Decision Support System (DSS)

Decision support systems are used by senior management to make non-routine decisions. Decision support systems use input from internal systems (transaction processing systems and management information systems) and external systems.

The main objective of decision support systems is to provide solutions to problems that are unique and change frequently. Decision support systems answer questions such as;

- What would be the impact of employees' performance if we double the production lot at the factory?
- What would happen to our sales if a new competitor entered the market?

Decision support systems use sophisticated mathematical models, and statistical techniques (probability, predictive modelling, etc.) to provide solutions, and they are very interactive.

Examples of decision support systems include-

- **Financial planning systems** – it enables managers to evaluate alternative ways of achieving goals. The objective is to find the optimal way of achieving the goal. For example, the net profit for a business is calculated using the formula Total Sales less (Cost of Goods + Expenses). A financial planning system will enable senior executives to ask what if questions and adjust the values for total sales, the cost of goods, etc. to see the effect of the decision and on the net profit and find the most optimal way.
- **Bank loan management systems** – it is used to verify the credit of the loan applicant and predict the likelihood of the loan being recovered.

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.

Decision Support System Component

1. Hardware Resource:

Executive workstations, connected through networks to other computers provide the primary hardware resource for the DSS.

Personal computers can be used as a stand-alone basis or connected through network to larger computer system to access DSS software.

2. Software Resource:

DSS software packages are called DSS generators. They contain models of databases, model, and creation, interrogation, and maintenance of the DSS database, A model base management module provides the ability to create, maintain, and manipulate the mathematical models in the models base using capabilities provided by modeling packages.

A dialogue generation and management module provides an attractive user interface that support interactive input and output by managers.

3. Data Resource:

A DSS contains data and information extracted from the databases of the organization, external databases. It includes summarized data and information most needed by the manager for specific type of decision.

4. Model Resource:

The model base includes a library of mathematical models and analytical techniques stored in a variety of program modules and files. The model base management software to create an integrated model to support a specific decision can combine components of models.

5. People Resource:

The managers or their staff specialists to explore decision alternatives can use a decision support system. Such end users can also develop decision support system.

6. Decision Support System Packages:

Many decision support system generators are available from independent consulting firms and computer manufacturers. PC/FOCUS, IFPS- Personal (Interactive Financial Planning System) and ENCORE are popular packages. SAS system and SPSS-X are used as DSS generators for decision support that requires extensive statistical analysis.

Types of DSS

Following are some typical DSSs −

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

Executive Information System

An executive information system (EIS) is a decision support system (DSS) used to assist senior executives in the decision-making process. It does this by providing easy access to important data needed to achieve strategic goals in an organization. An EIS normally features graphical displays on an easy-to-use interface.

Executive information systems can be used in many different types of organizations to monitor enterprise performance as well as to identify opportunities and problems.

Components

EIS components can typically be classified as:

1. Hardware

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

needs must be defined before the hardware can be selected. The basic hardware needed for a typical EIS includes four components:

a) Input data-entry devices. These devices allow the executive to enter, verify, and update data immediately

b) The central processing unit (CPU), which is the most important because it controls the other computer system components

c) Data storage files. The executive can use this part to save useful business information, and this part also helps the executive to search historical business information easily

d) Output devices, which provide a visual or permanent record for the executive to save or read. This device refers to the visual output device such as monitor or printer

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

2. 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:

a) Text: handling software—documents are typically text-based

b) Database: heterogeneous databases on a range of vendor-specific and open computer platforms help executives access both internal and external data

c) Graphic base: graphics can turn volumes of text and statistics into visual information for executives. Typical graphic types are: time series charts, scatter diagrams, maps, motion graphics, sequence charts, and comparison-oriented graphs (i.e., bar charts)

d) Model base: EIS models contain routine and special statistical, financial, and other quantitative analysis

3. User interface

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

4. Telecommunication

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

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
- Instruments of change
- Increased executive time horizons.
- Better reporting system
- Improved mental model of business executive
- Help improve consensus building and communication

- Improve office automation
- Reduce time for finding information
- Early identification of company performance
- Detail examination of critical success factor
- Better understanding
- Time management
- Increased communication capacity and quality

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