides many advantages over manual management of documents:
 - ✓ Lesser space requirements
 - ✓ Low cost document management
 - ✓ Provides remote access of documents from anywhere, where documents are stored in network servers.
 - ✓ Provides secured document management i.e. access of documents as per user access rights and with login-in id and password.
 - ✓ Provides fast/prompt access of required documents.

3. Electronic Message Communication Systems:

- ❖ Business enterprises have been using a variety of communication systems for sending and receiving messages. These include telephone, mail and facsimile (Fax), etc.
- ❖ Three basic components based message communication systems are:
 - a) Electronic Mail
 - b) Facsimile (Fax)
 - c) Voice Mail

a. Electronic Mail:-

Features of electronic mail are:

- ❖ **Electronic Transmission:** The transmission of messages with email is electronic and message delivery is very quick and confirmation of transmission is also quick and the reliability is very high.

- ❖ **Online Development and Editing:** The email message can be developed and edited online before transmission. The online development and editing eliminates the need for use of paper in communication.
- ❖ **Broadcasting and Rerouting:** Email permits sending a message to a large number of target recipients.
- ❖ **Integration with other Information Systems:** The E-mail has the advantage of being integrated with the other information systems. Such integration helps in ensuring that the message is accurate and the information required for the message is accessed quickly.
- ❖ **Portability:** Email renders the physical location of the recipient and sender irrelevant. The email can be accessed from any Personal computer/tablet/smart phones equipped with the relevant communication hardware, software and link facilities.
- ❖ **Economical:** The advancements in communication technologies and competition among the communication service providers have made Email the most economical mode for sending and receiving messages.

b. Facsimile (Fax):

- ❖ Facsimile (Fax) is electronic communication of images of documents over telephone lines.
- ❖ The computer based fax technology automates fax communication and permits sharing of fax facilities.
- ❖ It uses special software and fax servers to send and receive fax messages using common communication resources.

c. Voice Mail:

- ❖ Voice mail is a variation of the email in which messages are transmitted as digitized voice.
- ❖ The recipient of the voice mail has to dial a voice mail service or access the e-mail box using the specified equipment and he can hear the spoken message in the voice of the sender.

4. Teleconferencing and Video-conferencing Systems:

- ❖ Teleconferencing is conducted in a business meeting involving more than two persons located at two or more different places.
- ❖ It helps in reducing the time and cost of meeting.
- ❖ Teleconferencing may be audio or video conferencing with or without use of computer systems.
- ❖ The computer based teleconferencing has the advantage of flexibility in terms of pre-recorded presentations and integration with other information systems.

B. Knowledge Management System (KMS):

The World is becoming more and more a knowledge based economy and it is mostly dominated by organizations which can innovate new products and technologies e.g. Google, Apple etc. A shift is happening where management is more concerned for intangible resources such as knowledge, technologies and competencies than tangible or physical resources such as buildings, machinery etc.

Information and Knowledge are the key elements of this economy. A firm's competitive gain depends on its knowledge processing i.e. what it knows; how it uses & how fast it can know something new. It's much more influential than land, labour & capital (i.e. three most important production factors).

Knowledge Management Systems (KMS) refers to any kind of IT system that:

- **Stores and retrieves knowledge**
 - **Improves collaboration**
 - **Locates knowledge sources**
 - **Mines (i.e. extracting) repositories of data for hidden knowledge and captures and uses that knowledge,**
- (or)**

in some other way enhances the Knowledge Management (KM) process.

Knowledge Management (KM) is the process of capturing, developing, sharing, and effectively using organizational knowledge. It refers to a multi-disciplined approach to achieving organizational objectives by making the best use of knowledge.

KMS treats the Knowledge component a precious resource and treat this as a part of organizations explicit function just like finance and HR components are treated.

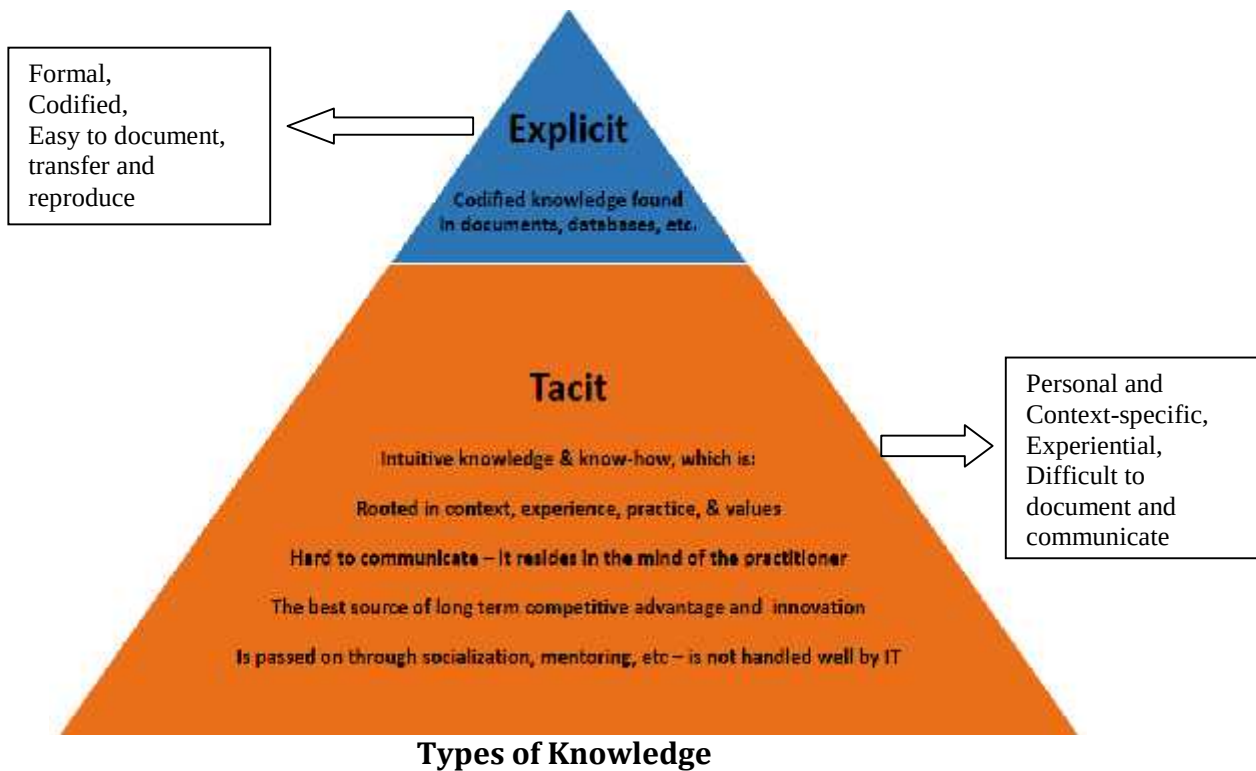
There are two broad types of knowledge – Explicit (recorded) and Tacit (personal know-how).

Explicit knowledge:

1. Explicit Knowledge is knowledge available in the documents and database of organization.
2. It is acquired through historical activities, operation and experience of organization.
3. Explicit Knowledge is articulated, and represented as spoken words, written material and compiled data.
4. This type of knowledge is: codified, easy to document, transfer and reproduce. E.g. Online tutorials, Policy and procedural manuals.

Tacit knowledge:

1. Tacit knowledge, on the other hand, resides in a few often-in just one person and hasn't been captured by the organization or made available to others.
2. Tacit knowledge is unarticulated and represented as intuition, perspective, beliefs, and values that individuals form based on their experiences.
3. It is difficult to document and communicate the tacit knowledge. For example – hand-on skills, special know-how, employee experiences.



Types of Knowledge

It is this tacit knowledge that differentiates between organizations and provides the strategic edge to any organization.

III. Management-Level Systems:

1. MSS supports managers in effective decision making by providing relevant and required information at the right time to the right people.
2. There are 2 types of Management level systems:
 - A. **Management Information System**
 - B. **Decision Support System**

A. Management Information Systems (MIS):

1. **MIS is a computer based system that provides flexible and speedy access to accurate data.**
2. Management Information System enables management at different levels in decision making and problem solving.
3. MIS use results produced by the TPS, but may also use other information.
4. MIS supports the managers at different levels to take strategic (at top level) or tactical (at middle level) management decisions to fulfill the organizational goals.
5. MIS is designed to provide accurate, relevant and timely information to managers at different levels and in different functional areas throughout the organization for decision-making purpose.

Components of MIS (Management + Information + Systems):

(just for better understanding MIS... Not in syllabus)

Management
Information
Systems

Management: The process or activities that describe what managers do in the operation of their organizations such as:

1. Determination of organizational objectives and developing plans to achieve them.
2. Securing and organizing the human and physical resources so that these objectives could be accomplished.
3. Exercising adequate controls over the functions and
4. Monitoring the results to ensure that accomplishments are proceeding according to plan.

Information: Sets of facts, figures and symbols processed for the current decision – making situation.

System: Set of interrelated elements that operate collectively to accomplish some common purpose or goal.

Management Information System = Management + Information + System. i.e. Set of interrelated elements that operate collectively to accomplish the common purpose or goal of providing information to the managers.

Characteristics of an effective MIS:

Major characteristic of an effective MIS are given as follows:

Management
related

Management Oriented – It means that efforts for the development of the information system should start from an appraisal of management needs and overall business objectives. Such a system is not necessarily for top management only but may also meet the information requirements of middle level or operating levels of management as well.

Management Directed – Because of management orientation of MIS, it is necessary that management should actively direct the system's development efforts.

Heavy Planning Element – An MIS usually takes one to three years and sometimes even longer period to get established firmly (i.e. in a secured manner) within a company. Therefore, a MIS designer must be present in MIS development and should consider future enterprise objectives and requirements of information as per the organization structure.

Information
related

Common Database – Database is defined as a "super-file", which consolidates and integrates data records formerly (i.e. at a previous time) stored in many separate data files. The organization of a database allows it to be accessed by several information sub-systems and thus, eliminates the necessity of duplication in data storage, updating, deletion and protection.

Common Data Flows – It means the use of common input, processing and output procedures and media whenever required. Data is captured by the system analysts only once and as close to its original source as possible. Afterwards, they try to utilize a minimum of data processing procedures and sub-systems to process the data and strive to minimize the number of output documents and reports produced by the system. This eliminates duplication in data collections, simplifies operations and produces an efficient information system.

Integrated – The best approach for developing information systems is the integrated approach as all the functional and operational information sub-systems are tied together into one entity. An integrated Information system has the capability of generating more meaningful information to management.

System
related

Sub System Concept – Even though the information system is viewed as a single entity, it must be broken down into digestible sub-systems, which can be implemented one at a time by developing a phased plan. The breaking down of MIS into meaningful sub-systems sets the stage for this phasing plan.

Computerized - MIS can be implemented without using a computer; the use of computers increases the effectiveness of the system and it can handle a wide variety of applications by providing their information requirements quickly. It also provides accuracy and consistency in processing data and reduction in clerical staff.

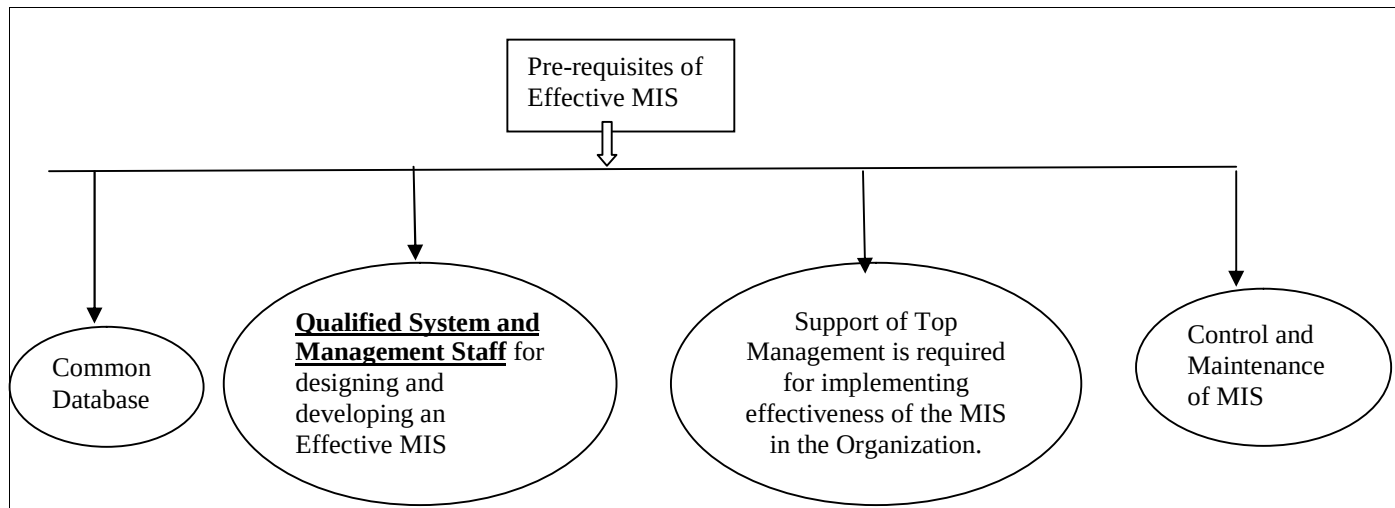
Misconceptions about MIS:

Misconception means "a view or opinion that is incorrect"

1. Any computer based information system is a MIS.
2. Any reporting system is MIS.
3. MIS is a management technique.
4. MIS is a bunch of technologies.
5. MIS is an implementation of organizational systems and procedures. It is a file structure.
6. The study of MIS is about use of computers.
7. More data in generated reports refers more information to managers.
8. Accuracy plays vital role in reporting.

Pre-requisites of an Effective MIS:

The pre-requisites of an effective MIS are given as follows:



1. Database:

- ❖ Database is collection of files, which is collection of records and records are nothing but collection of data.
- ❖ The data in database is organized in such a way that accessing to the data is improved and redundancy¹ is reduced.
- ❖ The main characteristics of database are given as follows:
 - ✓ It is user-oriented.
 - ✓ It is capable of being used as a common data source to various users, helps in avoiding duplication of efforts in storage and retrieval of data and information.
 - ✓ It is available to authorized persons only.
 - ✓ It is controlled by a separate authority established for the purpose, known as Database Management System (DBMS).

2. Qualified System and Management Staff:

- ❖ The second pre-requisite of effective MIS is that it should be manned (i.e. operated or carried) by qualified officers.
- ❖ These officers, who are experts in the field, should understand clearly the views of their fellow officers.
- ❖ For this, the organizational management base should comprise of two categories of officers; Systems and Computer experts and Management experts.
 - ✓ Systems and Computer experts in addition to their expertise in their subject area/s should also be capable of understanding management concepts to facilitate the understanding of problems faced by the concern. They should also be clear about the process of decision making and information requirements for planning and control functions.
 - ✓ Management experts should also understand quite clearly the concepts and operations of a computer. This basic knowledge of computers will be useful to place them in a comfortable position, while working with systems technicians in designing.

3. Support of Top Management:

The support from top management is required for the effectiveness of MIS in an organization. The reasons for the same are as follows:

- ❖ Any implementation, which does not receive the support of top management will not be effectively controlled and tends to be get lesser priority and may be delayed or abandoned.
- ❖ The resources involved in computer-based information systems are large and are growing larger in view of importance gained by management information system.
- ❖ To gain the support of top management, the officers should place before top management all the supporting facts and state clearly the benefits, which will accrue from it to the concern.

4. Control and maintenance of MIS:

- ❖ Control of the MIS means the operation of the system as it was designed to operate.
- ❖ Some time, users develop their own procedures or short cut methods to use the system, which reduce its effectiveness.
- ❖ To check such habits of users, the management at each level in the organization should devise checks for the information system control.
- ❖ Maintenance implies that there should be changes or modifications from time to time based on changing needs.

Evaluation of MIS:

An effective MIS should be capable of meeting the information requirements of its executives in future as well. This capability can be maintained by evaluating the MIS and taking appropriate timely action. The evaluation of MIS should take into account the following major points:

1. Examining whether enough flexibility exists in the system to cope with any expected or unexpected information requirement in future.
2. Ascertaining the views of users and the designers about the capabilities and deficiencies of the system.
3. Guiding the appropriate authority about the steps to be taken to maintain effectiveness of MIS.

Constraints in operating a MIS:

Major constraints, which come in the way of operating an information system, are given as follows:

1. Non availability of experts:

- ❖ Non-availability of experts, who can diagnose (I.e. Identify) the objectives of the organization and provide a desired direction for installing operating system.

- ❖ This problem may be overcome by grooming internal staff.

- ❖ The grooming of staff should be preceded by proper selection and training.

2. Problem of selecting the sub system of MIS to be installed and operated upon:

- ❖ Experts usually face the problem of selecting the sub-system of MIS to be installed and operated upon.

- ❖ The criteria, which should guide the experts, depend upon the need and importance of a function for which MIS can be installed first.

3. Non-standardization of MIS:

- ❖ Due to varied objectives of business concerns, the approach adopted by experts for designing and implementing MIS is a non-standardized one.

4. Non availability of cooperation from staff:

- ❖ Change is a major problem i.e. normally staff resists for acceptance of computerized system.

- ❖ Educating the staff may solve this problem.

- ❖ This task should be carried out by organizing lectures, showing films and also explaining to them the utility of the system.

Limitations of MIS:

Major Limitations of MIS are given as follows:

1. The quality of the outputs of MIS is basically governed by the quality of input and processes.
2. MIS is not a substitute for effective management, which means that it cannot replace managerial judgment in making decisions in different functional areas. It is merely an important tool in the hands of executives for decision making and problem solving.
3. MIS may not be flexible enough to update itself especially in fast changing and complex environment.
4. MIS cannot provide tailor-made information packages suitable for the purpose of every type of decision made by executives.
5. MIS takes into account mainly quantitative factors.
6. MIS is less useful for making non-programmed (Non-structured) decisions.
7. Culture of information hoarding and not sharing may reduce the effectiveness of the MIS.
8. MIS effectiveness decreases due to frequent changes in top management, organizational structure and operational team.

B. Decision Support System (DSS):

1. Decision Support System is a type of computerized information system that supports business and organizational decision-making activities.
2. A Decision Support System (DSS) can be defined as a system that provides tools to managers to assist them in solving semi-structured² and unstructured² problems in their own
3. A DSS is not intended to make decisions for managers, but rather to provide managers with a set of capabilities that enable them to generate the information required by them in making decisions.
4. A DSS support the human decision making process, rather than providing a means to replace it.

Characteristics of DSS:

1. This supports decision making and occurs at all levels of management.
2. Instead of helping individuals working on independent tasks, it should be able to help group making decisions.
3. It should be flexible and adaptable.
4. DSS focuses on decision rather than data and information.
5. It should be easy to use. A user should not have knowledge of computer programming to generate reports that helps in decision making.
6. DSS can be used for structured problems².
7. DSS should be user-friendly.
8. DSS should be extensible and evolve overtime.
9. DSSs are used mainly for decision making rather than communicating decisions and training purposes.
10. The impact of DSS should be on decision where the manager's judgment is essential and there is sufficient structure for computers.

Components of DSS:

The Decision Support System has four basic components:

1. The User
2. One or more Databases
3. Planning Languages, and
4. Model base

1. The user:

- ❖ The user of a DSS is usually a manager with an unstructured or semi-structured problem to solve. Manager and staff specialist (analyst) are the two broad classes of users.
- ❖ Typically, users do not need a computer background to use a decision support system for problem solving.
- ❖ The most important knowledge is a thorough understanding of the problem and the factors to be considered in finding a solution.
- ❖ The key points relating to these users are given as follows:
 - ✓ **Manager** - These are the users, who have basic computer knowledge and want the DSS to be very user friendly. The manager may be at any level of authority in the organization (e.g., either top management or operating management).
 - ✓ **Staff Specialist (Analysts)** - These are the people, who are more details oriented and willing to use complex system in their day-to-day work.

Analyst means a person who reviews and examines data or information for specific area. For example, a financial analyst looks into the economic and financial information associated with stocks and other securities.

2. Databases:

- ❖ DSS includes one or more databases.
- ❖ These Databases contain both routine and non-routine data from both internal and external sources.
- ❖ Some of the data may come from internal sources. An organization often generates this type of data in the normal course of operations. For example; data from the financial and managerial accounting systems.
- ❖ The database may also capture data from other subsystems such as personnel, production and marketing.
- ❖ External data include assumptions about such variables as interest rates, vacancy rates, market prices, and levels of competition.
- ❖ **Implementation of Database** - Database is implemented at three level s as listed below:
 - ✓ **Physical level** – It involves the implementation of the database on the hard disk i.e. storage of data in the hard disk.
 - ✓ **Logical Level** – It is designed by professional programmers, who have complete knowledge of DBMS. It deals with the nature of data stored, the scheme of the data.
 - ✓ **External level** – The logical level defines schema, which is divided into smaller units known as sub-schemas and given to the managers. Each sub-schema contains all relevant data needed by one manager.

3. Planning Languages:

Two types of planning languages that are commonly used in DSS are: **General-purpose planning languages** and **Special-purpose planning languages**. These are discussed below:

- ❖ **General-purpose planning languages** that allow users to perform many routine tasks, for example; retrieving various data from a database or performing statistical analyses. The Syntax, functions and procedures used in most electronic spreadsheets are good examples of general-purpose planning languages. These languages enable user to tackle abroad range of budgeting, forecasting, and other worksheet-oriented problems.
- ❖ **Special-purpose planning languages** are more limited in what they can do, but they usually do certain jobs better than the general -purpose planning languages. Some statistical languages, such as SAS (Statistical Analysis System) and SPSS (Special Purpose Statistical Software), are examples of special purpose planning languages.

4. Model base:

- ❖ The Model base is the “brain” of the decision support system because it processes data with the help of data provided by the user and the database.
- ❖ There are many types of model bases, but most of them are custom developed models that do some type of mathematical functions – for example, regression analysis, time series analysis, linear programming and financial computations.
- ❖ The analysis provided by model base is the key for user’s decision.

Examples of Decision Support Systems in Accounting:

Many DSS are developed in-house using either a general type of decision support program or a spreadsheet program to solve specific problems. DSS is used in following accounting applications.

- ❖ **Cost Accounting System** – Cost structure is very complex in health care industry. It is very difficult to divide costs in the areas of supplies, expensive machinery, technology and a variety of personnel. Cost accounting applications help health care organizations to calculate product costs for individual products or services.
- ❖ **Capital Budgeting System** - Companies require new tools to evaluate high - technology investment decisions. For example:
 - ✓ Decision support tools that can consider non-financial factors (e.g. new technology benefits) can be used with technique like NPV and IRR.
 - ✓ One DSS known as AutoMan supports decisions about investment in automated manufacturing technology: it considers financial, non-financial, quantitative, and qualitative factors in the decision-making process.
- ❖ **Budget Variance Analysis System** – Financial institutions can use a computerized DSS to generate monthly variance reports for division comptrollers, which further allows comptrollers to graph, view, analyse, and annotate budget variances, thus the comptrollers can create and control budgets for cost-centre managers reporting to them.
- ❖ **General Decision Support System** - In this, the user inputs data & the DSS asks the user to answer questions about specific problem domain. DSS analyses decision variables and present the decision maker with the best alternative. For example a program called Expert choice

supports a variety of problems requiring decisions. The user only needs to work interactively with the computer to develop a hierarchical model of the decision problem.

Difference between DSS and traditional MIS:

Dimensions	Decision Support System	Traditional MIS
Philosophy	Providing integrated tools, data, models, and languages to end users	Providing structured information to end users
Orientation	External orientation	Internal orientation
Flexibility	Highly flexible	Relatively inflexible
Analytical capability	More analytical capability	Little analytical capability
System analysis	Emphasis on tools to be used in decision process	Emphasis on information requirement analysis
System design	Interactive process	System development based on static information requirements

IV. Strategic Level Systems:

1. These systems are for strategic managers to track and deal with strategic issues, assisting long-range planning.
2. These systems support the senior level management to tackle and address strategic issues and long term trends, both inside organization and the outside world.
3. These answer questions like what products should be launched to increase the profit and capture the market. It helps in long term planning.
4. A principle area is tracking changes in the external conditions (market sector, employment levels, share prices, etc.) and matching these with the internal conditions of the organization.
5. The **EIS** (Executive Information System) or **ESS** (Executive Support System) falls under this category.

Executive Information Systems (EIS):

1. An Executive Information System (EIS) is a DSS that is designed to meet the special needs of top-level manager (Or) DSS when assist executives is called EIS.
2. It is a tool that provides direct on-line access to relevant information in a useful and navigable format.
3. EIS is sometimes referred to as an Executive Support System (ESS).
4. It serves the strategic level i.e. top level managers of the organization.

Characteristics of EIS:

1. EIS is a Computer-based-information system that serves the information need of top executives.
2. EIS enables users to extract summary data and model complex, problems without the need to learn query languages statistical formulas or high computing skills.
3. EIS provides rapid access to timely information and direct access to management reports.
4. EIS is capable of accessing both internal and external data.
5. EIS provides extensive online analysis tool like trend analysis, market conditions etc.
6. EIS can easily be given as a DSS support for decision making.

The Executive Decision-Making Environment:

The type of decisions that executives must make are very broad. Often, executives make these decisions based on a vision they have regarding 'what it will take to make their enterprise successful.' To a large extent, executives rely much more on their own intuition than on the sophisticated analytical skills. The intuitive character of executive decision- making is reflected strongly in the types of information found most useful to executives.

Following are the characteristics of information used in executive decision making:

1. **Lack of structure:** Many of the decisions made by executives are relatively unstructured. These types of decisions are not as clear-cut as deciding how to debug a computer program or how to deal with an overdue account balance.
2. **High degree of uncertainty:** Executives work in a decision space that is often characterized by a lack of precedent. Executives also work in a decision space where results are not scientifically predictable from actions. If prices are lowered, for instance, product demand will not automatically increase.
3. **Future orientation:** Strategic-planning decisions are made in order to shape future events. As conditions change, enterprises must change also. It is the executive's responsibility to make sure that the organization keeps pointed toward the future. Some key questions about the future include: "How will future technologies affect what the company is currently doing? What will the competition (or the government) do next? What products will consumers demand five years from now?" As one can see, the answers to all of these questions about the future external environment are vital.
4. **Informal Source:** Executives, more than other types of managers, rely heavily on informal source for key information. For example, lunch with a colleague in another firm might reveal some important competitor strategies.
5. **Low level of detail:** Most important executive decisions are made by observing broad trends. This requires the executive to be more aware of the large overview than the tiny items.

Contents of EIS:

1. EIS implementations begins with just a few measure that are clearly of interest to senior managers and then expand in respond to questions asked by those managers as they use the system.
2. Following is a practical set of principles to guide the design of measures and indicators to be included in an EIS:
 - ✓ EIS measures must be easy to understand and collect.
 - ✓ EIS measures must be based on a balanced view of the organization's objective.
 - ✓ Performance indicators in an EIS must reflect everyone's contribution in a fair and consistent manner.
 - ✓ EIS measures must encourage management and staff to share ownership of the organization's objectives.
 - ✓ EIS information must be available to everyone in the organization but confidential information should not be part of EIS.
 - ✓ EIS measures must evolve to meet the changing needs of the organization.

Difference between EIS and Traditional Information System:

Dimensions of Difference	Executive Information System	Traditional Information System
Level of management	For top or near top executives	For lower staff
Nature of Information Access	Specific issues/problems and	Status reporting
Nature of information provided	Online tools and analysis	Offline status reporting
Information Sources	More external, less internal	Internal
Drill down facility to go through details at successive levels	Available	Not available
Information format	Text with graphics	Tabular
Nature of interface	User-friendly	Computer-operator generated

2.2.6 Specialized Systems:

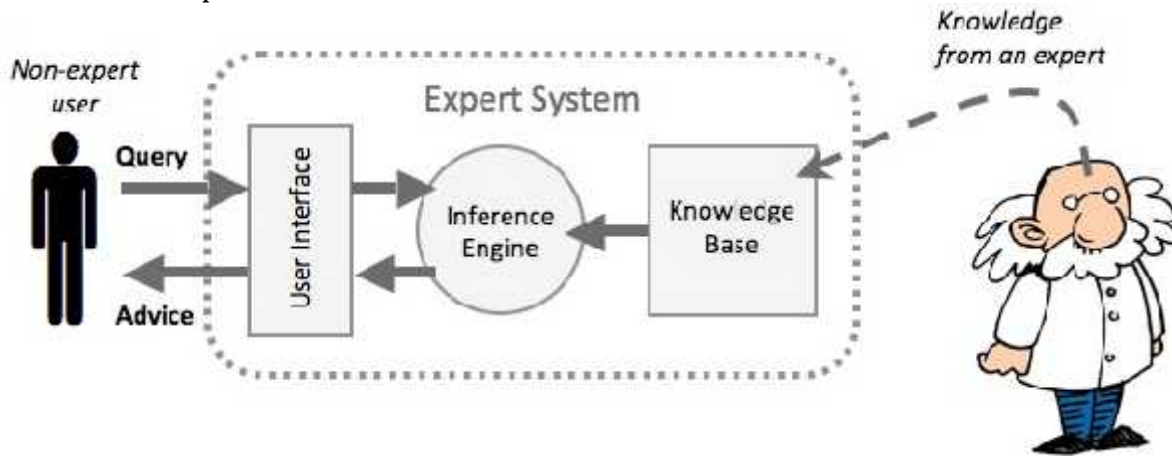
Apart from the information systems discussed above, there exists other categories of information systems also that provide comprehensive end to end IT solutions and services (including systems integration, implementation, engineering services, software application customization and maintenance) to various corporations globally.

Some of them are:

- A. Expert Systems
- B. Cross Functional Information Systems and
- C. Core Banking System (CBS)

A. Expert System:

1. An Expert System is highly developed DSS that utilizes knowledge generally possessed by an expert to share a problem.
2. Expert Systems are software systems that imitate the reasoning processes of human experts and provide decision makers with the type of advice they would normally receive from experts.



3. For instance, an expert system in the area of investment portfolio management might ask its user a number of specific questions relating to investments for a particular client like -
 - a) How much can be invested?
 - b) Does the client have any preferences regarding specific types of securities? And so on.
4. A characteristic of Expert Systems is the ability to declare or explain the reasoning process that was used to make decisions.

Business applications of Expert Systems or Examples of some business Expert Systems:

1. **Personnel:** It is useful to HR Managers in assessing applicant qualifications and assisting employees in filling out forms.
2. **Manufacturing:** It helps in:
 - ✓ Determining whether a process is running correctly
 - ✓ Analyzing quality and providing corrective measures
 - ✓ Maintaining facilities
 - ✓ Scheduling job-shop tasks
 - ✓ Selecting transportation routes
 - ✓ Assisting with product design.
3. **Marketing:** It provides:
 - ✓ Establishing sales quotas
 - ✓ Responding to customer inquiries
 - ✓ Referring problems to telemarketing centers
 - ✓ Assisting with marketing timing decisions
 - ✓ Determining discount policies.
4. **Accounting and Finance:** It provides:
 - ✓ Tax advice and assistance
 - ✓ Providing investment advice

- ✓ Selecting forecasting models
- ✓ Helping with credit- authorization decisions

5. General Business: It helps in:

- ✓ Assisting with project proposals
- ✓ Recommending acquisition strategies
- ✓ Educating trainees and
- ✓ Evaluating performance.

Need for Expert Systems:

Major reasons for the need of expert systems are given as follows:

1. Expert labor (i.e. work) is expensive and scarce. Knowledge workers employee , who routinely work with data and information to carry out their day-to-day duties are not easy to find and keep and companies are often faced with a shortage of talent in key positions.
2. Moreover, no matter how bright or knowledgeable certain people are, they often can handle only a few factors at a time.
3. Both these limitations imposed by human information processing capability and the rushed pace (i.e. steps taken) at which business is conducted today put a practical limit on the quality of human decision making; thus putting a need for expert systems.

Benefits of Expert Systems:

1. Expert Systems preserve knowledge that might be lost through retirement, resignation or death of an acknowledged company expert.
2. Expert Systems put information into an active -form so it can be summoned (i.e. ordered) almost as a real-life expert might be summoned.
3. Expert Systems assist novices (i.e. beginners or persons new to field) in thinking the way experienced professional do.
4. Expert Systems are not subjected to such human fallings as fatigue (i.e. tired), being too busy, or being emotional.
5. Expert Systems can be effectively used as a strategic tool in the areas of marketing products, cutting costs and improving products.

Properties that Expert System should posses:

Still, Expert Systems are not always the answer to managerial or organizational problems. Some of the properties that potential applications should posses s to qualify for Expert System development are given as follows:

1. **Availability** – One or more experts are capable of communicating ‘how they go about solving the problems to which the Expert System will be applied.
2. **Complexity** – Solution of the problems for which the Expert Systems will be used is a complex task that requires logical inference processing, which would not be easily handled by conventional information processing.

3. **Domain** – The domain, or subject area, of the problem is relatively small and limited to a relatively well-defined problem area.
4. **Expertise** – Solutions to the problem require the efforts of experts. That is, only a few possess the knowledge, techniques, and intuition needed.
5. **Structure** – The solution process must be able to cope with ill-structured, uncertain, missing, and conflicting data, and a dynamic problem-solving situation.

B. Cross Functional Information Systems:

It is also known as integrated information system that combines most of information systems and designed to produce information and support decision making for different levels of management and business functions. Example– Enterprise Resource Planning (ERP).

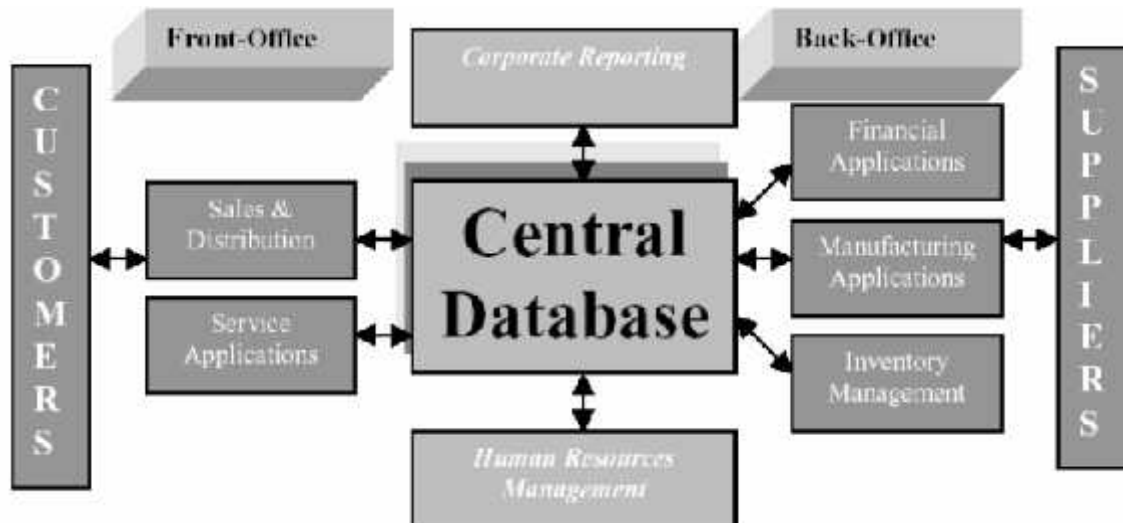
Enterprise Resource Planning (ERP):

INTRODUCTION:

- ✓ A Business comprises of several departments such as Purchase, Sales, Finance, HR etc. In most of the companies, the Operation departments such as Purchase and Sales were not linked to the Finance & Accounting software. For instance, a Purchase Order could be made in a software, but the corresponding entry for the same in Tally 54/ 72 had to be made separately.
- ✓ However, as businesses grow, there is a need for linkages between these. For instance, generation of a Purchase Order should pass the Accounting entry also. This is what an ERP does.
- ✓ **An Enterprise Resource Planning (ERP) system is a fully integrated business management system covering functional areas of an enterprise like Procurement, Inventory, Production, Sales, Logistics, Finance, Accounting and Human Resources.**
- ✓ It organizes and integrates operation processes and information flows to make optimum use of resources such as men, material, money and machine, i.e. ERP is the way an Enterprise plans the optimum use of its resources.
- ✓ ERP promises one database, one application, and one user interface for the entire enterprise.

Just for understanding purpose....just read it and leave

1. Enterprise resource planning (ERP) is process management software that allows an organization to use a system of integrated applications to manage the business and automate many back office functions related to technology, services and human resources.
2. ERP software integrates all facets of an operation, including product planning, development, manufacturing, sales and marketing.
3. ERP software is considered an enterprise application as it is designed to be used by larger businesses and often requires dedicated teams to customize and analyze the data and to handle upgrades and deployment.
4. In contrast, Small business ERP applications are lightweight business management software solutions, customized for the business industry we work in.



ERP System Concept

Components of ERP:

ERP model is consists of four components which are implemented through a methodology. All four components are as follows:

1. **Software Component:** The software component is the component that is most visible part and consists of several modules such as Finance, Human Resource, Supply Chain Management, Supplier Relationship Management, Customer Relationship, and Business Intelligent.
2. **Process Flow:** It is the model that illustrates the way how information flows among the different modules within an ERP system. By creating this model makes it easier to understand how ERP work.
3. **Customer mindset:** By implementing ERP system, the old ways for working which user understand and comfortable with have to be changed and may lead to users' resistance. For example, some users may say that they have spent many years doing an excellence job without help from ERP system. In order to lead ERP implementation to succeed, the company needs to eliminate negative value or belief that users may carry toward utilizing new system.
4. **Change Management:** In ERP implementation, change needs to be managed at several levels - User attitude; resistance to change; and Business process changes.

Benefits of ERP:

1. Streamlining processes and workflows with a single integrated system.
2. Reduce redundant data entry and processes and in other hand it shares information across the department.
3. Establish uniform processes that are based on recognized best business practices.
4. Improved workflow and efficiency.
5. Improved customer satisfaction based on improved on-time delivery, increased quality, shortened delivery times.

6. Reduced inventory costs resulting from better planning, tracking and forecasting of requirements.
7. Turn collections faster based on better visibility into accounts and fewer billing and/or delivery errors.
8. Decrease in vendor pricing by taking better advantage of quantity breaks and tracking vendor performance.
9. Track actual costs of activities and perform activity based costing.
10. Provide a consolidated picture of sales, inventory and receivables.

C. Core Banking System (CBS):

1. Core Banking is a banking services provided by a group of networked bank branches where customers may access their bank account and perform basic transactions from any of the member branch offices.
2. Normal core banking functions will include transaction accounts, loans, mortgages and payments. Banks make these services available across multiple channels like ATMs, Internet banking, and branches.
3. Core Banking System (CBS) may be defined as a back-end system that processes daily banking transactions, and posts updates to accounts and other financial records.
4. These systems typically include deposit, loan and credit -processing capabilities, with interfaces to general ledger systems and reporting tools.
5. Core banking functions differ depending on the specific type of bank.
6. Examples of core banking products include Infosys' Finacle, Nucleus FinnOne and Oracle's Flexcube application (from their acquisition of Indian IT vendor i-flex).

Elements of core banking include:

- ❖ Making and servicing loans.
- ❖ Opening new accounts.
- ❖ Processing cash deposits and withdrawals.
- ❖ Processing payments and cheques.
- ❖ Calculating interest.
- ❖ Customer Relationship Management (CRM) activities.
- ❖ Managing customer accounts.
- ❖ Establishing criteria for minimum balances, interest rates, number of withdrawals allowed and so on.
- ❖ Establishing interest rates.
- ❖ Maintaining records for all the bank's transactions.

2.2.7 Application of Information Systems in Enterprise Processes:

Information Systems perform following three vital roles in business firms:

1. **“Support an organization’s business processes and operations”:** This includes operations support systems such as Transaction Processing Systems, Process Control Systems.
2. **“Support business decision-making”:** This includes Management Information Systems, Decision Support Systems, and Executive Information Systems.
3. **“Support strategic competitive advantage”:** This includes Expert Systems, Knowledge Management Systems, Strategic Information Systems, and Functional Business Systems.

Pre-Requisites to Operate Information Systems (IS):

To operate Information Systems (IS) effectively and efficiently a business manager should have following knowledge about it:

1. **Foundation Concepts** – It includes fundamental business, and managerial concepts e.g. ‘what are components of a system and their functions’, or ‘what competitive strategies are required’.
2. **Information Technologies (IT)** – It includes operation, development and management of hardware, software, data management, networks, and other technologies.
3. **Business Applications** – It includes major uses of IT in business steps i.e. processes, operations, decision making, and strategic/competitive advantage.
4. **Development Processes** – It comprise how end users and IS specialists develop and execute business/IT solutions to problems.
5. **Management Challenges** – It includes ‘how the function and IT resources are maintained’ and utilized to attain top performance and build the business strategies.

IT AS A BUSINESS ENABLER AND ITS APPLICATION:

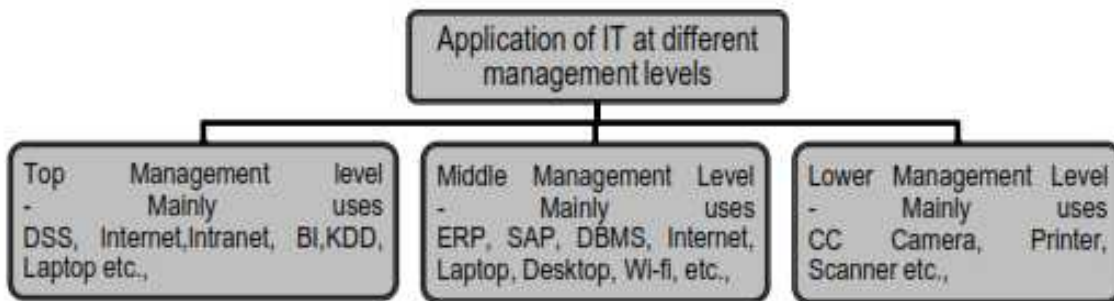
1. IT can be viewed as a subsystem of information system that includes hardware, software, databases, networks and other electronic devices. Sometimes, the term Information Technology can be used interchangeably with information systems.
2. Information Technology refers to the technology of the production, storage and communication and management of information using computers and micro-electronics and is a crucial part of information systems. Most of the businesses use IT to create and process data.
3. Small businesses generally need to purchase software packages, and may need to contract with IT businesses that provide services such as hosting, marketing web sites and maintaining networks.
4. However, larger companies can consider having their own IT staffs to develop software.
5. IT has changed the working styles of staff at all levels of enterprises, from the executives to middle management and lower level staff.
6. The primary areas where IT enabled tools are used in any organization are:
 - ✓ Marketing
 - ✓ Customer Relationship Management

- ✓ Supply Chain Management
- ✓ Knowledge Management
- ✓ Retailing
- ✓ Decision Making

7. Different IT enabled tools used at three layers i.e. top, middle and lower management of an organization.



IT in Prime Business Areas



Application of IT at Different Management Levels

Important implications of Information Systems in Business:

1. Information system helps managers in efficient decision-making to achieve the organizational goals.
2. An organization will be able to survive and thrive in a highly competitive environment on the strength of a well-designed Information system.
3. Information systems helps in making right decision at the right time i.e. just on time.
4. A good information system may help in generating innovative ideas for solving critical problems.
5. Knowledge gathered through Information system may be utilized by managers in unusual situations.
6. Information system is viewed as a process; it can be integrated to formulate a strategy of action or operation.

2.3 Relative Importance of Information Systems from Strategic and Operational Perspectives:

1. A **Business Model** can be defined as an outline of 'how business is to be done by a company to generate maximum revenue'.

2. A Business Strategy is defined as a long term planning for success i.e. tactics that are applied to manage business for increasing business revenue.
3. A good business strategy is one that enables company to satisfy customers, uses resources efficiently and explore business opportunities outside of the standard business practice to help inspire company expansion.
4. An Information System can be large or small depending upon the size of the company and can help in decision making, produce high quality of products and perform logistical functions.
5. Information system is used in every aspects of business right from customer relationship management, marketing strategies, retailing, communication, product promotion, product development, forecast future sales to supply chain management etc.
6. ERP, Data Mining tools, Data warehouse, Business intelligence, MIS, internet, intranet, extranet etc. are the information systems and information technologies that support managers in every step of business.
7. There are different kinds of systems depending upon the different interest, specialties and levels in an organization.
8. The organization comprise of strategic, management, knowledge and operational levels, which is further divided into functional areas e.g. sales, marketing, manufacturing, finance, accounting and human resources.
9. For example - the sales area uses operational level system to keep track of daily sales figures, a knowledge level systems designs the promotional displays of the organization, a management level system generate report of the monthly sales by territory and a strategic level system predicts the sale of the product in coming five years.
10. Managers or business professionals are not required complete understanding of complex technologies, concepts and the specialized applications in the area of information systems but what they should know is key areas of knowledge requirements, which are given below:
 - Foundation concepts,
 - Information technologies,
 - Business applications,
 - Development processes, and
 - Management challenges.

2.4 Role of Information in Business:

1. In today's dynamic business environment, it becomes mandatory to have complete information and knowledge of customer buying habits and market strategy for any enterprise.

2. Timeliness, accurate, meaningful and action oriented information enhances an organization ability and capacity to deal with and develop in mission, competition, performance and change.
3. The information can be categorized on the basis of its requirement by the top, middle and lower level management.

4. Top Level Management:

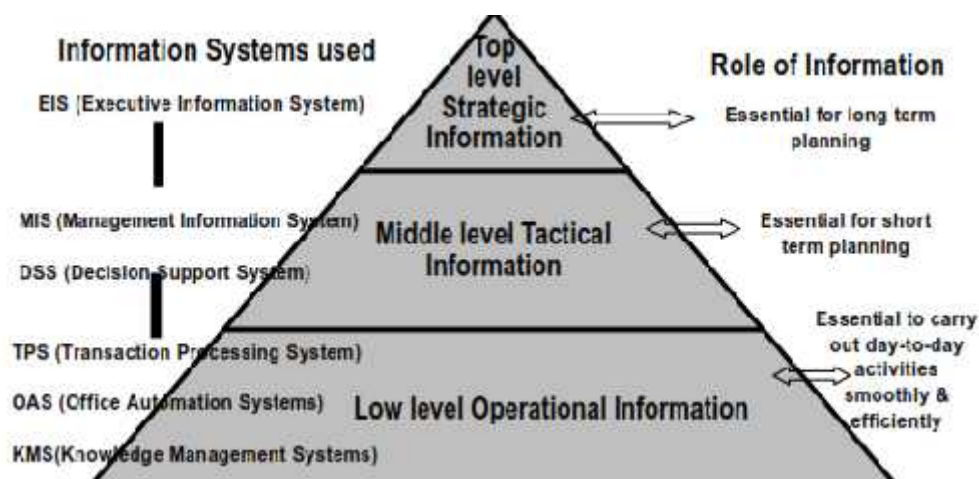
- The top management generally comprise of owners/shareholders, board of directors, its chairman, managing director, or the chief executive, or the managers committee having key officers.
- Top level management strives for the information that can help them in major policy decisions such as establishment of new plant, launching of new product etc.
- The top management requires strategic information that helps them in making strategy of an enterprise in terms of scope of products, targets of products i.e. customers, competition with market i.e. price, quality, long term planning etc.

5. Middle Level Management:

- The middle management comprise of heads of functions departments e.g. purchase manager, production manager, marketing managers, financial controller, and divisional sectional officers working under these functional heads.
- Middle managements require tactical information that helps in implementing decisions taken by the top management.
- Tactical information is used for short term planning whereas strategy information is used for long term planning.

6. Low Level Management:

- The lower level managers are superintendents, supervisor, etc.
- The lower management requires operational information, which is required in day -to-day activities. The operational information mainly comprises of information about stock on hand, information about customer order pending, information about bill payable by customer etc.
- These are essential for smooth running of the daily activities of a business at primary level.



2.5 Various types of Business Applications:

1. IT has increased the communication between executives by providing for online meeting and instant exchange of information, irrespective of their location.
2. Information system also contributes to an organization's success by providing information that provides innovative ideas to managers and helps them in decision making which is very important to keep the organization ahead in this competitive era.
3. Financial, trading, manufacturing, retail industries etc. are moving towards a real time business model where transaction and information sharing are near instantaneous.
4. The impact of IT on Information Systems for different sectors are:

5. E-business:

- This is also called electronic business and includes purchasing, selling, production management, logistics, communication, support services and inventory management through the use of internet technologies.
- The primary components of E - business are infrastructure (computers, routers, communication media e.g. wire, satellite etc., software and programmers), electronic commerce and electronically linked devices and computer aided networks.
- The advantage of E -business are 24 hour sale, lower cost of doing business, more efficient business relationship, eliminate middlemen, unlimited market place and access with broaden customer base, secure payment systems, easier business administration and online fast updating.

6. Financial Service Sector:

- The financial services sector (banks, building societies, life insurance companies and short term insurers) manages large amounts of data and processes enormous numbers of transactions every day.
- Owing to application of IT, all the major financial institutions operate nationally and have wide networks of regional offices and associated electronic networks.

7. Wholesaling and Retailing:

- Retail business uses IT to carry out basic functions including till systems for selling items, capturing the sales data by item, stock control, buying, management reports, customer information and accounting. IT can be used in wholesale for supply chain logistics management, planning, space management, purchasing, re-ordering, and analysis of promotions.
- E-commerce among partners (suppliers, wholesalers, retailers, distributors) helps in carrying out transactions.

8. Public sectors:

- It includes services provided by the government mainly hospitals, police stations, universities etc. IT/IS can be used here, to keep records of the cases, respective people involved it, other related documents and can consult the existing data warehouse or databases to take appropriate actions.

9. Others :

- IT is efficiently used in entertainment industry (games, picture collection etc.), agriculture industry (information is just a mouse click away to the farmers), Tour industry (railway, hotel and airline reservations) and consultancy etc.

2.6 Overview of Underlying IT Technologies:

1. Now day's business uses IT to carry out basic functions including systems for selling items, capturing the sales data by item, stock control, buying, management reports, customer information, decision making, accounting etc.

2. Some of the IT tools crucial for business growth are:

3. Business Website:

- By having a website, enterprise/business becomes reachable to large amount of customers. In addition, it can also be used in an advertisement, which is cost effective and in customer relationship management. These websites can be designed by using HTML, XML, ASP.NET etc.

4. Internet and Intranet:

- It is the best source of communication. Time and space is no more obstacles for conducting meeting of people working in a team from multiple locations, or with different vendors and companies.
- Intranet is system that permits the electronic exchange of business data within an organization, mostly between managers and senior staff.
- E-commerce among partners (suppliers, wholesalers, retailers, distributors) using intranets, e-mail etc. provides new platform to the business world for conducting business in a faster and easier way.

5. Software and Packages:

- DBMS, data warehousing, data mining tools, knowledge discovery can be used for getting information that plays important role in decision making that can boost the business in the competitive world.

6. Enterprise Resource Planning (ERP) Packages:

- ERP is one of the latest high-end solutions that seek to streamline and integrate operation processes and information flows in the company to synergize the five major resources of an organization namely men, money, machine, materials and market.
- ERP can be defined as a system, which is a fully integrated business management system that integrates the core business and management processes to provide an organization a structured environment in which decisions concerning demand, supply, operational, personnel, finance, logistics etc. are fully supported by accurate and reliable real-time information.
- The objective of ERP is to provide support for adopting best business practices; to implement these practices with a view towards enhancing productivity and to empower the customers and suppliers to modify the implemented business processes to suit their needs.

- An ERP System is a multi module software system that integrates all business process and functions of the entire Enterprise into a single software system, using a single integrated database.
- Each module is intended to collect, process, and store data of a functional area of the organization and to integrate with related processes.
- For example, a module may be designed to process purchasing transactions and record all data about purchase orders.
- Each of the software modules of an ERP system automates business activities of a functional area within an organization.
- Information is updated instantly using the same database and each functional area can easily share information with other areas of the organization.
- For example, when customer order is entered in an ERP system, a customer representative can have access to information such as the production schedules, and shipping schedules.
- For example, employee can answer any questions that the customer may ask, such as the following:
 - ✓ Is the product in stock?
 - ✓ If not, when will it be produced or restocked?
 - ✓ How soon can it be shipped?
 - ✓ When did we place the last order for this item?

7. Data Mining (DM):

- Data Mining refers to the Process of searching for valuable business information in a large database or multiple databases.
- Data Mining (DM) can be applied in database analysis and decision support i.e. market analysis and management by finding patterns that are helpful in target marketing, customer relation management, market basket analysis, cross selling, market segmentation, risk analysis, customer retention, improved underwriting, quality control, competitive analysis and fraud detection.
- Other applications of DM are:
 - ✓ text mining,
 - ✓ web analysis,
 - ✓ customer profiling - it can list out what types of customers buy what products by using clustering or classification,
 - ✓ identifying customer requirements - it can identify the most demanding and appropriate products for different customers, and also can list the factors that will attract new customers by using prediction etc.,
 - ✓ provide summary information i.e. various multidimensional summary reports and statistical summary information,
 - ✓ finance planning and asset evaluation
 - ✓ cross-sectional and time series analysis, and
 - ✓ resource planning- it can summarize and compare the resources and spending.

8. Business Intelligence (BI):

- BI refers to applications and technologies that are used to collect and provide access and analyze data and information about companies operations. BI software consists of range of tools.
- Some BI applications are used to analyze performance or internal operations and to store, analyze data and manage the human resources.
- A complete Business Intelligence provides consistent and standard information essential in enterprise operations.

9. Computer Systems, Scanners, Laptop, Printer, Webcam, Smart Phone etc.:

- Webcam, microphone etc. are used in conducting long distance meeting. Use of computer systems, printer; scanner increases accuracy; reduce processing times; enable decisions to be made more quickly and speed up customer service.