Unit-1: Information Systems and Types

BCA III Semester-2076

Data versus information

- The raw material from which information is generated. data appear in the form of text, numbers, audio, video, images, figure or any combination of these. There are many way to collect data, including survey, interviews, the use of sensors, the reading of document .
- Data processed and converted into a form that is useful to the decision maker. Facts, principles, knowledge, experience, and intuition are applied to convert data into information. Information is time-dependent so its value and usefulness often decrease with time.

Data versus information

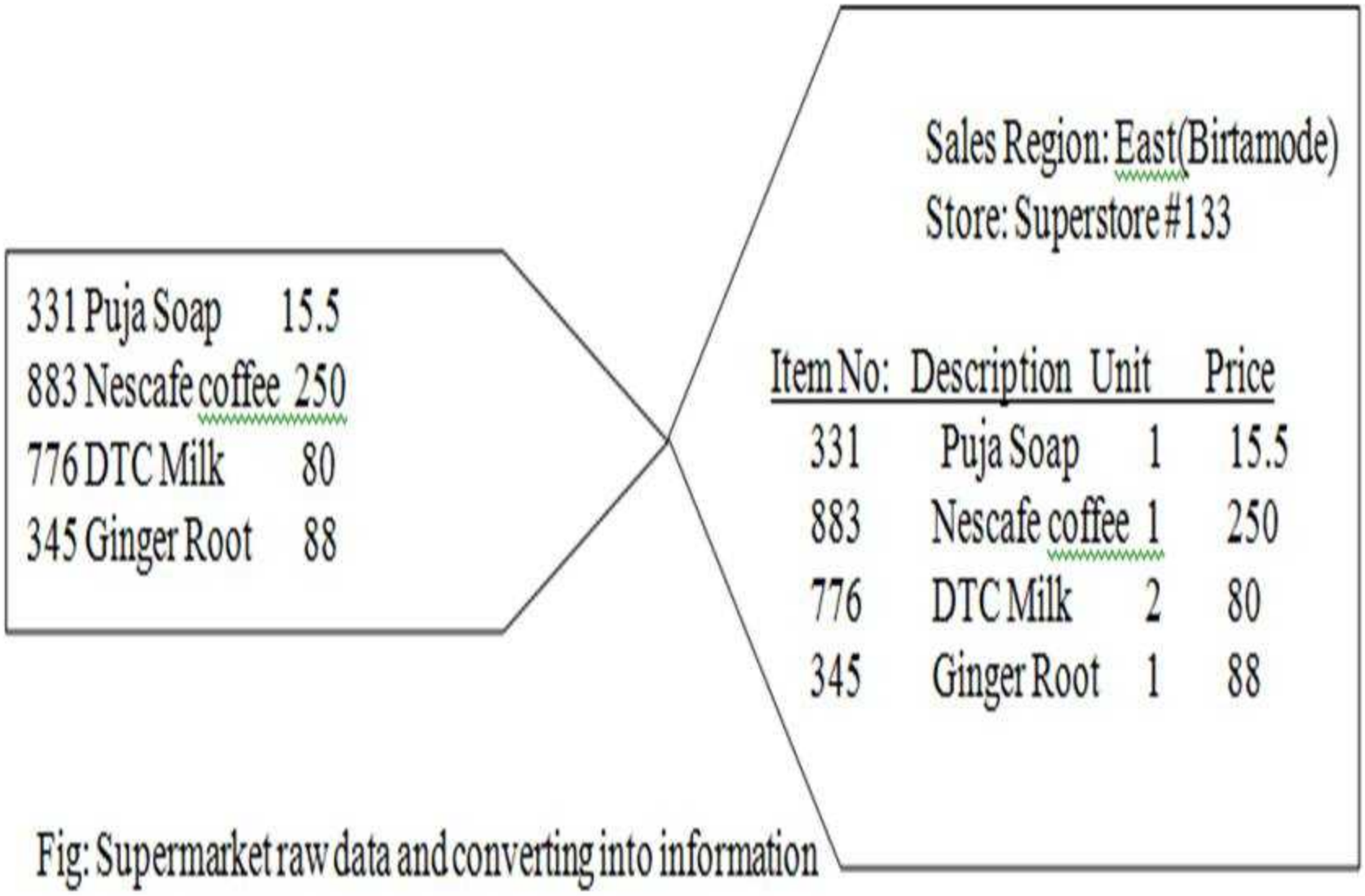


Fig: Supermarket raw data and converting into information

Characteristics of information

- **Subjectivity:**
  The value and usefulness of information are highly subjective because what is information for one person may not be for another. For example even small change in the price of share of company may influence buying and selling shareholder, however to none-shareholder person a share price of may be just a number with little or no meaning.
- **Relevance:**
  Information is good only if it is relevant that is meaningful to decision maker. For example a plant manager is trying to determine why a certain machine breaks down frequently. For that plant manager, the number of units that the machine has produced in the last 5 years is probably not relevant to the problem at hand.

- **Timeliness**

  Information must be delivered at the right time and the right place to the right person. In the above example, if the manager gets information about the causes of machine failure a years after requesting it. The information is not timely and hence probably not used.

- **Accuracy**

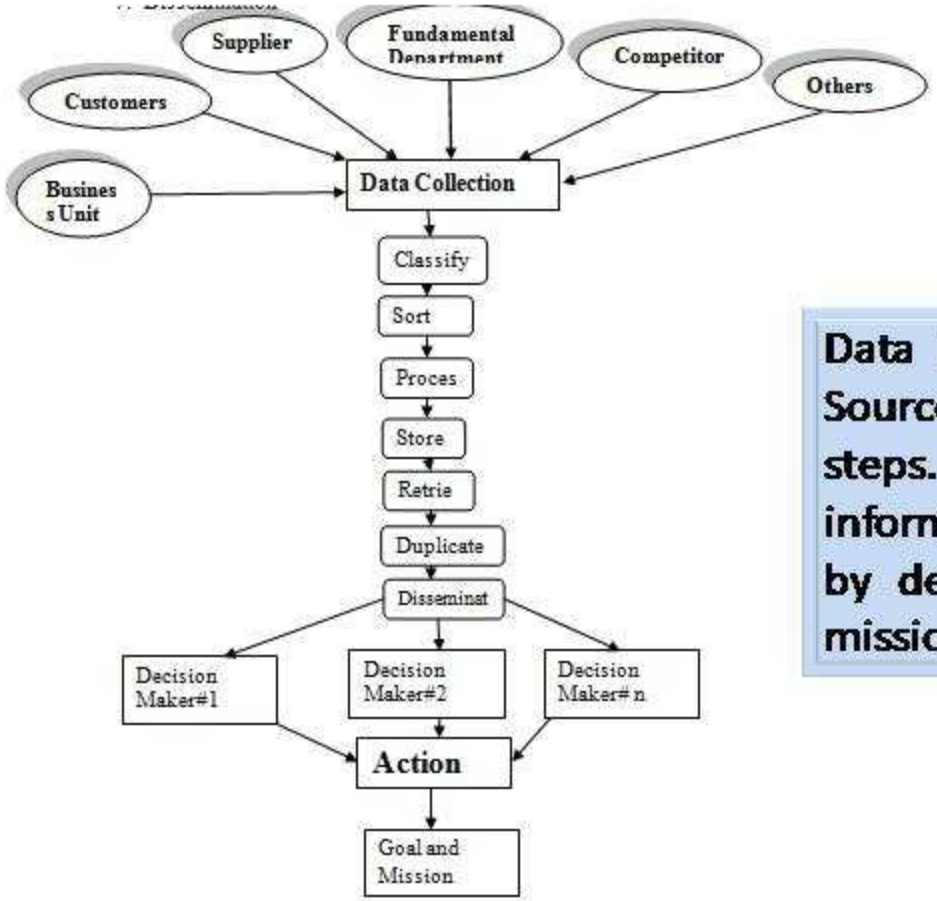
  Information must be free of errors because erroneous information results in poor decisions and erode the confidence of users. For example great precision is not required in predicting the number of customers at restaurant but is critical for calculating salary of person.

- **Correct information format**
  Information must be in the right format to be useful to the decision maker. If manager wants to know the total sales of product A last years, the most appropriate format is an annual summary of sales figure for that product. The format should be such that it can be applied directly to the problem hand without further processing.

- **Completeness**
  Information is said to be complete if the decision maker can satisfy solve the problem at hand using that information. Although the completeness of information is highly desirable, often complete information is not available. Managers are compelled to make decision even when their information is in complete.

- **Accessibility** –If the decision maker cannot access and use the information at the required time, it is of no use. With the use of latest technologies information are becoming more accessible than ever before. The important thing to consider here is that the information system should implement proper security mechanism so that only authorized person can access it.

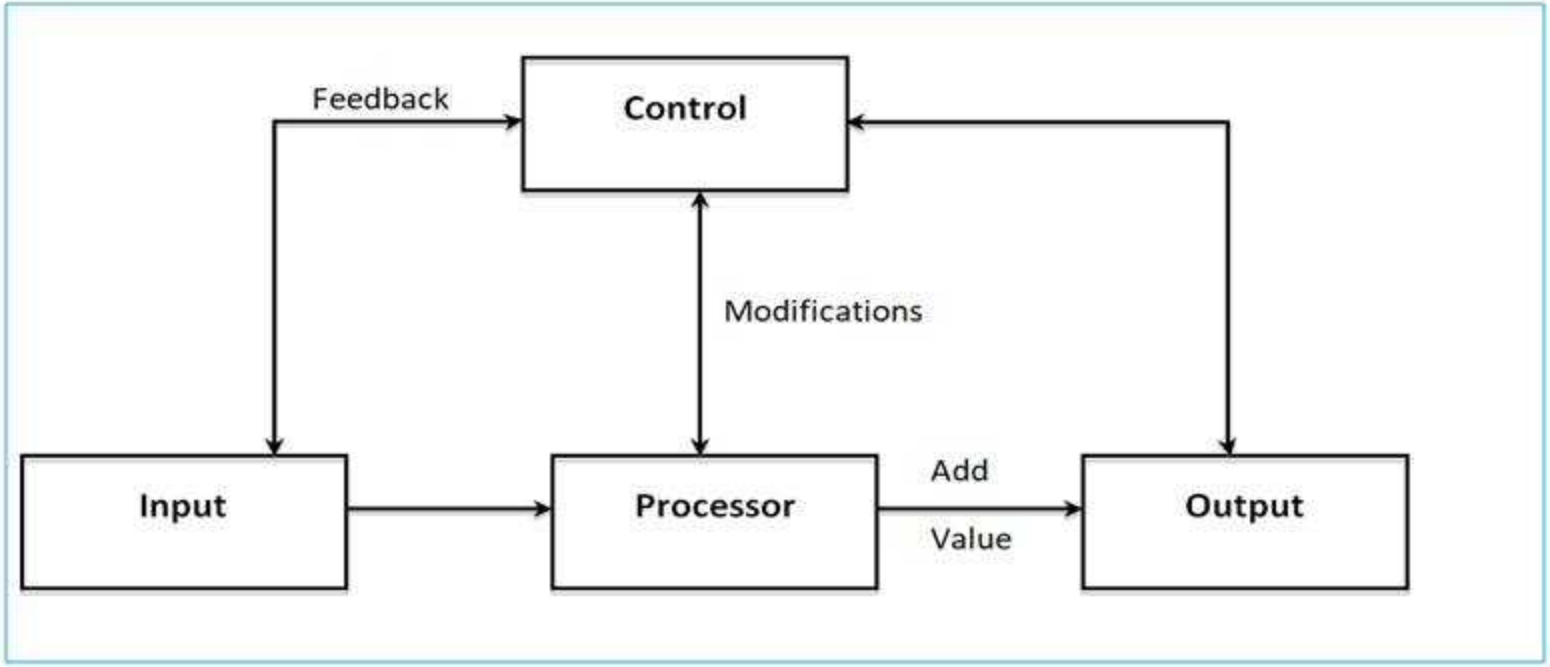
The process of converting data into information



Data is collected from a number of Sources and processed using a series of steps. Processed data becomes information. Information is finally used by decision makers to set goals and mission of the organization.

System Components

- System is a collection of components (interrelated parts) that must work together to realize an objective. Basically a system has five primary components:



System Components

System Components:

- **Input** – The collection of raw data from within the organization as well as from external environment that are needed to be processed in an information system. These could be machines, manpower, raw materials, time, money and so on.
- **Process** – The transformation and manipulation of raw data into useful information i.e. policies, procedures and operations that convert data into meaningful information.
- **Output** – The distribution of processed data in the right format at the right time and place to the right person.
- **Feedback**–It is the data about the performance of the system that is made available to the right person of the organization that will help them to evaluate the performance or to correct inputs.
- **Control**–It is mechanism of processing the feedback and taking necessary actions.

Computer Literacy & Information Literacy

- **Computer literacy** is the knowledge of how a computer and its component work. Computer literacy can also refer to the comfort level someone has with using computer programs and other applications that are associated with computers. To use the information system users need to be computer-literate. They should know about the operations of computer such as inputting, processing, storing, outputting and controlling.

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- **Information Literacy** covers the broad sense. It is the ability to create and use information systems to achieve the competitive advantage. It includes computer literacy, business insights, and understanding of the organization, management, information technology & problem solving skills.

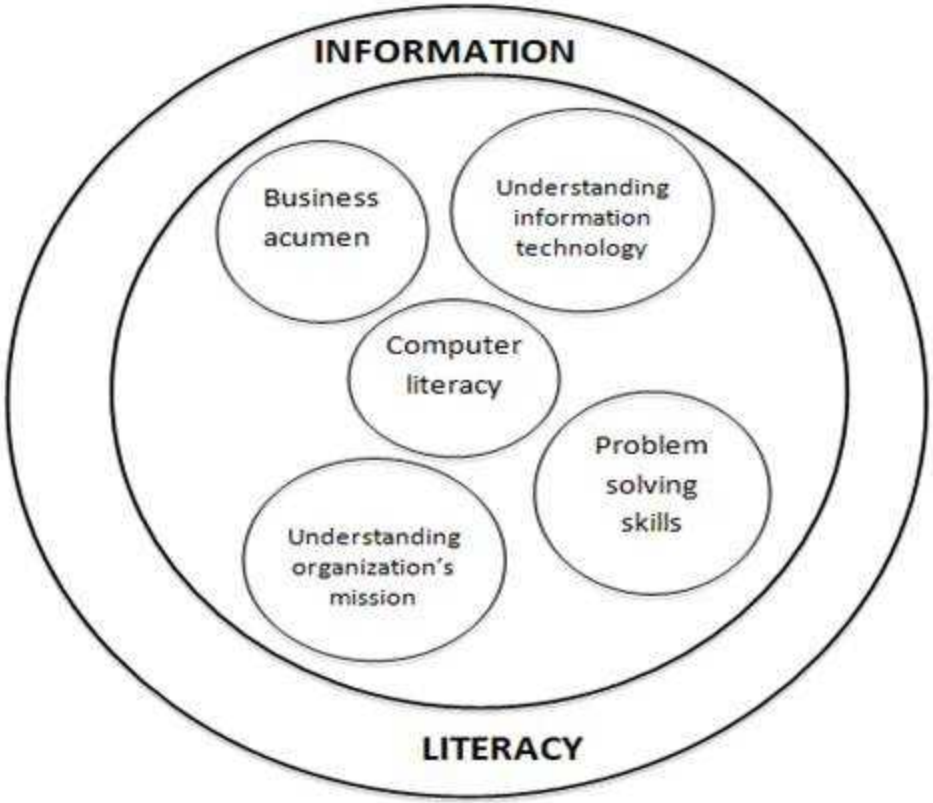

Figure : - Computer literacy and Information literacy

Information Technology and Information System

- **Information technology (IT)** consists of all the hardware and software that a firm needs to use in order to achieve its business objectives.
- Information Technologies are tools and techniques that support the design and development of information systems. They include hardware, software, databases, telecommunications and client-servers. Information technology is one of many tools that managers use to cope with change.

- **Information System (IS),** on the other hand, is a set of interrelated components that creates, processes, stores, retrieves and disseminates information to facilitate organizational decision-making process.
- Information systems also help managers and workers analyze problems, visualize complex subjects, and create new products. The input to such a system is data and processed data becomes information. Information systems are guided by a set of policies, principles procedures and resources.

Different Types of Information Systems

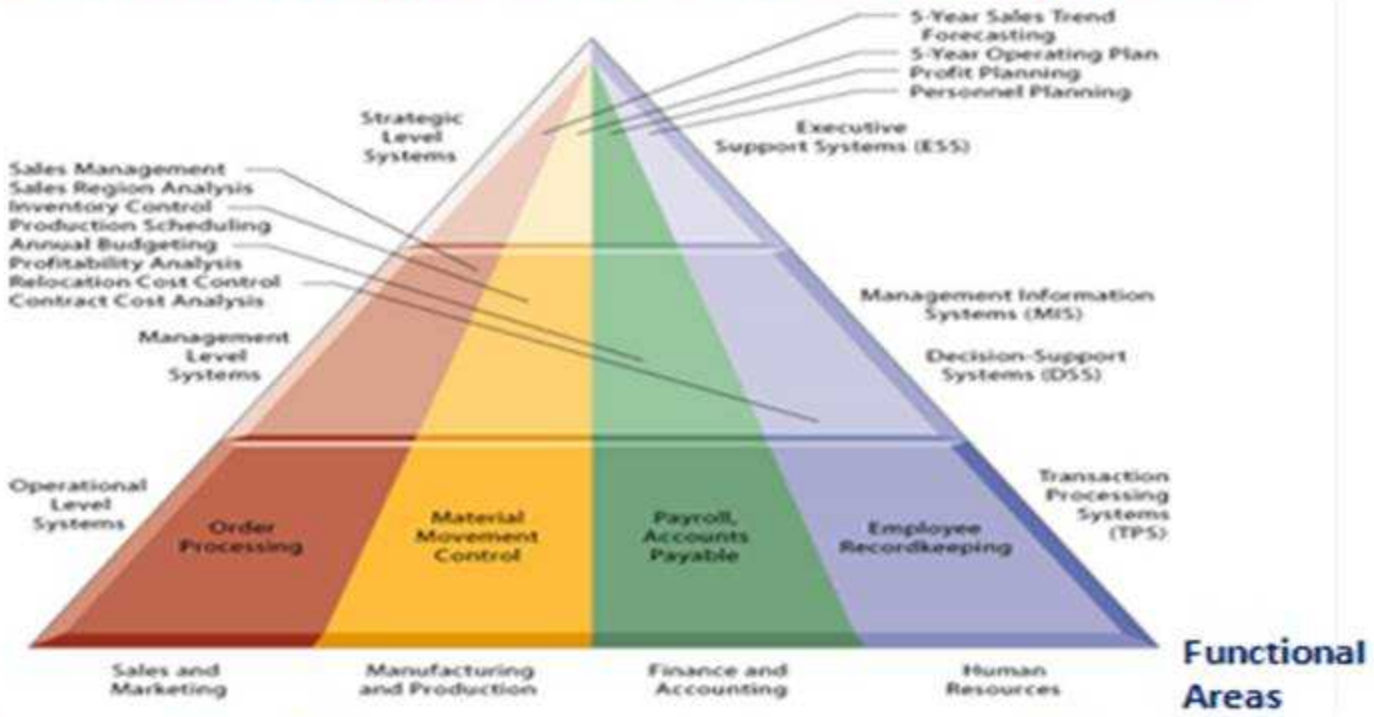

FIG: Types of information systems: *Organizations can be divided into strategic, management, and operational levels and into four major functional areas: sales and marketing, manufacturing and production, finance and accounting, and human resources. Information systems serve each of these levels and functions.*

Different Types of Information Systems

There exist different information systems for a business firm to support different group or levels of management.

System for different Management Groups [Constituency Perspective]

- Transaction Processing System (TPS)
- Management Information System (MIS)
- Intelligent Support System (ISS)
  - ❖ Decision Support System (DSS)
  - ❖ Executive Information System (EIS)
  - ❖ Expert System (ES)
- Knowledge work system (KWS) and Office Automation System (OAS)

Different Types of Information Systems

Transaction Processing System [TPS]

- A transaction processing system is a computerized system that performs and records the ***daily routine transactions*** necessary to conduct business, such as sales order entry, hotel reservations, payroll, employee record keeping, and shipping.
- TPS meets the information needs of ***operational managers***. The major purpose of TPS is to answer ***routine questions*** and to track the flow of transactions through the organization. How many goods are sold? How many parts are in the inventory? What happened to *RatnaSagar's* payment?

Transaction Processing System [TPS]

To ensure those characteristics there should exist following steps for processing a transaction.

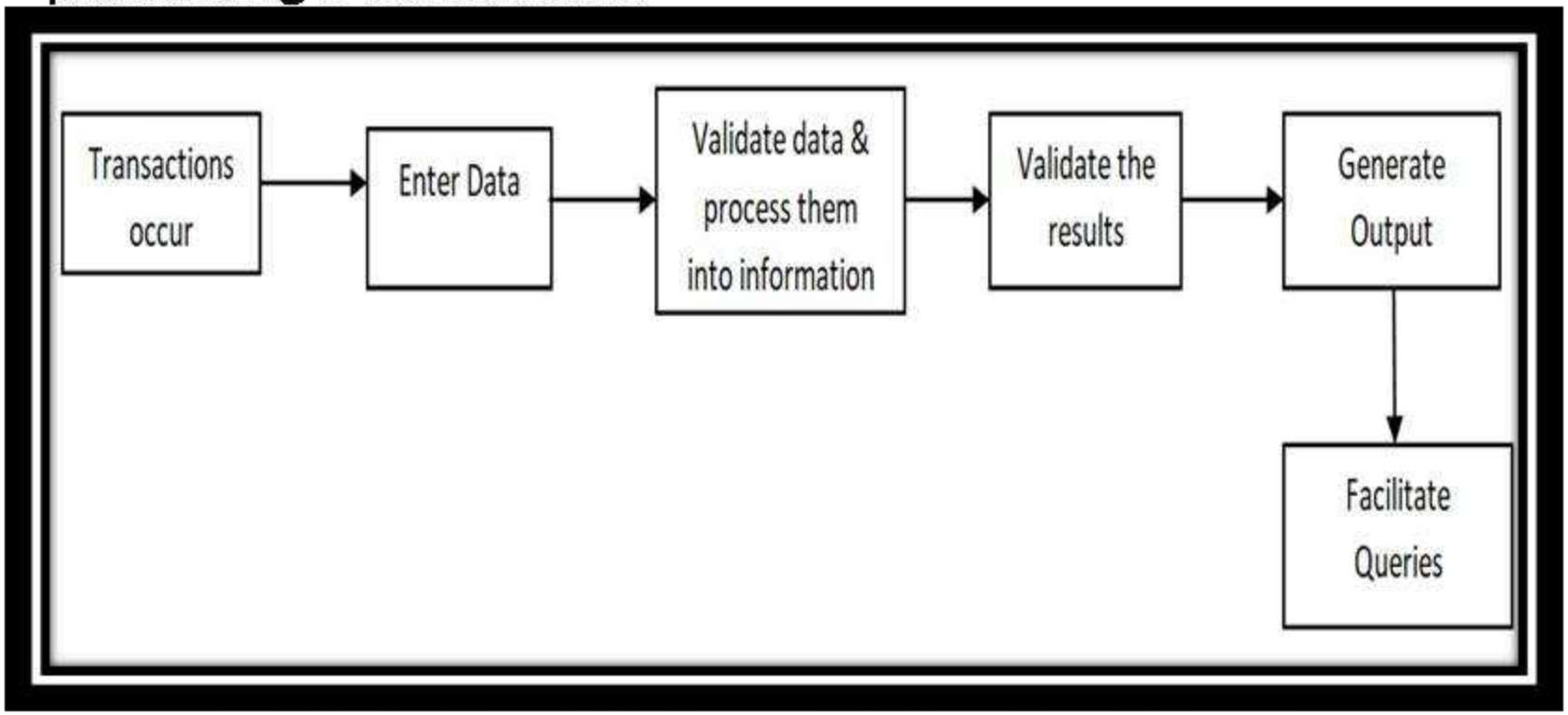

Fig: Steps in processing a transaction

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Transaction Processing System [TPS]

In a gist, a TPS is the data lifeline for a company because it is the source of data to other information systems such as MIS and DSS. If the TPS go out of business, the consequences can be serious for the organization. The examples of TPS include Airlines Reservation System, Payroll Processing System, Transport Ticket Reservation System, and Purchase Order Entry System . ☺

Management Information Systems [MIS]

- MIS is a specific category of information systems serving ***middle management***. MIS provide middle managers with reports on the organization's current performance. This information is used to monitor and control the business and predict future performance.
- ***MIS summarize and report on the company's basic operations using data supplied by transaction processing systems***. The basic transaction data from TPS are compressed and **usually presented in reports** that are produced on a regular schedule.
- MIS are general purpose and well-integrated systems that meet the tactical information ***needs of middle managers***.
- MIS are general purpose and well-integrated systems that meet the tactical information needs of middle managers. ***MIS provide middle managers with vital information that serves the functions of planning, controlling and decision-making.***

Management Information Systems [MIS]

- The main input source of MIS is the output of the TPS. The MIS generates output in two forms: I) Summary reports II) Exception reports.

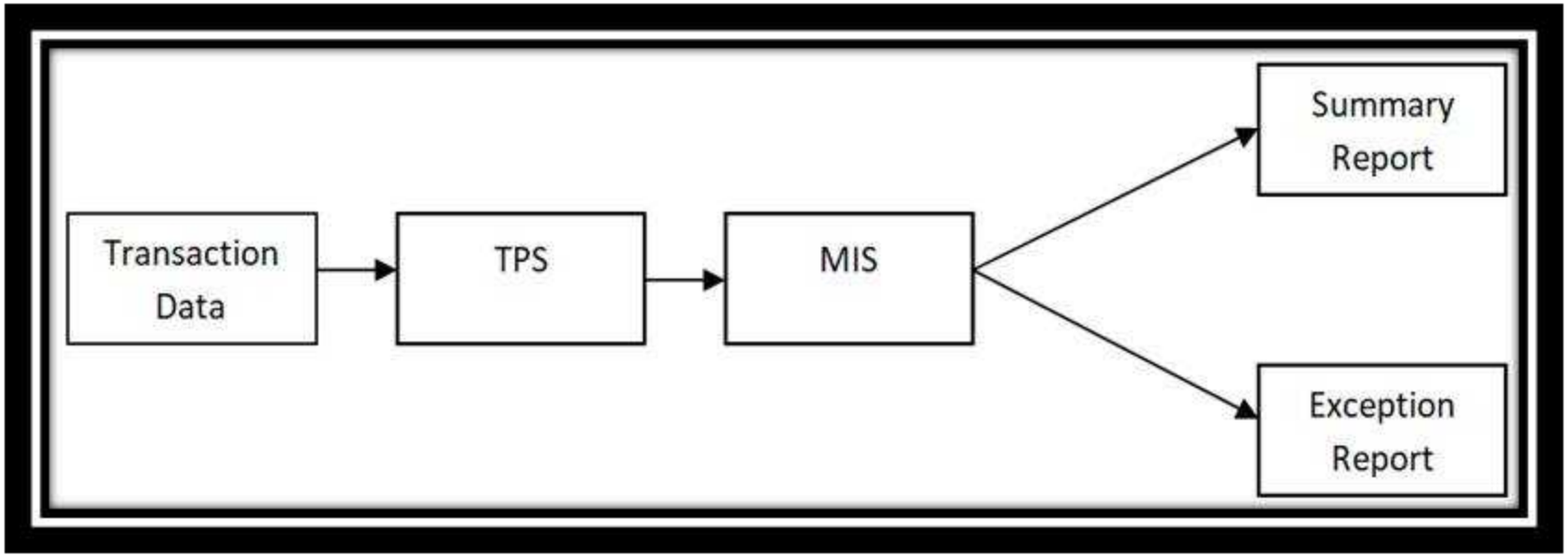

Fig: Reports of MIS

Decision Support Systems (DSS)

- Decision support systems are interactive computer based systems, which help decision makers utilize data and models to solve semi-structured problems.
- ***A DSS is the type of intelligent support system that integrates internal and external data with various decision-making models in order to produce alternative solutions to a given problem.*** It helps to automate routine and repetitive elements in a problem while simultaneously supporting the use of intuition and judgments.

Three types of decisions are found to have occurred in the organization.

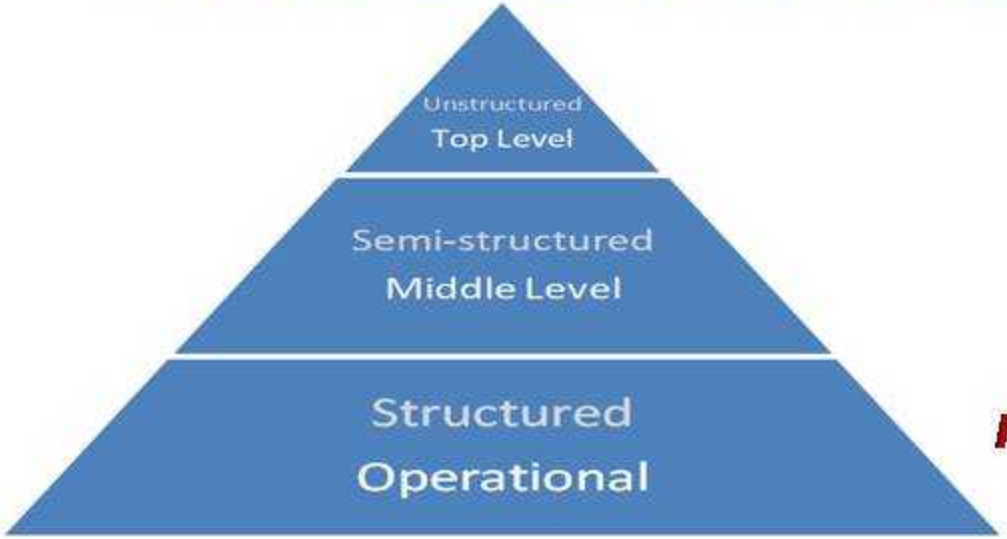

Fig: Decisions at different levels

Decision Support Systems (DSS)

- **A set of well integrated, user friendly, computer-based tools that combine internal and external data with various decision making models to solve semi-structured and unstructured problems.**

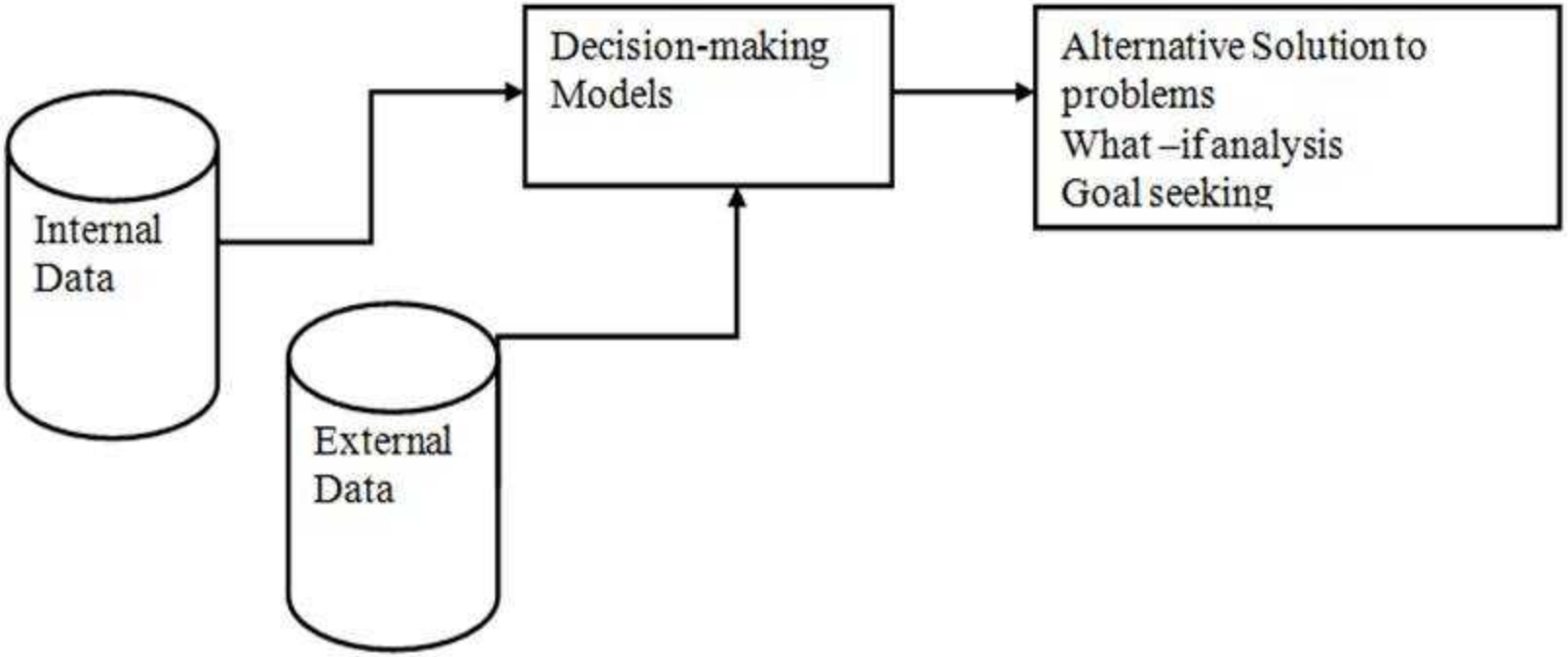

Fig. DSS integrates internal and external data with different module to produce alternative solution to given problem.

Decision Support Systems (DSS)

Characteristics of DSS

- DSS helps the decision makers in the decision making process.
- DSS is designed to solve semi-structured and unstructured problems.
- DSS supports managers at various managerial levels, ranging from top executive to line managers.
- DSS makes general-purpose models, simulation capabilities and other analytical tools available to the decision makers.
- DSS is an interactive and user-friendly system that can be used by the decision makers with little or no assistance from an MIS professional.
- DSS can be readily adopted to meet the information requirements for any decision environment.
- DSS provides the mechanism to enable a rapid response to a decision maker's request form information.
- DSS is flexible enough to accommodate varieties of management styles.
- Support for intelligence, design, choice, and implementation

Decision Support Systems (DSS)

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
- Higher quality decisions
- Increase productivity
- Minimize cost
- Better customer & employee satisfaction

Executive support systems(ESS)

- It is primarily used by ***top level management***, is user friendly, interactive system, designed to meet information needs of top management engaged in ***long-range planning, crisis management, and other strategic decision(unique, non-repetitive and future oriented)***, which address long-term issues such as emerging markets, merger and acquisition strategies, new product development and investment strategies.
- Thus, Executive information systems are intended to be used by the ***senior managers directly to provide support to non-programmed decisions in strategic management***.
- ESS assists in the making of decision that requires an ***in-depth understanding of the firm and of the industry*** in which the firm operates.

Executive support systems(ESS)

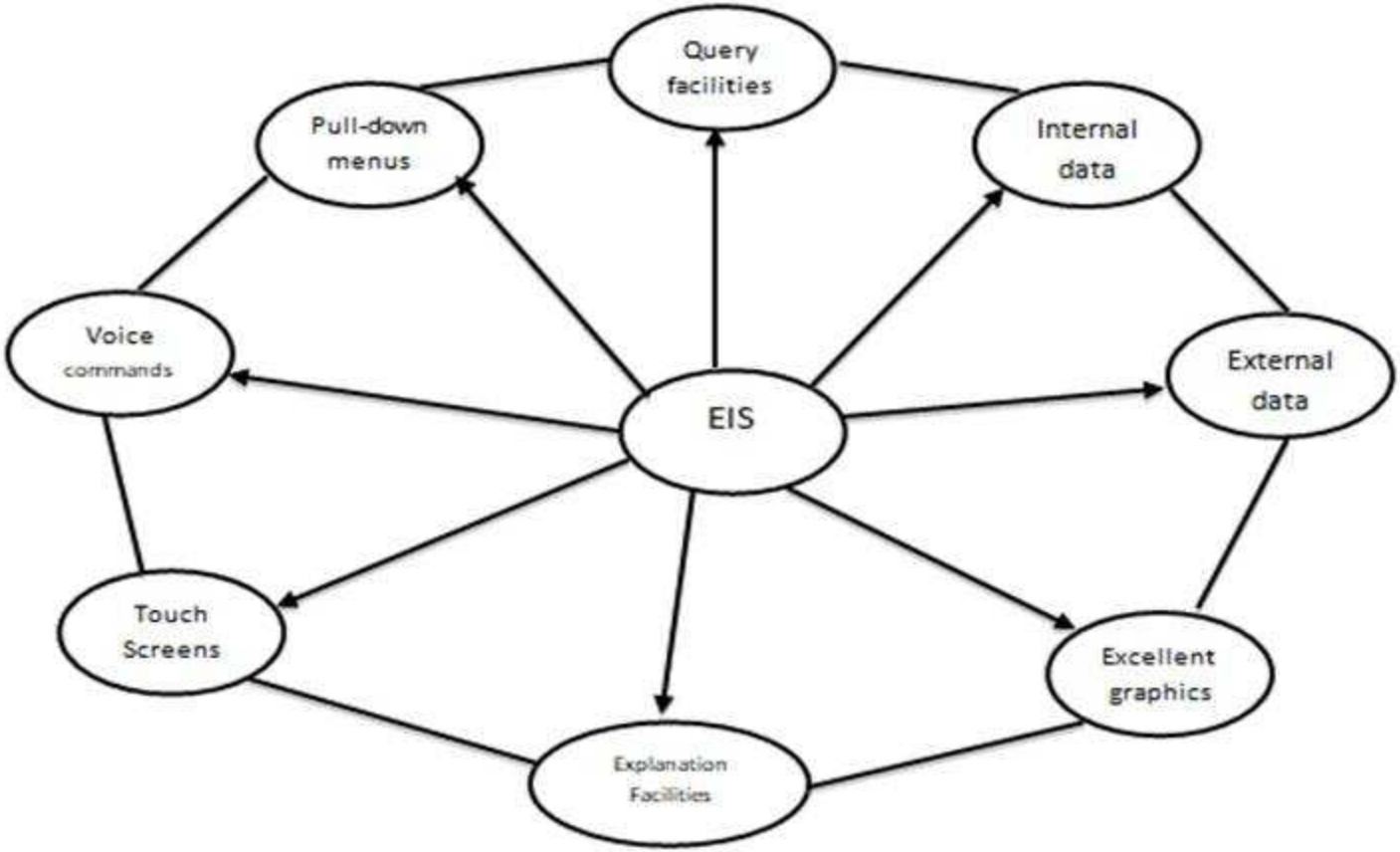

Fig: Executive Information Systems

Interrelationships among systems

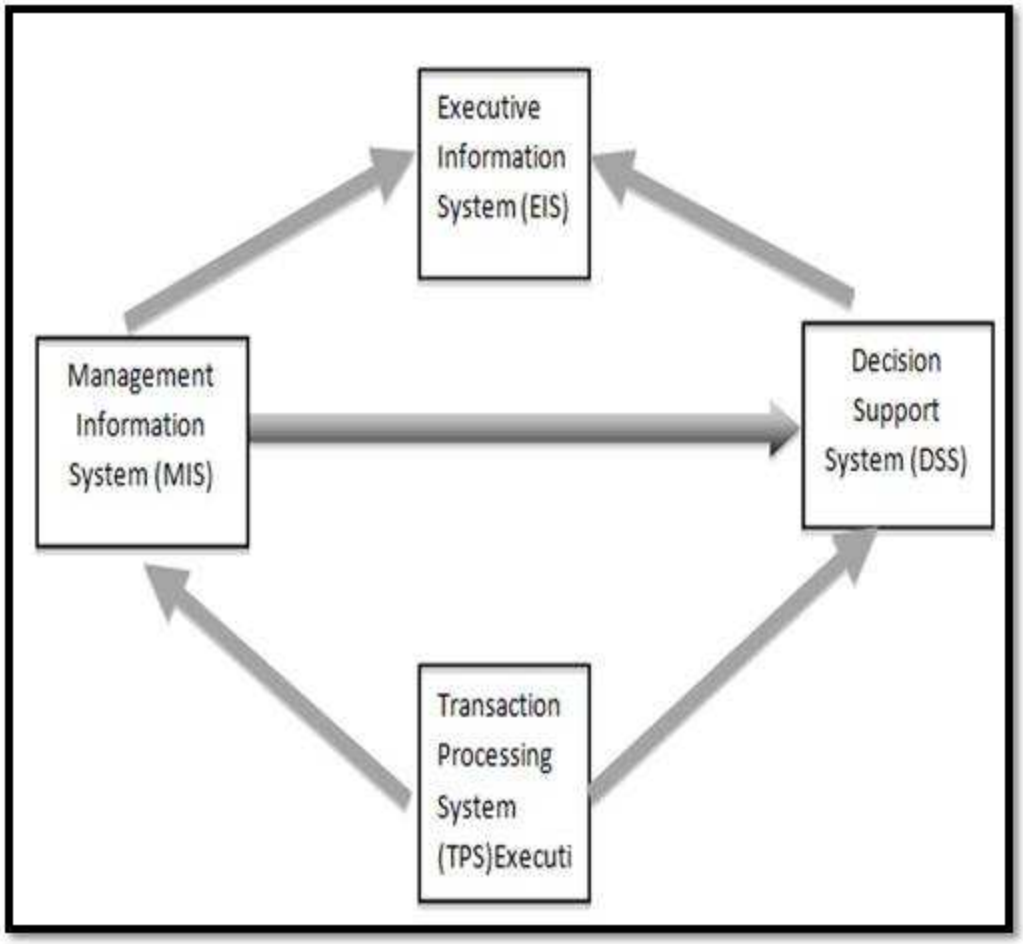

Fig: Interrelationships among systems

Figure here illustrates how the systems serving different levels in the organization are related to one another. TPS are typically a major source of data for other systems, whereas ESS are primarily a recipient of data from lower-level systems.

The various types of systems in the organization have interdependencies. TPS are major producers of information that is required by the other systems, which, in turn, produce information for other systems. These different types of systems have been loosely coupled in most organizations.

Expert System (ES)

- Expert system is an ***artificial intelligence based system that converts the knowledge, experience, intuition and judgment of human expert to help organizations acquire and retain knowledge that is vital to the competitiveness and success of the company.***
- ***Expert systems are good at solving semi-structured and unstructured problems*** and can solve complex problems that require theoretical knowledge and practical experts.
- Expert systems typically consist of three parts: (1) a **knowledge base** which contains the information acquired by interviewing experts, and logic rules that govern how that information is applied; (2) an **Inference engine** that interprets the submitted problem against the rules and logic of information stored in the knowledge base; and a (3) **user interface** that allows the user to express the problem in a human language such as English.

[Read Yourself the features, benefits and applications of Expert Systems]

Expert System (ES)

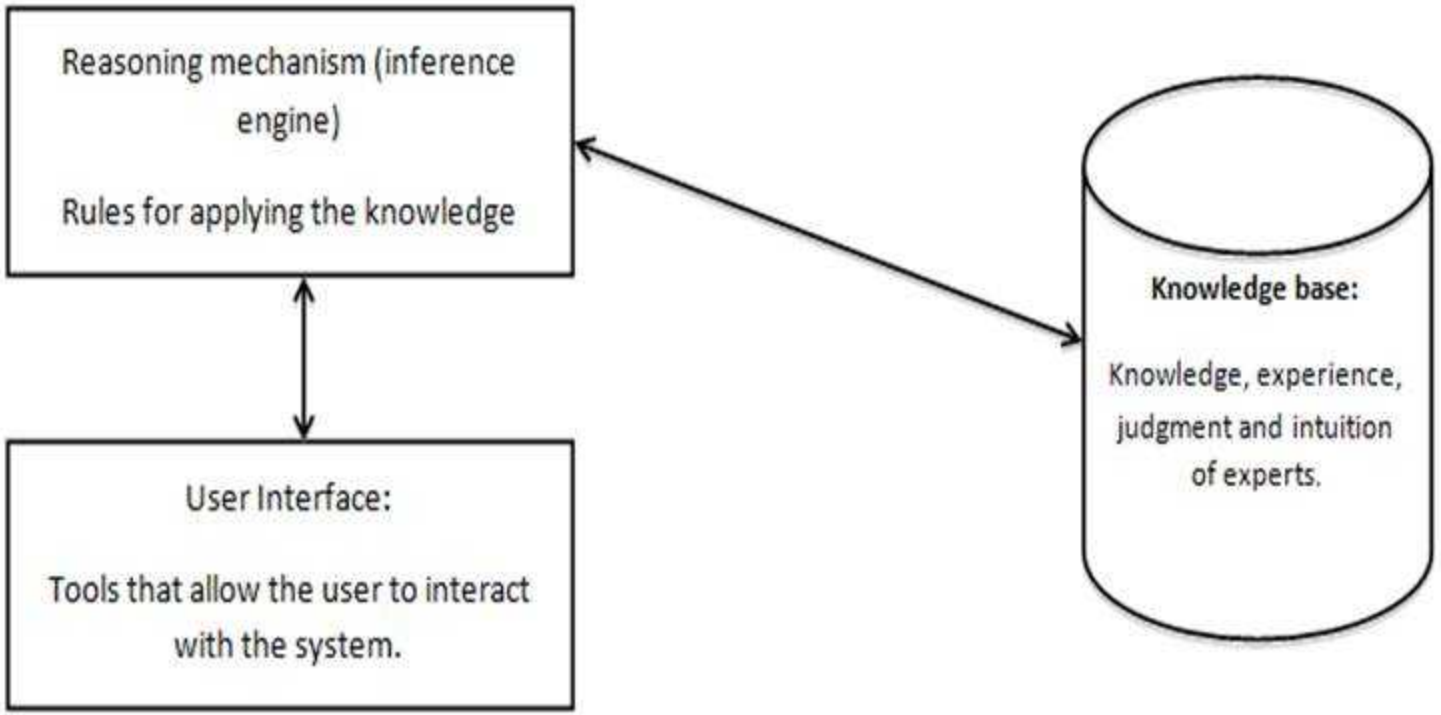

Fig: Components of Expert System

Office Automation Systems (OAS)

- office automation systems are ***designed to increase the productivity of clerical & knowledge workers and enhance communication in the workplace.***
- Office automation uses software and hardware solutions to ease your workload. Varieties of office automation systems are now applied to business and communication functions that used to be performed manually or in multiple locations of a company, such as preparing written communications and performing regular official activities.

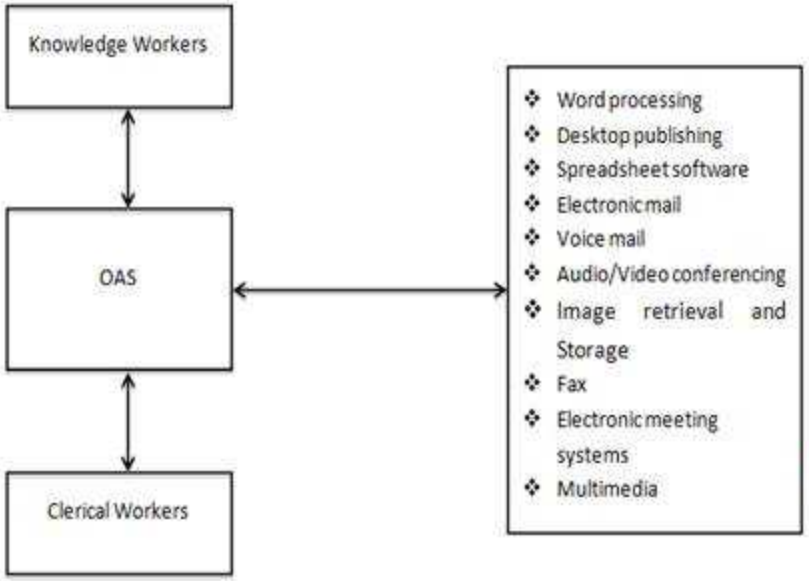

Fig: Office Automation System