Information Management and Decision Making

Decision Support Systems (DSS)

The more information you have, based on internal or external sources, the better your decisions. Business executives are faced with the same dilemmas when they make decisions. They need the best tools available to help them.

What is a Decision Support System (DSS)?

It is a type of information system that helps executives make better decisions using historical and current data derived from internal information systems, as well as external sources. These systems can be comprised of smaller computer-based systems and subsystems that are intended to help decision-makers important tasks, such as usage of communication technologies, collation and organization of data and documents, and the processing of data using tools and models.

By combining large amounts of data with analytical models and tools, and by making the system easy to use, they are a reliable source of information to use in any decision-making process.

Comparing DSS to MIS

In order to better understand these two (2) systems, one must understand they govern two (2) distinct decisions of differing criteria:

- Does the system make decisions involving routine activities, or are they big one-time decisions?
- Does the system involve organization-wide decisions, or does it involve specific decisions involving select people?
- Does your system produce output in the form of organized raw data, or does it produce tabulated, processed information?

The Framework of a DSS

The conceptual framework of a DSS is based on key factors:

- **Dominant technological component** – Five (5) generic categories can be proposed.
- **Target Users** – A DSS can target internal (employees, executives, board of directors, managers) or external (consumers, regulators, investors, suppliers) stakeholders.
- **System Goals and Applications** – A DSS can have specific or very generalized objectives. This is usually based on a specific application the system will be dealing with.
- **Deployment Technology** – A DSS can be deployed on either a mainframe computer, a client/server LAN network, or a web-based system architecture.

DSS Components

Traditionally, a DSS has four (4) major components:

- **User Interface** – The most commonly seen component, it contains the various way for a user to interact with the system. A typical user interface may contain menus, submenus, buttons and icons that will allow the system user to access the various resources available to the system.
- **Database** – This component holds all digitized data and information essential for the system's tasks. Databases can have specialized components apart from their usual purpose of holding data.
- **Models and Analytical Tools** – These are the technical components that will allow the system accomplish its scope and tasks; each system may use different components depending on their purpose.
- **Architecture and Network** – These refer to how the system hardware is organized, how software and data is distributed, and how other components of the system are integrated and connected. Organizations can opt for a networked or a web-based architecture, depending on the system applications.

Types of DSS

The different types of DSS are categorized based on a primary framework factor (the dominant technological component), and three (3) secondary framework factors (the users, the system's goals and applications, and the deployment technologies used). Some DSS types can be considered as a **Hybrid Type** by having more than one (1) primary framework factor:

- **Data-Driven DSS** – This type of DSS can take a very large amount of data available from various other information systems (such as Transaction Processing Systems) and derive useful information for decision-making. This system

doesn't follow a specific theory or model, but can "free-flow" the data whenever needed. A data-driven DSS emphasizes access and manipulation of large amounts of internal and/or external data. Possible tools for this system include File Management Systems, Executive Information Systems (EIS), and Spatial Decision Support Systems.

- **Model-Driven DSS** – This type of DSS emphasizes access to and manipulation of a data model in order to help decision-making for possible and probable situations. A model-driven DSS includes systems that use accounting or financial models, representational models, and optimization models. Some instances of this type of DSS allow complex analysis of data, and can even by classified as a hybrid type of system by providing data modelling, data retrieval, and data summarization functionality. This system can include statistical and analytical tools such as data processing, data segregation, and parameter setting. Unlike a data-driven DSS, this type of system is not data-intensive.
- **Knowledge-Driven DSS** – This type of DSS focuses on knowledge as its primary framework factor. A knowledge-driven system can suggest or recommend actions to managers by providing expert knowledge on a particular domain, as well as solving any problems inherent in that domain. The concept of **data mining** can be correlated to this system, as it involves the processing of stored data to produce data content relationships via hidden patterns.
- **Document-Driven DSS** – This type of DSS, also known as the **Knowledge Management System**, is a currently evolving system capable of helping managers work on unstructured digital documents and web pages. The system integrates a variety of storage and processing technologies to provide retrieval and analysis of documents and other types of media, such as web pages, images, audio and video. This allows the system to handle organizational files, such as policies and procedures, product specifications, catalogs, and corporate historical documents such as meeting minutes, records, and internal/external correspondence. Allowing the system to access web-based resources adds a bigger scope of use for the system.
- **Communications-Driven and Group DSS** – This type of DSS, previously known as the **Group Decision Support System (GDSS)** or **Groupware**, includes communication, collaboration, and decision support technologies that do not fit with other DSS types. It is considered as a hybrid system that emphasizes both the use of communication and decision models. This allows the system to solve problems of decision-makers that work together as a group. Potential tools for this system include document sharing either via network or the web, electronic communication such as email, collaboration scheduling tools.
- **Inter-Organizational/Intra-Organizational DSS** – These types of DSS put external (clients, customers, business partners, etc.) and internal (departments in the organization, employees, managers, etc.) as its primary key factor. Considered a relatively new type of DSS, it is made possible by emerging technologies and the rapid growth and popularity of the Internet as a business tool. While an inter-organizational DSS provides external users access to its capabilities, most types of DSS are considered as intra-organizational due to their users being persons within the organization.
- **Function-Specific/General Purpose DSS** – These types of DSS are designed to support more specific functions for specific types of industries or businesses. The purpose of this type of system is mostly to solve problems involving broad, routine or recurring decision tasks. These systems can have different primary key factors and can be classified as a hybrid DSS type depending on the tasks they perform.

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