Computer Application And Management Information System MB 402

UNIT V – Management Information System (MIS)

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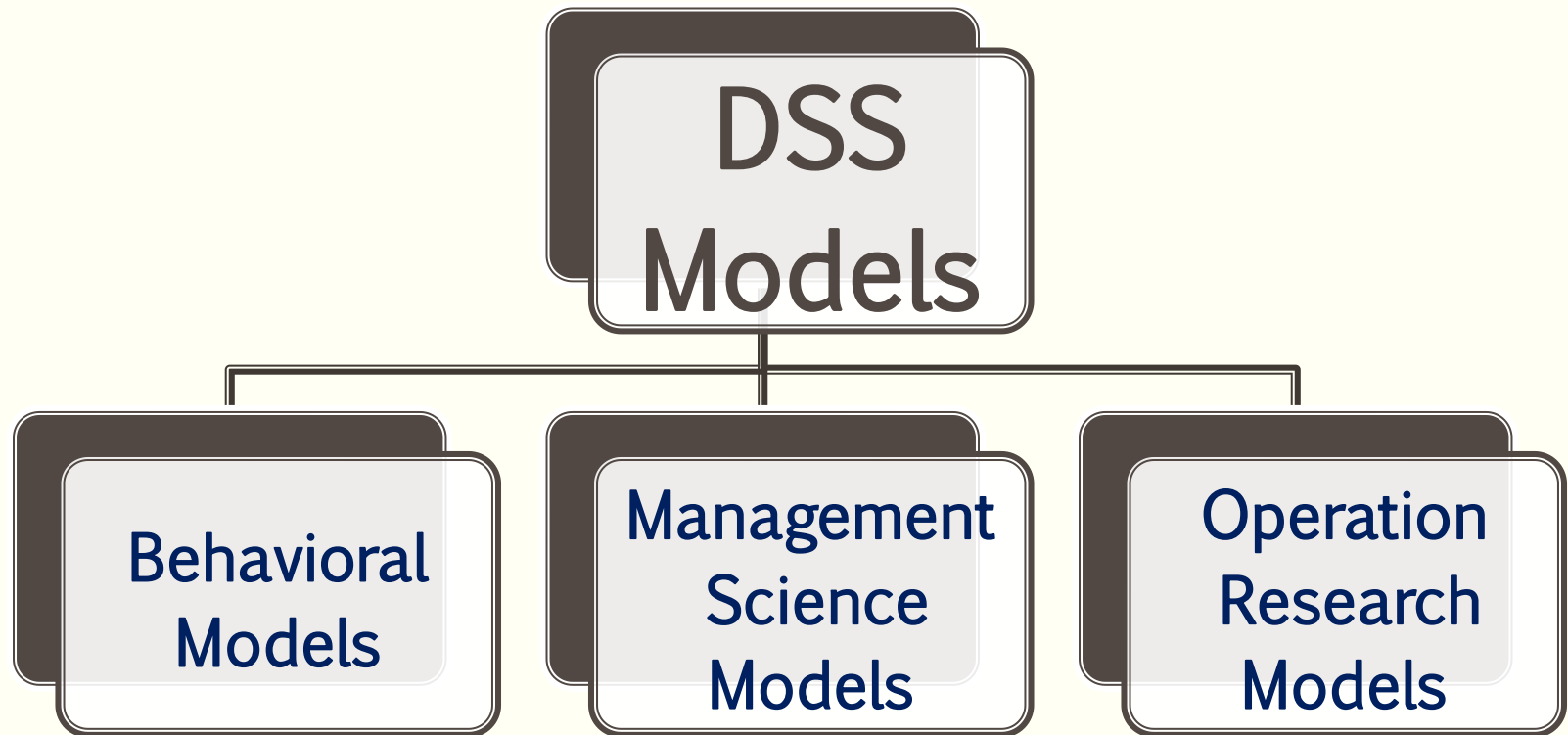
Decision Support System (Contd….)

Period : 05 (1hr.)

DSS - Models

▪ The decision support system can be based on different types of models :

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          │     DSS      │
          │    Models    │
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│Behavioral│ │Management│ │Operation │
│ Models   │ │ Science  │ │ Research │
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DSS - Models

- **Behavioural model** : These models are useful in understanding the behaviour amongst the business variables.
- The decision maker can then make decisions giving due regard to such behavioural relationships.
- Trend analysis, forecasting and statistical analysis models belong to this category.
- Trend analysis indicates how different variables behave in trend setting in the past and hence in the future. A regression model shows the correlation between one or more variables. It also helps in identifying the influence of one variable on the other.
- These types of models are largely used in process control, manufacturing, agricultural sciences, medicines and marketing.
- The behavioural analysis can be used to set the points for alert, alarm and action for the decision maker.

DSS - Models

- **Management science models :** These models are developed on the principles of business management, accounting and econometrics.
- In many areas of management, the proven methods of management control are available which can be used for management decisions.
- There are several management systems, which can be converted into decision support system models.
- Budgetary system, cost accounting systems, system of capital budgeting for better return on investment, ABC analysis, control of inventory through maximum-minimum levels etc. are the examples of the use of the management science in materials management.

DSS - Models

- Production planning and control, scheduling and loading systems are the examples of production management model.
- Human resource planning and forecasting is the example in human resource management model.
- Some of these models can be used straight away in the design of the decision support system.
- While some others require the use of management principles and practices, most of the procedure based decision making models belong to this category.

- **Operations research models** : The operations research models are mathematical models.
- These models represent a real life problem situation in terms of the variables, constants and parameters expressed in algebraic equations.

DSS - Models

- Since the models are mathematical, there are solutions to these problems.
- These models have clarity to the extent that each of them has a set of assumptions, which must be true in real life.
- Further, if the assumptions are valid, the solutions offered are realistic and practical, the model represents a real life problem.
- In manufacturing business, the maximization of profit with an appropriate product mix, within the capacity and the market constraints, is a common problem.
- The allocation of inventory to various destinations with least transportation costs is another well known problem.

DSS - Models

- Some problems do not fall in the category of the standard of operations research models.
- In such cases, the problems are solved using a simulation approach.
- This approach uses a random occurrence of a large number of events, determines the status of the system and evaluates its cost of operations.
- The simulation technique helps to assess the quality of the facility design before the investment is made in building such a facility.

DSS - Development

- The development of a decision support system is determined by the type of information and the facilities required for taking decisions. Decision support systems are developed using programming languages or produced by packages specially incorporating decision support development tools.
- Conventional high-level languages, such as C++ can be used to develop the decision support systems, which are extremely flexible.
- However, decision support systems that use these languages involve a lengthy analysis and design phase.

DSS - Development

- Fourth generation languages or similar type of languages or systems, are more appropriate. They are particularly useful as they are generally database oriented. This is important for those systems that rely on data retrieval and analysis for decision support.
- An example of a prominent fourth-generation language is SQL, which can be used on many relational database systems such as ORACLE.
- The selection of a language depends on factors such as :
  - Availability of language and support for it
  - Experience of developers with various languages
  - Amount of manipulation v/s presentation of data
  - Need to document and maintain the program
  - Frequency of use and number of users
- The advantages of using programming languages are that
  - applications development is speedy,
  - many are end-user orientated and
  - they are more likely to be declarative rather than procedural.

DSS - Development

There are three methods for developing a DSS :-

- **DSS Generator** : A DSS generator is comprised of programs such as data management tools, electronic spreadsheets, report generators, statistical packages, graphical packages, query languages, and model building tools, that help in the development of a DSS. Some known DSS generators are FOCUS, Excel, and Lotus 1-2-3.

- **Custom made Software** : Custom-made software is designed and developed by organisations, who are committed to the DSS technology but cannot find a suitable generator or shell. The software is developed using a procedural language, such as C or a fourth generation language (4GL) such as FOCUS. Organisations may also choose to combine shells and customised software.

DSS - Development

- **DSS Shells** : A DSS shell is a program used to build a customised DSS. Shells eliminate the need for developing the DBMS, model management system, and user interfaces, because skeletal versions of these modules are already available in the shell. A user can simply connect the shell with the appropriate external and internal databases and input the appropriate models in order to have a fully functional DSS.
- System development can proceed at a rapid pace because of availability of basic versions of the DBMS, the model management system and the set of interfaces in the shell.
- Shells have become user friendly, allowing even users with little or no programming background to develop fairly sophisticated systems. The main disadvantage of a shell is that it may have to be customised to meet the needs of the decision maker or the user may have to adopt the problem to the tool.

DSS - Applications

The various applications of a DSS can be classified into following three categories :

- **Independent problems** : The independent problems are 'standalone problems' whose solutions are independent of other problems. The goal is to find the best possible solution to the given problem. In the business world, independent problems are rare.
- **Interrelated problems** : In interrelated problems, solutions are interrelated, by each other, to find the most effective solution to the group of interrelated problems. These types of problems usually require team effort.
- Example of interrelated problems – If a soft drink company's goal is to increase sales of its soft drink by 10% during the summer season, then this requires the coordination of a set of interrelated tasks, such as developing an effective advertising

DSS - Applications

campaign, motivation of the sales force, developing pricing strategies, and offering incentives to distributors. To accomplish these tasks, talents of a group of experts are required.

- **Organisational problems** : In organisational problems, all departments within an organisation are included. Such problems require team effort. Total quality management is a good example of an organisational effort, because for it to be effective, it requires a joint effort from all departments in the organisation. A DSS is ideal for interrelated and inter organisation problems. For example, in a manufacturing environment, a DSS can help a production manager answer complex and data-intensive questions such as the number of machines to be operated, the amount of materials required to fill a new order, production scheduling, and labour scheduling.

DSS - Applications

- Other applications of DSS are - forecasting, demand management, and supplier evaluation.
- A DSS can consolidate data from different sources to forecast demand, determine the appropriate quantity and mix the resources necessary to meet the demand, and balance supply and demand for a wide variety of products.
- It can also present managers with comprehensive data about different company projects, programs, and products so that they can make sound decisions.
- Applications of DSS also include corporate planning, developing effective advertising strategies and pricing policies, determining an optimal product mix, and handling investment portfolios.

Group DSS - GDSS

- GDSS are computer-based information systems that facilitate the free flow and exchange of ideas and information among group members while maintaining their anonymity.
- Other terms have also been coined to describe the application of information technology to group settings. These terms include Group Support System (GSS), Computer-supported Cooperative work (CSCW), Computerised Collaborative Work Support (CCWS), and Electronic Meeting System (EMS).
- The software used in these settings has been given the name groupware.
- Groups typically consist of less than 20 people, who arrive at decisions through communication.
- The communication serves to share information and implement the decision-taking process. The decision may be taken by vote but is more often by negotiation, consensus or preference ranking.

GDSS – Computer based support

Three types :-

- **Decision networks** : This type allows participants to communicate through networks with each other or with a central database. Applications software may use commonly shared models to provide support. The commonest implementation is using a local area network and microcomputers. The technology filters out many of the typical group dynamics of a participative meeting.
- **Teleconferencing** : If groups are composed of members or subgroups that are geographically dispersed, teleconferencing provides for interactive connection between two or more decision rooms. This interaction will involve transmission of computerised and audiovisual information. Whereas decision networks can be viewed as the use of local area networks, for decision making involving groups the decision room is an entirely new development.

GDSS – Computer based support

- **Decision room** : Participants are located in one place i.e.; the decision room. The purpose of this is to enhance participant interaction and decision making by computerised support within a fixed period of time using a facilitator.

- The facilitator is usually not from within the organisation but a trained professional in group dynamics, brought in for the decision making sessions. There will also usually be a computer controller whose responsibility is to maintain computer communications and software support within the room.

- The decision room is used by an organisation to create an environment in which groups may enhance their decisions.

- The decision making process is guided by a facilitator.

GDSS – Computer based support

- The decision room should consist of a table with networked workstations for the participants and workstations, for the facilitator and controller.

- The screen of any node of the network can be projected onto the wall screen.

- The facilitator can also ensure that, if required, any participants screen can replace some or all of the other nodes for demonstration or interactive purposes.

- Breakout rooms, used for smaller discussions, are also equipped with similar networked machines.

- A combination of overhead projector, flipchart, photocopier and other presentation devices are provided as well.

GDSS – Computer based support

- The software for GDSS may take many forms but will always consist of tools that aid group decision making, are easy to use and are interactive. Examples of such software are :
- **Brainstorming** : Brainstorming software may be used at any stage of the proceedings but is particularly valuable at early stages when members of the group need to think and converse freely on issues. A problem or statement can be entered for comment. This will appear on all screens. Each individual may then produce comments, which are anonymously consolidated and displayed. The tool increases creativity and lateral thinking.
- **Policy formation** : Software can aid policy formation by allowing decision makers to identify connections and relations between issues and communicate this to all present for comment.

GDSS – Computer based support

- **Voting** : It is frequently important to obtain a swift view on the acceptability of proposals from a group perspective before proceeding.

- Voting software enables this to happen.

- It is not merely restricted to yes/no but will also enable different formats for expressing preference including multiple choice and 1-5 scale.