



Decision Support System- Integral Part of Organization's Decision Making

Ranjit Kaur^{#1} Gurjot Kaur^{*2} Ruchi Sikka^{#3}

^{#1}Assistant Professor, Department of Computer Science, Khalsa College for Women, Ludhiana, Punjab, India

^{#1}email: ranjit75135@gmail.com

^{*2}Assistant Professor, Department of Computer Science, Khalsa College for Women, Ludhiana, Punjab, India

^{*2}email: gurjotsidhu192@gmail.com

^{#3}Assistant Professor, Department of Computer Science, Khalsa College for Women, Ludhiana, Punjab, India

^{#3}email: sikkaruchi81@gmail.com

Abstract: Decision support system is the backbone of any organization's decision making process. DSS is inseparable part of business processes. It helps the manager to take good decision from the output produced by decision support system. DSS analyzes all the data and produces firm decisions. These decisions can be good or bad depending upon the knowledge of the manager. The manager needs to be aware of all the models and abstractions being used by DSS to take any final decision else the organization may face losses. There are several types of DSS available to us. The manager needs to look for most suitable DSS for his organization. The paper also discusses the components of DSS architecture, its advantages and disadvantages in long run. The characteristics of the suitable DSS are discussed too.

Keywords: Decision Support System, knowledge based DSS, Model Based DSS, OLAP, Web based DSS

I. Introduction

Decision support system is an information system that helps in making trivial to critical decisions of an organization in an efficient manner. It is an application that allows analysis of enormous amount of business data to take further decisions regarding the business processes in a better, easy and efficient manner. A Decision support system can be manual system or it can be a computerized system depending on the needs of the organization. Some typical information a DSS can present is ^[1]:

- Comparison of sales figure on weekly, monthly, yearly basis in an organization.

- Projected revenue figures based on new product sales assumptions
- The consequences of different decision alternatives, given past experience in a context that is described

A DSS can make use of graphics to present the information. There are several types of DSS which are used by organizations these days. There are some DSS that include expert systems or AI to match the latest trends in IT. A Decision Support system allows the upper- level authorities in an organization to make most appropriate decisions regarding management activities or operational activities. It may be aimed at business executives or some other group of knowledge workers.



With the advancement in IT, the production of data has increased many folds. This has also lead to birth of another technology called **BIG DATA**. The scope of this paper is limited to decision support systems. So we will not take up big data here.

II. History of Decision Support System

Over the past three decades, Decision Support Systems have evolved from simple model-oriented systems to advanced multi-function entities. Some of the highlights are discussed below [3]:

Year	Description
1960's	DSS based on powerful and expensive mainframe computers for providing structured and periodic reports.
1970's	DSS evolve into more elaborate computer-based systems that supported production, promotion, pricing, marketing and some logistical functions.
1980's	DSS framework was expanded for academic purposes.
1990's	new innovative systems such as OLAP and other web-drive systems were developed as result of complex systems using advanced database technology and client/server capabilities,

Table 1 History of DSS

III. Architecture/Components of Decision Support System

There are four fundamental components of DSS architecture [4]:

- a) User Interface
- b) Database
- c) Model (context or situation representation)
- d) Knowledge

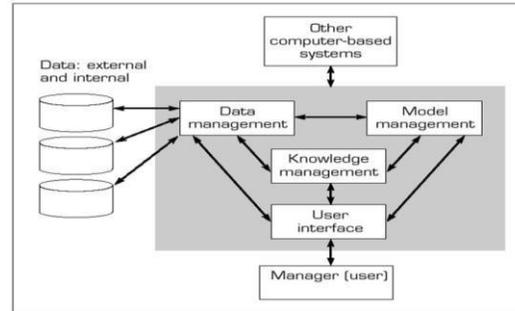


Fig.1 Architecture of DSS

IV. Characteristics of appropriate DSS

Some of the characteristics of the suitable DSS are discussed below [5] [6]:

1. **Facilitation.** DSS facilitate and support specific decision-making activities and/or decision processes.
2. **Interaction.** DSS are computer-based systems designed for interactive use by decision makers or staff users who control the sequence of interaction and the operations performed.
3. **Ancillary.** DSS can support decision makers at any level in an organization. They are NOT intended to replace decision makers.
4. **Repeated Use.** DSS are intended for repeated use. A specific DSS may be used routinely or used as needed for ad hoc decision support tasks.
5. **Task-oriented.** DSS provide specific capabilities that support one or more tasks related to decision-making, including: intelligence and data analysis; identification and design of alternatives; choice among alternatives; and decision implementation.
6. **Identifiable.** DSS may be independent systems that collect or replicate data from other information systems OR subsystems of a larger, more integrated information system.



7. **Decision Impact.** DSS are intended to improve the accuracy, timeliness, quality and overall effectiveness of a specific decision or a set of related decisions.
8. **Flexibility:** DSS features are flexible and can be altered according to need providing a helping hand in the work process.
9. **Integrated software:** DSS's integrated platform enables administrators and IT professionals to develop data models, perform sophisticated analysis, generate analytical reports, and deliver these reports to end users via different channels (Web, email, file, print and mobile devices).

V. Types of Decision Support System

There are several DSS available in market. An organization selects the suitable DSS as per their needs [3].

1. Model driven

Model driven DSS lays emphasis on manipulation and access of the models instead of data it uses data and parameters to help decision makers in analysis. These systems are not data intensive so they are not linked to very large databases. The models on which DSS is made can be interdisciplinary.

2. Knowledge driven

Knowledge driven DSS are often referred to as management expert systems or intelligent decision support systems. They focus on knowledge and recommends actions to managers based on an analysis of a certain knowledge base. Moreover, it has special problem solving expertise and are closely related to data mining.

3. Document driven

These systems help managers retrieve and manage unstructured documents and web pages by integrating a variety of storage and processing technologies to provide complete document retrieval and analysis. It also access documents such as company policies and procedures, product specification, catalogs, corporate historical documents, minutes of meetings, important correspondence, corporate records, etc. and are usually driven by a task-specific search engine.

4. Communication driven

This kind of DSS is often called group decision support systems (GDSS). They are a special type of hybrid DSS that emphasizes the use of communications and decision models intended to facilitate the solution of problems by decision makers working together as a group. GDSS supports electronic communication, scheduling, document sharing and other group productivity and decision enhancing activities and involves technologies such as two-way interactive video, bulletin boards, e-mail, etc.

5. Inter- and Intra-organization DSS

These systems are driven by the rapid growth of Internet and other networking technologies such as broadband WAN's, LAN's, WIP, etc.

Inter-organization DSS are used to serve companies stakeholders (customers, suppliers, etc.), whereas intra-organization DSS are more directed towards individuals inside the company and specific user groups. The latter, because of their stricter control, are often stand-alone units inside the firm.

6. Latest DSS



- Hybrid Systems, which are combinations units using aspects of more than one different type of DSS. For e.g. Web based DSS, which can be driven by a combination of different models such as document-driven, communication driven and knowledge drive.
- On-line Analytical Processing (OLAP) - a category of software technology that enables analysts, managers and executives to gain insight into data through fast, consistent, interactive access to a wide variety of possible views of information that has been transformed from raw data to reflect the real dimensionality of the enterprise as understood by the user.

VI. Applications of DSS

- Forest management
- Agricultural production.
- Business and Management
- Medical diagnosis.

VII. Advantages of DSS

- Improves performance and effectiveness of the user^[7]
- Allows for faster decision-making^[7]
- Reduces the time taken to solve problems
- These combine to save money!
- Has been seen to improve collaboration and communication within groups
- Reduces training times because the experience of experts is available within the programs algorithms
- Provides more evidence in support of a decision
- May increase decision-maker satisfaction
- Providing different perspectives to a situation
- Helps automate various business systems

VIII. Disadvantages

- Too much emphasis/control given to the machines.
- May reduce skill in staff because they become dependent on the computers
- Reduction in efficiency because of information overload^[7]
- Shift of responsibility - easy to blame computer!
- Disgruntled employees who feel they are now only doing clerical work^[7]
- False sense of being objective - humans still feed information in and decide how exactly to process it.

IX. Conclusion

DSS plays a very crucial role in enhancing overall performance of an organization. But these DSS can also cause trouble producing inaccurate analysis hence confusion and misperception. As these systems are not programmed to eliminate bad decisions by own, treating all outputs equally good. So, here the manager using DSS comes into picture as he carries the responsibility of making operational decisions. An overall understanding of the models, templates and abstractions that the DSS is built on is required for accurate understanding of how to approach opportunities, challenges and threats within the organization. The design of the DSS provides knowledge on how the system can blend into business operations to enhance decision making in the organization. Although a very close guarded and careful method is used while using DSS because a wrong choice can lead to more damage than failure but still DSS cannot be eliminated from organization's business decision process because of high competition in market. With evolution in DSS, it will enhance



and expand further as per the changing business needs.

References

1. Margaret Rouse, decision support system, Retrieved from <http://searchcio.techtarget.com/definition/decision-support-system>
2. Wikipedia, Decision Support System, Retrieved from https://en.wikipedia.org/wiki/Decision_support_system
3. Randall E. Louw, Retrieved from http://www.umsl.edu/~sauterv/analysis/488_f02_papers/dss.html, 2002
4. Management Study Guide, DSS Architecture, Networking and Security Issues Retrieved from <https://www.managementstudyguide.com/decision-support-system-architecture-networking-security-issues.htm>
5. Sayantan Sur, DSS, Retrieved from <https://www.slideshare.net/sursayantan92/decision-support-systemdss>
6. Dan Power, characteristics of DSS, Retrieved from <http://dssresources.com/faq/index.php?action=artikel&id=13>
7. Decision making confidence, DSS uses, Retrieved from <http://www.decision-making-confidence.com/decision-support-systems.html>
8. Nastaran Ghorbani Khodashahri Masoome Mir Hassannia Sarabi, *DECISION SUPPORT SYSTEM (DSS)*, 2013

BIOGRAPHY



Ms. Ranjit Kaur #1

Qualification:

- Bachelor of Computer Applications under PU, Chandigarh
- Masters of Computer Applications under PAU, Ludhiana, Punjab

Designation: Assistant Professor, Department of Computer Science, Khalsa College for Women, Ludhiana

Publications: 07

Areas of interest: Cloud Computing, Web Technology, Digital Marketing, AI



Ms. Gurjot Kaur #2

Qualification:

- Bachelor of Computer Applications under PU, Chandigarh
- Masters of Science – Information Technology, PU Chandigarh

Designation: Assistant Professor, Department of Computer Science, Khalsa College for Women, Ludhiana

Publications: 05

Areas of interest: Computer Graphics, AI, Multimedia, Web Technology



Mrs. Ruchi Sikka #3

Qualification:

- Masters of Computer Applications under LPU, Phagwara, Punjab

Designation: Assistant Professor, Department of Computer Science, Khalsa College for Women, Ludhiana

Publications: 10

Areas of interest: AI, Neural Networks, Multimedia, Web Technology