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Review Article

Significance of Decision Support Systems

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Abstract

Main aim regarding our research is to analyze the importance and significance of taking decisions in organizations. Decision support system is used in every field of life these days. The main modules of decision support system are database, model base, knowledge base and users. The decision support systems help us to take optimal decisions in complex situations. It is used in education, medicine, business and agriculture etc. Thus it has found its application in every walk of life due to tremendous amount of success achieved in decision making. We are exploring the norm of decision support system in different fields and huge success it achieved. We can say that decision support system has become an integral part of any organization's decision process.

Keywords: *Decision Support Systems, Knowledge base, Database, Decision making.*

1. Introduction

Decision support systems gained importance as a study area and a support to information management during starting days of distributed computing (Arnott e Pervan, 2005; Power, 2007). It is the field of the information management which is based on enhancing the process of decision making at the level of enterprise and executives (Power, 2007). Decision Support System is " *shared system based on database and models to use data and information to tackle amorphous issues* " (Cui *et al.*, 2014). Different to rational phenomenon of data and information management, it is focused; user operated, controlled, more over it also integrates models along with systematic methods to access and retrieve data efficiently and effectively. It was created to help organizations in decision making of complex situations by the usage of communication technologies, data, knowledge and available documents (Arnott e Pervan, 2008). The basic aim of development of Decision Support system is enhancement of the quality of decisions by the help of latest tools and technologies (Pearson e Shim, 1994). The entire system is a collection of database; different software's related to data management and decision making.

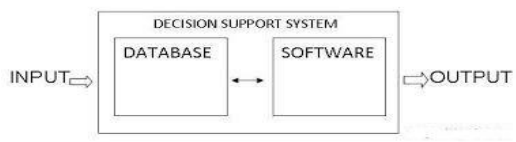

Fig.1 Typical architecture of a decision support system

In 1960s, administrations were beginning to automate most of the operative features. Information systems were created to accomplish different tasks related to daily life activities. The purpose of earlier information systems was to make information available to data managers to aid decision making for effective management (Power, 2007). However, a small number of information systems were effective. The main reason of failure was that the professionals could not understand the phenomenon of managerial work.

The idea of "decision support systems" was given in 1971, although some writers point the starting date of the term in 1965. Gory and Scott Morton (1971) built an interface for enhancement of information system management through Anthony' distribution of managerial activities and Simon's classification of decision variations during 1960-1970. Gory and Scott Morton consider Decision support systems as a system which can support different management activities for decision making that are completely defined/undefined.

Most of the earlier effort on DSS was based on trial. Purpose of early DSS engineers was to make an atmosphere in which the managers and decision makers could work together in IT-based system in a cooperative way to diagnose and solve problems (Arnott e Pervan, 2005). Requirement of DSS was not just to enable the user with an application that could solve user's queries effectively but the basic requirement was to provide the user an environment in which problems which looked impossible to solve earlier could be solved. So we can say that the basic aim of creating decision support system is to enhance the capability of users. Concisely we can consider DSS as an idea of integrating information systems with the users to enhance the decision making in different situations.

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2. Decision Support System

2.1 The Structure of DSS

The overall structure is composed of three main components which are discussed as under.

2.1.1 Database management system

A DBMS acts as data storage for the Decision support systems. It saves huge volume of data and information related to the applications and issues for which the database in the DSS has been created and it enriches the user with the systematic view of data (divergent to the physical data layout) which a user can handle and communicate easily. So the DBMS software parts the users from physical features of database and provides logical layout (Druzdzel e Flynn, 1999).

2.1.2 Model base management system

The basic purpose of this component is to provide freedom from specific models which are used in a DSS from application which the user is using. Task of this component is to transform data from DBMS into useful information which can be handy in the process of deciding. As many of the issues faced by the manager of the system can be amorphous, so we can say that the model base management system must have the capability of supporting the user in model management (Druzdzel e Flynn, 1999).

2.1.3 Conversation and conversation management

Main advantage of using a Decision support system is awareness. The operators are mostly the executives who do not have the knowledge of using computer aided systems, so the Decision support systems should have easy to use interfaces. Conversation management not only helps in model creation, but also provides a rich environment for interaction with overall system, like getting knowledge of hidden patterns and recommendations from it. The main function of this feature is to improve the conversation ability of the user with system and enable the operators to gain maximum benefit from the system.

These three components integrate to build a decision support system. Distinctive uses of decision support system are in management and planning in the fields of education, corporate, agriculture, medicine.

2.2 Approaches to decision support system

There are number of styles of management of Decision support system. All types present unique ideas of assistance at the level of enterprise, ratios of assets and impact of these factors on organizational growth. Decision support system uses different tools and technologies to support and maintain different managerial activities. Another aspect of growth of DSS is enhancement in technology standards, as the surfacing of every DSS category is usually linked to the provision of improved tools and technologies. DSS can be implemented in different forms. It can be implemented as:

- Personal decision support systems
- Group decision support systems
- Executive decision support system

The personal DSS was created to support individual decision making. Group decision support system was created to support decision making at the levels of groups (Desanctis e Gallupe, 1987). Executive support system supports decision making at the level of senior heads and officials (Nandhakumar, 1996). This support of workers and operators has made software in DSS much better, faster, flexible and reliable. The main types are discussed here.

2.2.1 Communication based

In communication based decision support system decision making is basically based on communication between the group members. Communication can be through text messages, emails, and video conferencing.

2.2.2 Model based

Model based decision support system is complicated. It assists the user in analysis of decisions taken and select between different options. Executives and users use it to provide solution of complex situations.

2.2.3 Data oriented

It uses database and data ware house to ask data about different problems and situations. It is mainly used by managers, staff members.

2.2.4 Document based

Document based decision support system is most common type employed in organizations. It can be used when the user is searching web or other specific documents.

2.2.5 Knowledge based

Knowledge based decision support system include information which may not be visible to the user beforehand. It includes identifying hidden pattern among data records, management advice and services.

Various techniques are used to gather knowledge for decision making process in personal dss, group dss or executive system layout. The selection of a particular methodology to solve a problem is based on some constraints:

- What is disturbing area?
- How can the problem be solved?
- Availability of data to solve problem.
- Alternatives to user.

After getting required knowledge then the solution process is started. Decision support system is used in every field. We will discuss its use in some relative and important fields.

3. Decision Support Systems and its Application

3.1 Medical field

Decision support system is being adopted in almost every field. The wide adoption of DSS has simplified the procedure of identifying medical issues. Decision Support Systems when executed with support of Artificial Intelligence have the built capability of adoption of new atmosphere and adjust with the passage of time (Abbasi e Kashiyarndi, 2006). Artificial intelligence can be helpful in medical field in the diagnosis of disease.

To check the level of pain and disease, there is a need of some special computer supported software which can gather all data of patients and use the detailed data to measure the severity of pain and then save all record in the databases (Powell e Johnson, 1995). Disease can destroy the composure of any life and because of less effective assessment methods patient may lose heart and stop asking for further assessment and pain may become worse (Abbasi e Kashiyarndi, 2006).

Critical care of patients after getting operated is highly important because at that stage patient is in need of intense care and overtake can sometimes cause threat of life. The use of a Clinical Decision Support System to identify and estimate degree the pain is proficient, operative and necessary. The important components of clinical decision support system are depicted as under.

- Knowledge base
- Neural networks
- Genetic algorithms
- Database
- Fuzzy logic

All these components integrate to accomplish tasks in medicine field.

3.2 Business field

In current years decision support system in business field has gained an increasing amount of value among researchers and users due to a number of success cases that have reported incredible progress in organization's performance (Arnott e Pervan, 2008; Kowalczyk, Buxmann e Besier, 2013).

The decision support system helps the business personnel's in the creation of policy, execution and in usage of technical means to aid the professionals in decision-making. Decision support system is an informational model accompanied by mathematical model, informational databases moreover user friendly environment to communicate suggested decisions to the users and managers (Tech, 2014). We can say that Decision making in decision support system is diverse of rational information system or management information system because of the fact that it not only delivers information and knowledge to users, database and reports but also provides answers to user queries. Concisely DSS helps manager's to take decisions in complex situations.
Better decisions means improving information provided. Decision models should be adopted in business field to improve working. Applying knowledge depends on choice, decision-making duty, time, situation, interest etc. Management decisions modeling involves the management and optimization models (Evolution).

E commerce has the potential to enhance effectiveness and output of business actions. E-commerce is no more a technical matter; but it is also a business problem. Decision support system equipped with the databases is "a shared information system which provides information, models and data manipulation tools to aid in decision making in complex situations (Evolution).

3.3 Education field

Decision support has also been adopted in schools, colleges and universities after achieving success in every field. There has been growing pressure on educators to deal with internal and exterior competitive demands related to student's assessment like quizzes, assignments, intelligence tests (Arnott e Pervan, 2008).the data of students is saved in databases from where assessment can be performed. Database is an integral part of decision support system used in schools, colleges and universities. It can be used to analyze the performance of students, teachers. The starting point of decision support system is availability of data. Data is gathered, saved in data store and then successive means of accessing data from database are used.

Data base driven decision support system is adopted in schools, colleges, universities. Teachers can use data driven DSS to support future decisions even teacher's; students' performance can be evaluated. Data driven DSS can include assessment reports of students, attendance, exam results to evaluate student's performance in order to decide for the students' performance (Arnott e Pervan, 2008), which can then be used to take important decisions.

3.4 Agricultural field

Recent fast growing computer techniques have changed the world dramatically. Some traditional industry also impacted by the computer era (Pearl, 1988). For example, agricultural field used to be very manpower consuming. Now with the help of computerized devices, the agriculture fields can transform the orthodox farming methods by conserving natural resources, producing efficiently and cutting down labor hours (Manos, 1989; Henrion, Breese e Horvitz, 1991). The agricultural industry faces a challenging task of sustaining the world growing population (Cui *et al.*, 2014).Presently, agricultural field has to deal with many issues like augmented production rate, lack of available water, weather changes. All these issues can have adverse effects on agriculture.

Database is an integral part of decision support system used in agriculture field. Decision Support Systems joins database, database management system, model base, knowledge base to provide an interface for decision management (Reddy e Rao, 1995).

In 21st century, modern agriculture equipped with Information Communication Technology (ICT) and Decision Support System (DSS) is adopted in rural areas (Holtzman, 1988; Andries August, 2004). ICT enables

farmers to collect significant crops information and DSS guides farmers to understand and utilize the information to make correct decision. Special databases, systematic and virtual models along with geographical information system gives a systematic view to analyze the difference and delivery of crop production, water rate along with many other agricultural factors like soil and weather conditions and management strategies (Andries August, 2004). Decision support equipped with database system in agricultural field can help the farmers to get knowledge of temperature and humidity at the time of irrigation, weather prediction and can also give information related to necessary government policies to the farmers.

Conclusion

From the analysis of decision support system we can conclude that decision support system is vital for any organization's success. It is turning out to be an integral part of any organization(whether business, education, agriculture, medicine).it helps the managers to manage the information in a better way that can then be used to take important decisions related to organizational success. Decision support system helps the managers and operators to take decisions in complicated solutions. Some more effort is required to understand the pyramid more comprehensively.

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