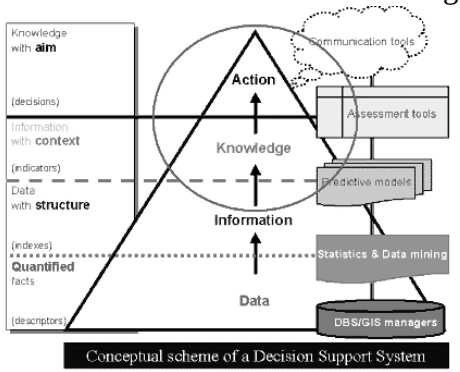
Enhancing Management Decision Making for the Digital Firm

Decision Support Systems (DSS)

- Decision Support Systems (DSS) is a computer-based system at the management level of an organization that combines data, analytical tools and models to support semi-structured and unstructured decision making.



Conceptual scheme of a Decision Support System

Why DSS are more targeted than MIS?

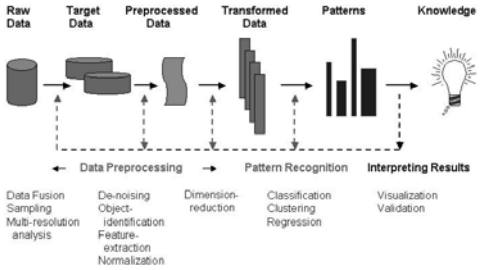
- MIS provides managers with reports based on routine flow of data and assists in general control of the organization. In contrast, a DSS is tightly focused on a specific decision such as routing, queuing, evaluating, predicting, and so forth.
- MIS focuses on structured information flows, whereas a DSS emphasizes change, flexibility, rapid response.
- Both the DSS and MIS reply on professional analysis and design. However, MIS usually follows a traditional systems development methodology, freezing information requirements before design and throughout the lifecycle, DSS is consciously iterative and never frozen.

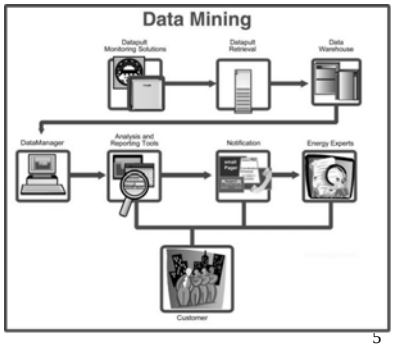
Types of DSS

- Data-driven DSS
  - It supports decision making by allowing users to extract and analyze (using OLAP / Data mining) useful information that was previously buried in large databases.
- Model-driven DSS
  - Primarily stand-alone system that uses some type of model to perform “What=if” and other kinds of analyses.

Data Mining

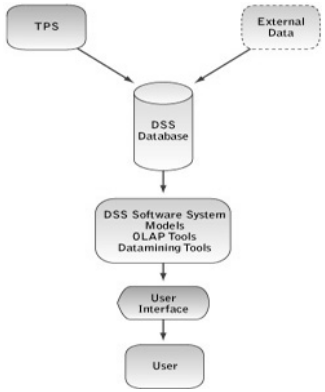
- Technology for finding hidden patterns and relationships in large databases and inferring rules from them to predict future behavior.





Components of DSS

- The main components of the DSS are **DSS Database**, the **DSS Software System** (model & analytical tools), and the **User Interface**.



DSS Database

- The DSS database is a collection of current and historical data from a number of applications or groups.
- It may be a small database residing on a PC that contains a subset of corporate data that has been download and possibly combined with external data.
- Or it may be a massive data warehouses are generally extracts or copies of production databases so that using the DSS does not interfere with critical operational systems.

DSS Software System

- The DSS software system contains the software tools that are used for data analysis.
- It may contain various (On-line Analytical Processing) OLAP tools, data mining tools or a collection of mathematical and analytical models that easily can be made accessible to the DSS users.

Model

- A **Model** is an abstract representation that illustrates the components or relationships of a phenomenon.
- Model can be
  - Physical (E.g. model airplane)
  - Mathematical (E.g. equation)
  - Verbal (E.g. description of a procedure for writing an order)
- Each DSS is built for a specific set of purposes and will make different collections of models available depending on those purposes.

Some Common Models

- Statistical Models - means, medians, deviations etc.
- Optimization Models - linear programming etc.
- Forecasting Models
- Risk Analysis Models
- Sensitivity analysis models that ask “what-if” questions repeatedly to determine the impact of changes in one ore more factors on outcomes.

Benefits of DSS

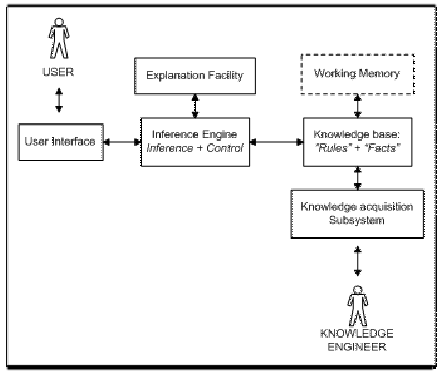
- The ability to examine more alternatives.
- The ability of achieve a better understanding of the business.
- The ability to respond quickly to unexpected situations.
- The ability to carry out ad-hoc types of reporting and analysis.
- The ability to provide timely information for control of ongoing operations.
- The ability to save time and costs.
- The ability to make better decisions.

Risks of DSS

- Lack of Quality Assurance.
- Lack of Data Security.
- Failure to Specify Correct Requirements.
- Failure to Understand Design Alternatives.

Customer DSS (CDSS)

- System to support the decision-making process of an existing or potential customer.



Group Decision Support Systems (GDSS)

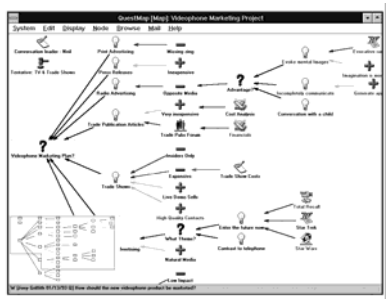
- An interactive computer-based system that facilitates the solution of semi-structured problems by a set of decision makers working together in a group.
- A GDSS includes a **Database**, a **Model Base**, and **Software Supporting Group Processes**.
- Software might be used to summarize members' idea, to report votes, to calculate the weights of decision alternatives, and to anonymously record ideas. In a group decision support situation, a group facilitator coordinates the use of the technology in the process of conducting the meeting.

Basic Elements of GDSS

- Hardware
  - Conference facility, including room, tables, chairs, electronic display boards, audiovisual, computer and networking equipment.
- Software Tools
  - Tools for organizing ideas, gathering information, ranking and setting priorities and other aspects of collaborative work.
- People
  - participants, facilitator, supporting staff

Electronic Meeting System (EMS)

- A collaborative GDSS that uses IT to make group meetings more productive by facilitating communications as well as decision making.
- Supports meeting at the same place and time or at different places and times.



How GDSS can enhance Group Decision Making?

- To overcome ten discrete meeting elements
  - Improved preplanning
  - Increased participation
  - Open, collaborative meeting atmosphere
  - Criticism-free idea generation
  - Evaluation objectivity
  - Idea organization and evaluation
  - Setting priorities
  - Documentation of meetings
  - Access to external information
  - Preservation of "organizational memory"

Ten Discrete Meeting Elements

- **Improved Preplanning**
  - To make meeting more effective and efficient.

Ten Discrete Meeting Elements

- **Increased Participation**
  - All attendees will be able to contribute fully even if the number of attendees in large.
  - Free riding (attending the meeting but not contributing) must also be addressed.

Ten Discrete Meeting Elements

- **Open, Collaborative Meeting Atmosphere**
  - In which attendees from various organization levels feel able to contribute freely.
  - The lower level attendees must be able to participate without fear of being judged by their management; higher status participants must be able to participate without having their presence or ideas dominate the meeting and result in unwanted conformity.

Ten Discrete Meeting Elements

- **Criticism-free Idea Generation**
  - Enabling attendees to contribute without undue [unnecessary, too much] fear of feeling personally criticized.

Ten Discrete Meeting Elements

- **Evaluation Objectivity**
  - Creating an atmosphere in which an idea will be evaluated on its merits rather than on the basis of the source of the idea.

Ten Discrete Meeting Elements

- **Idea Organization and Evaluation**
  - Require keeping the focus on the meeting objectives, finding efficient way to organize the many ideas that can be generated in a brainstorming session and evaluating those ideas not only on their merits but also within appropriate time and constraints.

Ten Discrete Meeting Elements

- **Setting Priorities and Making Decisions**
  - Require finding ways to encompass the thinking of all the attendees in making these judgments.

Ten Discrete Meeting Elements

- **Documentation of Meetings**
  - Attendees will have as complete and organized a record of the meeting as may be needed to continue the work of the project.

Ten Discrete Meeting Elements

- **Access to External Information**
  - Allow significant, factual disagreements to be settled in a timely fashion, thus enabling the meeting to continue and be productive.

Ten Discrete Meeting Elements

- **Preservation of "Organization Memory"**
  - Who do not attend the meeting can also work on the project.
  - Often a project will include teams at different locations who will need to understand the content of a meeting at only one of the affected sites.

Executive Support System (ESS)

- IS at the strategic level of an organization designed to address unstructured decision making through advanced graphics and communication.
- Focus on information needs of senior management
- Combining data from internal and external sources
- Help senior executives monitor organizational performance, track activities of competitors, spot problems, identify opportunities, and forecast trends.
- Have the ability to 'drill down', moving from a piece of summary data to lower and lower level of details.
- ESS includes tools for modeling and analysis.

Benefits of ESS

- Flexible
- Ability to analyze, compare and highlight trend
- To monitor performance
- Improve management performance
- Increase upper management’s span of control