Chapter 12 Decision support Systems
Introduction:
MIS: Some of the earliest applications for supporting management decision making were management information systems (MIS)

- provide information on performance to help managers in monitoring and controlling business
- produce fixed, regular scheduled reports based on data extracted and summarised from TPS
- report formats are often specified in advance
- focus on structured problems

e.g. summary of monthly sales for different areas, exception reports on exceptional conditions.

DSS

- emphasis change, flexibility and rapid response
- support unstructured and semi structured problems
- not intended to replace managers , but work with managers to solve the problems
- need human judgement
- Aim at improving the manager's decision making effectiveness rather than efficiency (better decision rather than faster decision making)
- Directed to users who are skilled in their subject area i.e. senior management
- Users must have good knowledge of their problem areas.

Components of DSS

- DSS database: a collection of current and historical data from a number of applications or groups. DSS database is separated from the corporate active database so as not to interfere with critical operational systems. DSS database can also contain external data.
- DSS software: contains software tools that are used to data analysis such as mathematical models, analytical models, data mining, OLAP etc. Most popular models include statistical models, sensitivity analysis, forecasting models.

Types of DSS

- **Model driven DSS:** apply strong mathematical theory and modelling technique to perform "what-if" and other kind of analyses.
  e.g. voyage-estimating DSS, Continental Airlines Inc system for cargo revenue optimisation

- **Data driven DSS:** support decision making by allowing users to extract useful information that was previously buried in a large quantity of data. Two common methods used are data mining and OLAP.
  E.g. WH Smith: previously used paper based report and transaction, the analytical power was very limited due to large amount of information, no exchange of information among stores, etc

  Data driven DSS helps WH Smith in:
  - Compare Profit and Space used
  - Identify if the location is right for the products
  - Identify optimal stock level for each item.
  - Identify profit margin for each item

Comparing model/data driven DSS
Model driven:

- Faster than data driven due to less data analysis
- Higher predictive power due to its strong mathematical theory and modelling techniques.
- Less expensive with regards to maintenance cost, hardware requirements

Data driven:

- Captures more dimensions of the organisation's activities.
- Easier to develop as it needs simpler mathematical models.

GROUP DECISION SUPPORT SYSTEM

A group decision support system (GDSS) is computer based system that supports groups of people engaged in a common task (or goal) and that provides an interface to a shared environment.

Applications of GDSS are wide. However, they are focused on group decision making e.g. procurement evaluation, strategic planning etc.

Design principles:

- Simple
- Productive
- Appropriate level of human and technology interaction.

Example:

GDSS meeting room:

- 40 seats, 40 microcomputers
- Agenda of the meeting is projected on a big screen for everyone to see
- Participants type simultaneously their ideas
- GDSS software sorts the ideas
- Participants votes for the ideas, make comments
- Summary of the meeting is printed to participants

Reasons for development of GDSS:

- Large amount of time devoted to decision-making meetings (managers spending 35-70% of their time in meeting)
- Large number of participants in meetings.

Elements of a GDSS

- Hardware: including the conference facility, room, tables, chairs, electronic hardware, audiovisual equipment, computer hardware.
- Software tools: including tools for gathering information, organising, ranking and prioritising ideas.
- People; including participants, a trained facilitator (facilitator is a person whose task is to keep the discussion on track), hardware and software support staff.

GDSS software tools:

- Electronic questionnaires: identifying issues of concern before the meeting, ensuring key information is not overlooked.
- Electronic brainstorming tools: allow individuals simultaneously and anonymously to contribute ideas on the topic of the meeting
- Idea organisers: facilitate the organised integration and synthesis of ideas generated during brainstorming. Ideas, comments relating to one particular goal may be grouped together.
- Questionnaire tools: support the facilitators and group leaders as they gather information before and during the prioritisation process.
- Voting and prioritising tools: a range of methods of prioritising and decision making: voting, ranking in order, weighted prioritising/voting
- Stakeholder identification and analysis tools: identify stakeholders and evaluate the potential impact of those stakeholders upon the proposed project.
- Policy formation tools: provide structured support for developing agreement on the wording of policy statements
- Group dictionaries: group agreement on definition of words, terms central to the project

Advantages of GDSS:

- More participation:
  - Anonymity of participant
  - Parallel communication
- Group synergy:
  - Ideas are more likely to be considered as group ideas. Comments are therefore more constructive.
- Automated record keeping:
  - Meeting is automatically recorded. It's more convenient and accurate than taking notes, remembering ideas, understanding vocal comments.
  - Records are also kept for future meeting.
- More structure
  - GDSS helps the meeting more focused and structured, makes it more difficult to deviate from the meeting agenda, problem solving process, make incomplete or premature decisions.
- Others:
  - Large group size
  - Higher group satisfaction
  - Meetings can be conducted in a dispersed environment e.g. over LAN, the Internet.

Disadvantages of GDSS;

- Slow communication: people speak much faster than they type. The break-even point is around 8 people.
- Not all tasks are amendable to GDSS: some group meeting environment such as one-to-many does not benefit from GDSS

Conclusion: GDSS is an effective and efficient method for large groups to conduct meetings in which comments and preferences must be exchanged.