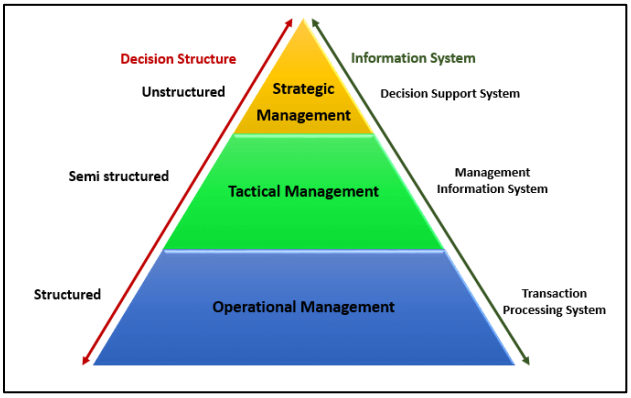
Chapter No. 3 Information System

3.1 Types of Information System:

A typical organization is divided into operational, middle, and upper level. The information requirements for users at each level differ. Towards that end, there are number of information systems that support each level in an organization.

This tutorial will explore the different types of information systems, the organizational level that uses them and the characteristics of the particular information system.

Pyramid Diagram of Organizational levels and information requirements: Understanding the various levels of an organization is essential to understand the information required by the users who operate at their respective levels. The following diagram illustrates the various levels of a typical organization.

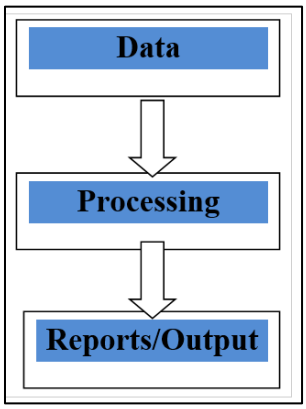


Some examples of such systems are:

- Decision Support System
- Social Information Systems
- Management Information System
- Intelligent System
- Enterprise Systems
- Enterprise Resource Planning
- Expert Systems
- Geographic Information System
- Multimedia Information System
- Office Automation.

3.2 A) Transaction Processing System:

- 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 a transaction processing system is to answer routine questions
- **TPS** manages and records transactions. It is the automation of the simple, repetitive processing used to support business operations.
- Many real-time advantages for every company are offered by transaction processing systems. **TPS** uses data and creates reports as shown in the diagram below. To find out the key insights for decision-making, it offers graphical or condensed textual data.



- **TPS** was previously referred to as the Management Information System. Data processing was conducted manually or with simple machines before computers. TPS's domain is at the lowest level of an organization's management hierarchy.
- A **transaction processing system** is a form of computer processing that takes place in the presence of a computer user and allows a user request or transaction to be answered immediately. Some examples of processing systems for transactions include,

✓ ATM transactions	✓ Online Payments
✓ Credit Card system	✓ Online Trading Stocks
✓ Electronic Commerce	✓ Self-checking stations

Transaction Processing Activities

The processing of individual transactions depends, of course, to some extent on their nature. The transaction processing general elements include,

1. Capturing and validating data
2. Transaction-steps of processing
3. Maintenance of the database

Transaction Processing Types: Transaction processing is distinct from and can be contrasted with other computer processing models, such as batch processing and real-time processing.

1. **Batch processing:** Batch processing is execution of a series of programs (*jobs*) on a computer without manual intervention. Several transactions, called a *batch* are collected and processed at the same time. The results of each transaction are not immediately available when the transaction is being entered; there is a time delay.
2. **Real-time processing:** "Real time systems attempt to guarantee an appropriate response to a stimulus or request quickly enough to affect the conditions that caused the stimulus". Each transaction in real time processing is unique; it is not part of a group of transactions.

Transaction processing system features:

The following features are considered important in evaluating transaction processing systems.

1. Performance: Fast performance with a rapid response time is critical. Transaction processing systems are usually measured by the number of transactions they can process in a given period of time.
2. Continuous availability: The system must be available during the time period when the users are entering transactions. Many organizations rely heavily on their TPS; a breakdown will disrupt operations or even stop the business.
3. Data integrity: The system must be able to handle hardware or software problems without corrupting data. Multiple users must be protected from attempting to change the same piece of data at the same time, for example two operators cannot sell the same seat on an airplane.
4. Ease of use: Often users of transaction processing systems are casual users. The system should be simple for them to understand, protect them from data-entry errors as much as possible, and allow them to easily correct their errors.

B) Decision Support System:

- A DSS is a computer based information system that supports business or organizational decision-making activitites.

- A DSS is a collection of integrated software applications and hardware that form the backbone of an organization's decision making process and help to make decisions, which may be rapidly changing and not easily specified in advance.
- All though it is used by managers it is part of organization's MIS. A DSS is prepared for a specific managerial task and special problem and thus its use is limited to that problem. Decision support systems tend to be designed to serve management control level and strategic planning level managers.
- The elements of DSS include
    - A Database
    - A model base and
    - A software providing interactive dialogue facility for a manager.

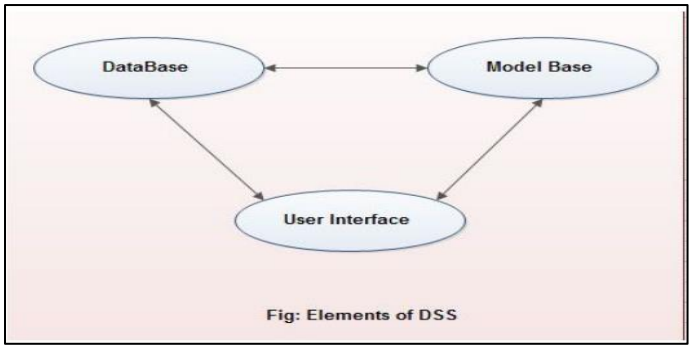


Fig: Elements of DSS

Characteristics of a DSS

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

Benefits of DSS

- Improves efficiency and speed of decision-making activities.

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

C) Executive Support System:

Executive support systems are intended to be used by the senior managers directly to provide support to non-programmed decisions in strategic management.

These information are often external, unstructured and even uncertain. Exact scope and context of such information is often not known beforehand.

Components:

EIS components can typically be classified as:

- Hardware
- Software
- User interface
- Telecommunications

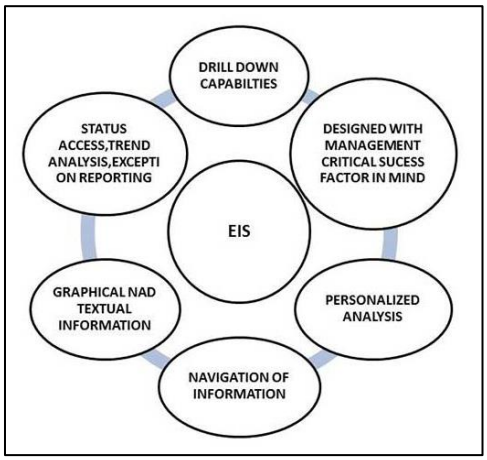
Hardware: When talking about computer hardware for an EIS environment, we should focus on the hardware that meets the executive's need. The executive must be put first and the executive's needs must be defined before the hardware can be selected.

Software: Choosing the appropriate software is vital to an effective EIS. Therefore, the software components and how they integrate the data into one system are important. A typical EIS includes four software components: Text, Database, Graphic base and Model base.

User interface: Several types of interfaces can be available to the EIS structure, such as scheduled reports, questions/answers, menu driven, command language, natural language, and input/output.

Telecommunication: Transmitting data from one place to another has become crucial for establishing a reliable network. Telecommunications within an EIS can accelerate the need for access to distributed data.

Features of ESS:



Advantages of ESS

- Easy for upper level executive to use
- Ability to analyze trends
- Augmentation of managers' leadership capabilities
- Enhance personal thinking and decision-making
- Contribution to strategic control flexibility
- Enhance organizational competitiveness in the market place
- Better reporting system
- Improve office automation
- Early identification of company performance
- Detail examination of critical success factor

Disadvantage of ESS

- Functions are limited
- Hard to quantify benefits
- Executive may encounter information overload
- System may become slow
- Difficult to keep current data
- May lead to less reliable and insecure data
- Excessive cost for small company

Applications

Manufacturing: It is a large branch of industry and of secondary production. Manufacturing operational control focuses on day-to-day operations, and the central idea of this process is effectiveness.

Marketing: To assist marketing executives in making effective marketing decisions, an EIS can be applied. EIS provides sales forecasting, which can allow the market executive to compare sales forecast with past sales. EIS also offers an approach to product price, which is found in venture analysis.

Financial: Financial analysis is one of the most important steps to companies today. An EIS integrates planning or budgeting with control of performance reporting, and it can be extremely helpful to finance executives.

D) Geographical Information System:

A geographic information system (GIS) is a computer system for capturing, storing, checking, and displaying data related to positions on Earth's surface. GIS can show many different kinds of data on one map, such as streets, buildings, and vegetation. This enables people to more easily see, analyze, and understand patterns and relationships.

GIS can use any information that includes location. The location can be expressed in many different ways, such as latitude and longitude, address, or ZIP code. Many different types of information can be compared and contrasted using GIS. The system can include data about people, such as population, income, or education level. It can include information about the landscape, such as the location of streams, different kinds of vegetation, and different kinds of soil. It can include information about the sites of factories, farms, and schools, or storm drains, roads, and electric power lines.

The Uses of GIS

Summarized below are some of the more common and basic uses of GIS.

Mapping Data: The central function of a geographic information system is to provide a visual representation of data. It is estimated that 80% of the data we consider has a geospatial element of some form. GIS provides a means for that data to be stored in a database and then represented visually in a mapped format. Simply understanding where things are is a first step in understanding spatial patterns and relationships.

Proximity Analysis

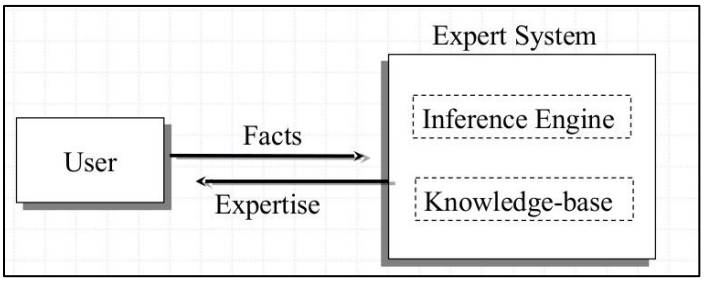
A proximity analysis is an analytical technique that is used to define the relationship between a specific location and other locations or points that are linked in some way. It is used by many commercial organisations to identify sites suitable for business outlets.

E) Expert System:

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

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

Components of Expert System



The key components of Expert System are as followings,

1. **User Interface**: It contains a computerized system between the user and the machine for friendly communication. This system provides an interface to the user in a graphical way.
2. **Interference Engine**: It regains & determines the data process. It performs this task to deduce new facts which are subsequently used to draw further conclusions. This component is associated with an expert system as the brain of the expert system.
4. **Knowledge Base**: This is the most important element of an expert system because it holds the expert's knowledge of problem-solving. It is here that the expert's elicited knowledge is stored. It contains the rules, facts and object descriptions, etc. The knowledge base is always stored in the data with the newest expert system products.

5. **Data Acquisition Subsystem**: The specialist has to learn the information reflected in the knowledge base. Information acquisition software is used by a person who has problem experience to build, incorporate or modify the base of knowledge.

Advantages of Expert System

Expert System (ES) gives clear responses for routine actions, procedures and activities .

- Expert System (ES) retains significant levels of the knowledge base.
- Expert System (ES) supports organizations to explain the rationale of their decision-making.

Disadvantages Expert System

- Expert System (ES) doesn't reply creatively as a human expert in unusual ways.
- Expert System (ES) requires more technical aspects due to this difficult in use.
- Highly costlier system.

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