

Lecture-02

BI (DECISION SUPPORT SYSTEM)

A Decision Support Framework (by Gory and Scott-Morten, 1971)

Type of Decision	Type of Control		
	Operational Control	Managerial Control	Strategic Planning
Structured	1 Accounts receivable Accounts payable Order entry	2 Budget analysis Short-term forecasting Personnel reports Make-or-buy	3 Financial management Investment portfolio Warehouse location Distribution systems
Semistructured	4 Production scheduling Inventory control	5 Credit evaluation Budget preparation Plant layout Project scheduling Reward system design Inventory categorization	6 Building a new plant Mergers & acquisitions New product planning Compensation planning Quality assurance HR policies Inventory planning
Unstructured	7 Buying software Approving loans Operating a help desk Selecting a cover for a magazine	8 Negotiating Recruiting an executive Buying hardware Lobbying	9 R & D planning New tech development Social responsibility planning

A Decision Support Framework

The left side of the diagram is based on Simon's (1977) idea that decision-making processes fall along a continuum that ranges from highly structured (sometimes called programmed) to highly unstructured (i.e., non-programmed) decisions.

Structured processes are routine and typically repetitive problems for which standard solution methods exist. In structured DSS the objectives are clearly defined. Common objectives are cost minimization and profit maximization.

Unstructured processes are fuzzy, complex problems for which there are no cut-and-dried solution methods.

Semistructured problems fall between structured and unstructured problems, having some structured elements and some unstructured elements. Keen and Scott-Morton (1978) mentioned trading bonds, setting marketing budgets for consumer products, and performing capital acquisition analysis as semi structured problems.

TYPES OF CONTROL The second half of the Gorry and Scott-Morton framework (refer to Figure 1.2) is based on Anthony's (1965) taxonomy, which defines three broad categories that encompass all managerial activities: strategic planning, which involves defining long-range goals and policies for resource allocation; management control, the acquisition and efficient use of resources in the accomplishment of organizational goals; and operational control, the efficient and effective execution of specific tasks.

Decision Support Matrix

A "Decision Support Matrix" is a tool used to evaluate and select the best option among several choices by systematically analyzing each option against a set of predetermined criteria, often presented in a table format, allowing for a more informed decision based on weighted factors rather than solely subjective opinions; it is essentially a structured way to compare different alternatives and choose the most suitable one based on the most important considerations.

	Cost	Experience	Communication	Customer reviews	Score
Agency 1					
Agency 2					
Agency 3					

Key points about a Decision Support Matrix

Function:

- Helps decision-makers weigh various options against important criteria, assigning scores or weights to each factor to determine the most favorable choice.
- **Components:**
- **Options:** The different choices being evaluated, listed as rows in the matrix.
- **Criteria:** The key factors used to assess each option, listed as columns in the matrix.
- **Weights:** Numerical values assigned to each criterion to reflect their relative importance.

Benefits:

- **Reduces bias:** By using a structured approach, it minimizes the influence of personal preferences in the decision-making process.
- **Improves transparency:** Allows for clear comparison of options and facilitates communication among stakeholders.
- **Facilitates complex decisions:** Particularly helpful when dealing with multiple factors and options.

Other names for Decision Support Matrix:

Decision matrix, Decision grid, and Problem selection matrix

How to use a Decision Support Matrix:

- **Identify the decision:** Clearly define the problem or choice you need to make.
- **List options:** Brainstorm and list all possible alternatives.
- **Determine criteria:** Identify the most important factors to consider when evaluating each option.
- **Assign weights:** Assign a weight to each criterion based on its relative importance.
- **Evaluate each option:** Score each option against each criterion based on a predetermined scale.
- **Calculate total scores:** Multiply each criterion score by its weight and sum the scores for each option.
- **Select the best option:** Choose the option with the highest total score.

Computer Support for Structured Decisions

Computers have historically supported structured and some semi structured decisions, especially those that involve operational and managerial control, since the 1960s. Operational and managerial control decisions are made in all functional areas, especially in finance and production (i.e., operations) management. Structured problems, which are encountered repeatedly, have a high level of structure. It is therefore possible to abstract, analyze, and classify them into specific categories. For example, a make-or-buy decision is one category. Other examples of categories are capital budgeting, allocation of resources, distribution, procurement, planning, and inventory control decisions. For each category of decision, an easy-to-apply prescribed model and solution approach have been developed, generally as quantitative formulas.

Computer Support for Unstructured Decisions

Unstructured problems can be only partially supported by standard computerized quantitative methods. It is usually necessary to develop customized solutions. However, such solutions may benefit from data and information generated from corporate or external data sources.

Computer Support for Semi structured Problems

Solving semi-structured problems may involve a combination of standard solution procedures and human judgment. Management science can provide models for the portion of a decision-making problem that is structured. For the unstructured portion, a DSS can improve the quality of the information on which the decision is based by providing, for example, not only a single solution but also a range of alternative solutions, along with their potential impacts. These capabilities help managers to better understand the nature of problems and, thus, to make better decisions.

THE CONCEPT OF DECISION SUPPORT SYSTEMS (DSS)

In the early 1970s, Scott-Morton first articulated the major concepts of DSS. He defined decision support systems (DSS) as "interactive computer-based systems, which help decision makers utilize data and models to solve unstructured problems"

Decision support systems couple the intellectual resources of individuals with the capabilities of the computer to improve the quality of decisions. It is a computer-based support system for management decision-makers who deal with semi structured problems Keen and Scott-Morton, 1978

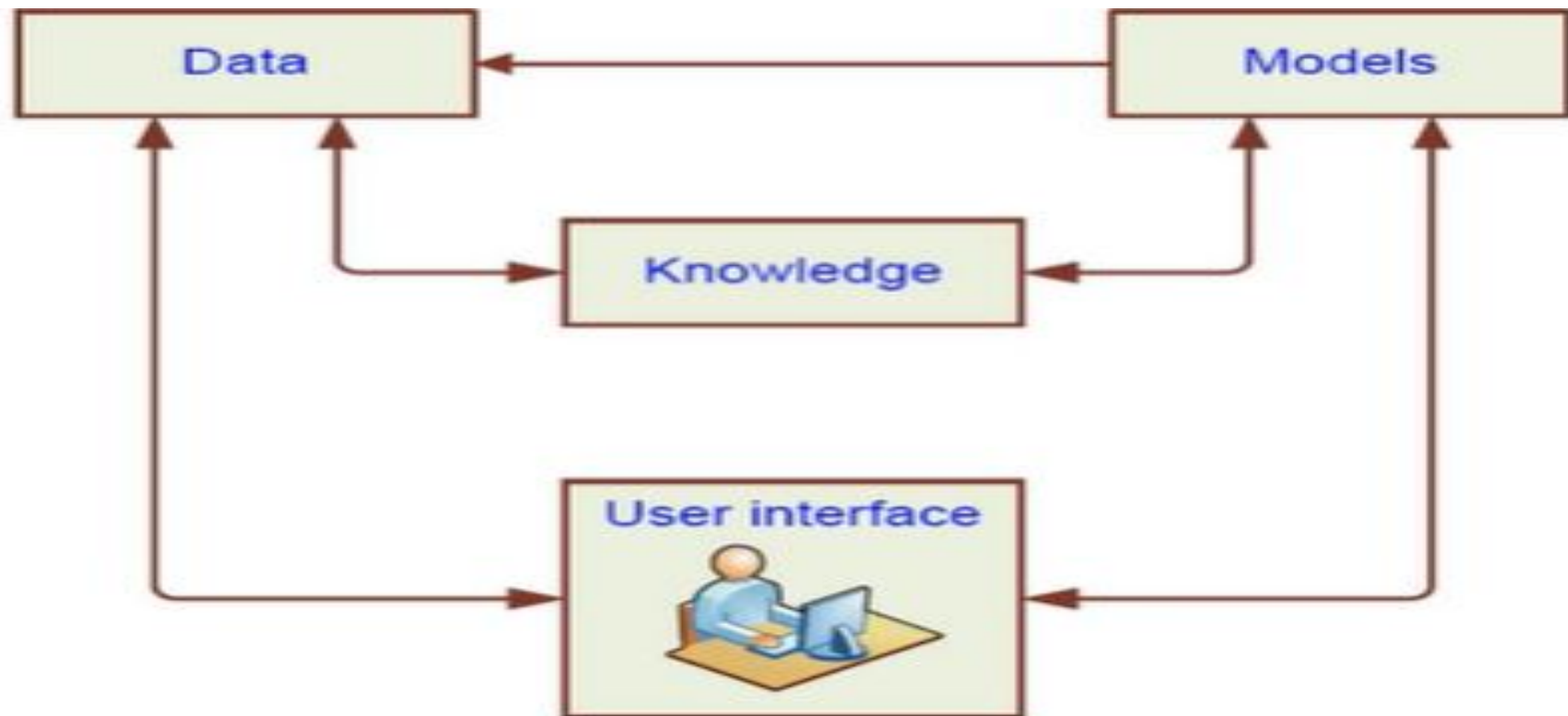
In a narrow sense DSS refers to a process for building customized applications for unstructured or semi-structured problems

Components of the DSS Architecture

Data, Model, Knowledge/Intelligence, User, Interface (API and/or user interface)

DSS often is created by putting together loosely coupled instances of these components

High-Level Architecture of a DSS



Types of DSS

Model-oriented DSS

Data-oriented DSS

Evolution of DSS into Business Intelligence

Use of DSS moved from specialist to managers, and then whomever, whenever, wherever Enabling tools like OLAP, data warehousing, data mining ,intelligent systems, delivered via Web technology have collectively led to the term “business intelligence” (BI) and “business analytics”