Applications of Decision Support System (DSS) by Business Executives: A Study in Khulna City

Md. Khashrul Alam*
S. M. Towhidur Rahman**
Shamsun Nahar***

Abstract

The study attempts to explore the level of DSS application by business executives. DSS can be viewed as a computer based system that supports managers and business professionals in decision-making process. The study reveals that the present status of DSS applications by the business professionals is not up to the mark. Executives use Microsoft Excel as a tool for decisions making. The survey finds that all most all of the executives have some knowledge regarding computers like computer application in business, business information systems or management information systems. It also finds that lack of knowledge; difficulty to build appropriate models and training are the main reasons of not using DSS. The major uses of DSS are confined to data aggregation and simple calculations. A small number of executives use DSS to solve out quantitative techniques or to develop model.

Key Words: Data mining; Semi Structured; Unstructured; DSS, GDSS

1. Intoduction

Business professionals have to take decisions in their day-to-day activities. They take both quantitative and qualitative decisions frequently. The nature of decisions includes structured semi structured and unstructured. DSS can help to enhance any of that nature of decisions. Decision sup-

* Assistant Professor, Business Administration Discipline, Khulna University, Email: khashru74@yahoo.co.in

** S. M. Towhidur Rahman, Assistant Professor, Business Administration Discipline, Khulna University, Email: towhid_ku_97@yahoo.com; towhid@ku.ac.bd

*** Shamsun Nahar, Lecturer, Business Administration Discipline, Khulna University, Email: shajjudu@yahoo.com

port system can also play an important role to enrich decision quality. Decision support systems are computer technology solutions that are used to complex decision-making and problem solving (Shim and et al, 2002). Most business fails to achieve the target because of poor quality of decisions. Business executives in developing nations are using DSS in their daily activities successfully. At the same time they are getting so much benefits in their decision making process. But level of DSS uses in underdeveloped countries is not known exactly. With a view to know the status of DSS uses in a country like Bangladesh, we decided to conduct a study in Khulna city to find out the extent of DSS applications by the business executives. That definitely sheds light on the status of the development our business society in the area of decision making using technology.

1. Objectives of the study

To know the level of DSS use
To understand the knowledge of DSS among the executives
To understand the problems faced by the executives while using DSS

1.2. Development of the DSS concept

The original DSS concept was most clearly defined by Gorry and Scott Morton ,who integrated Anthony's categories of management activity and Simon's description of decision types. Anthony described management activities as consisting of strategic planning (executive decisions regarding overall mission and goals), management control (middle management guiding the organization to goals), and operational control (first line supervisors directing specific tasks). Simon described decision problems as existing on a continuum from programmed (routine, repetitive, well structured, easily solved) to non programmed (new, novel, ill-structured, difficult to solve). Gorry and Scott Morton combined Anthony's management activities and Simon's description of decisions, using the terms structured, unstructured, and semi-structured, rather than programmed and non programmed. They also used Simon's Intelligence, Design, and Choice description of the decision-making process. In this framework, intelligence is comprised of the search for problems, design involves the development of alternatives, and choice consists of analyzing the alternatives and choosing one for implementation.

A DSS was defined as a computer system that deals with a problem where at least some stage was semi-structured or unstructured. A com-

puter system could be developed to deal with the structured portion of a DSS problem, but the judgment of the decision-maker was brought to bear on the unstructured part, hence constituting a human– machine, problem-solving system. Gorry and Scott Morton also argued that characteristics of both information needs and models differ in a DSS environment. The ill-defined nature of information needs in DSS situations leads to the requirement for different kinds of database systems than those for operational environments. Relational databases and flexible query languages are needed. Similarly, the ill-structured nature of the decision process implied the need for flexible modeling environments, such as those in spreadsheet packages. Fig. 1 describes what probably came to be a more customarily used model of the decision-making process in a DSS environment. Here, the emphasis came to be on model development and problem analysis. Once the problem is recognized, it is defined in terms that facilitate the creation of models. Alternative solutions are created, and models are then developed to analyze the various alternatives. The choice is then made and implemented consistent with Simon's description. Of course, no decision process is this clear-cut in an ill structured situation. Typically, the phases overlap and blend together, with frequent looping back to earlier stages as more is learned about the problem, as solutions fail, and so forth. Over the last two decades or so, DSS research has evolved to include several additional concepts and views. Beginning in about 1985, group decision support systems (GDSS), or just group support systems (GSS), evolved to provide brainstorming, idea evaluation, and communications facilities to support team problem solving (Gory & Scott, 2002). A typical DSS must meet three criteria (Liang & Hung, 1997):

(1) Support but not replace decision makers;
(2) Tackle semi-structured decision problems; and
(3) Focus on decision effectiveness, not efficiency

While it is expected that a DSS will improve decision quality, prior research indicates that the effect of DSS use on managerial decision performance is still uncertain. In some instances decision performance improved, while in others there is no effect. This is not entirely unexpected since there are multiple variables, issues and context that interact when we set out to assess DSS use (Kanungo & et al, 2001).
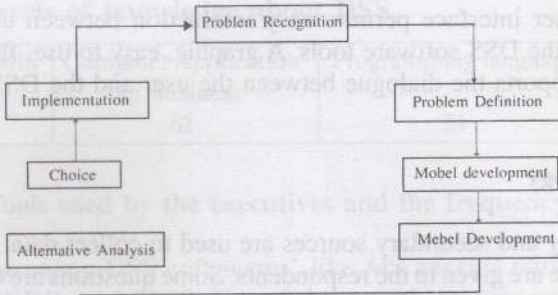
Figure 1: The DSS decision making process

1.3. The component of DSS:

The main components of the DSS are the DSS data base, the DSS software system, and the user interface DSS database is a collection of current or historical data from a number of applications or groups. The database may be small database residing on a PC or massive data warehouse. The DSS software system contains the software tools that are used for data analysis. It may contain various OLAP tools, data mining tools or a collection of mathematical and analytical models. Figure below shows the major components of DSS
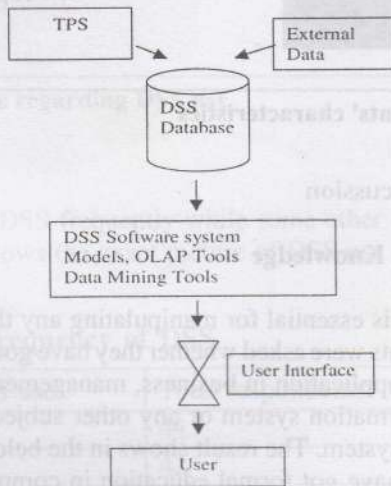

Figure 3: Components of DSS

The DSS user interface permits easy interaction between users of the system and the DSS software tools. A graphic, easy to use, flexible user interface supports the dialogue between the user and the DSS (Laudon, 2006).

. Methodology

Both primary and secondary sources are used to collect data. Structured questionnaire are given to the respondents. Some questions are open ended while some are close-ended. 120 respondents are surveyed to gather the information. Convenience sampling technique is used to collect the data from the respondents. Respondents are from different sectors of business like banks, pharmaceuticals, mobile operators and so on. The chart below shows demographic pattern of the respondents. Respondent's positions range from entry level to mid level. Different journals, texts and various electronic search engines are also used to conduct the study. We use simple statistical tools to analyze the data.
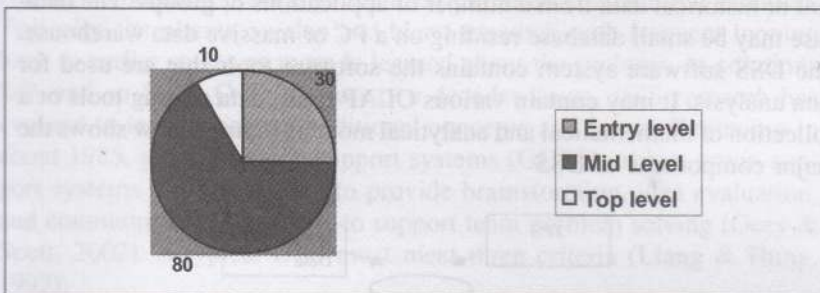

Figure 2: Respondents' characteristics

## 5. Findings & discussion

5.1. Level of DSS Knowledge

Proper knowledge is essential for manipulating any thing in an efficient manner. Respondents were asked whether they have got any formal knowledge in computer application in business, management information system, business information system or any other subjects related to computer information system. The result shows in the below, that large number of executives have got formal education in computer application in business.

Table 1: levels of knowledge about DSS

Completed MIS	Computer Application in business	Programming language	Others
26	62	24	08

5.2. DSS Tools used by the executives and the frequency of use

There are so many DSS soft wares' like MS excel, Lotus 123, Corel Quattro, LINDO, and SPSS. Out of those decision support tools, most users use Ms excel for analyzing business problems. At the same time it is found that all most all of the respondents are not well aware of the available alternative DSS tools. While asking about the frequency of DSS use the respondents give a mix reply.
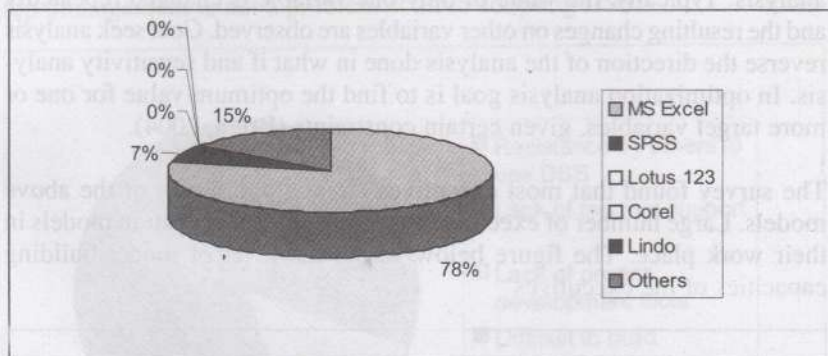
Figure 4: Response regarding DSS use

Some of them use DSS frequently while some other use it occasionally. The table below shows the exact picture of DSS use by the executives.

Table 2: Usage frequency of DSS

Frequency of DSS use	Total respondents	Percentage
Daily	44	37
Occasionally	42	35
Seldom	34	28

5.3. Model building and DSS

Model is the abstraction of reality. It represents real thing in a simplified version. Models can be of many types like schematic, physicals and mathematical. Business executives need to build model before taking decisions. Models are popular among manger because of many reasons such as, convenient to manipulate, less expensive, consistent tool for evaluation and provide standardized format for analyzing problems (Stevenson, 2006).

Business professionals can develop number of models such as what if analyses, scenario analyses, optimization, goal seek analysis, mathematical models etc. In what if analysis, user makes changes to variables, or relationships among variables, and observes resulting changes in the values of other variables. Sensitivity analysis is a special case of what if analysis. Typically, the value of only one variable is changed repeatedly and the resulting changes on other variables are observed. Goal seek analysis reverse the direction of the analysis done in what if and sensitivity analysis. In optimization analysis goal is to find the optimum value for one or more target variables, given certain constraints (Brien, 2004).

The survey found that most executives are not well aware of the above models. Large number of executives uses only data aggregation models in their work place. The figure below shows the level of model building capacities of the executives
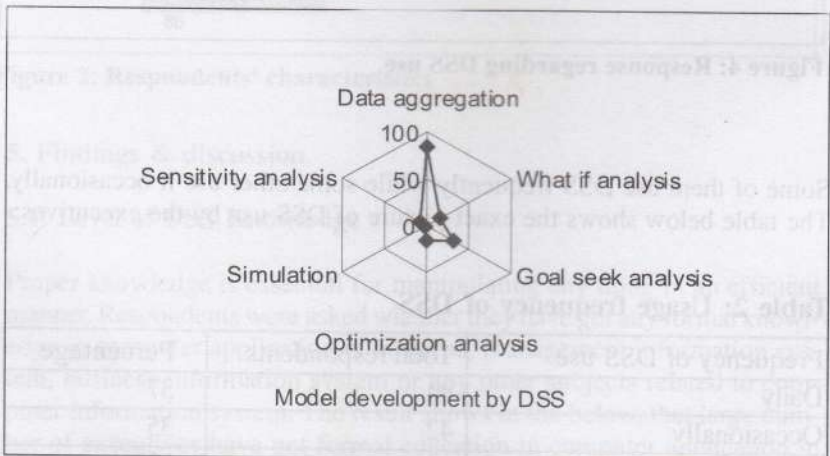

Figure 5: level of model building capacities.

5.4. Problems in adopting DSS

Application of DSS in business scenarios demands user's knowledge, top management supports, opportunities to develop model and a congenial environment. Employees should have the mentality to accept DSS as a tool for enhancing decision-making capacity. Respondents were asked about the problems in adopting DSS by 5 points scale ranges from strongly agree to strongly disagree. A weight is given to each option such as, for strongly agree 2 and strongly disagree -2 and neither agree nor disagree 0.Then the total weighted score is calculated by multiplying each score with the respective weight. The chart below shows the results. The highest score tells that user consider as the biggest problem in adopting DSS and vice versa (See Appendix- Table 3-A and 3-B). The survey finds that most users face difficulty in developing model while they consider lack of top management is not a problem at all in adopting DSS.
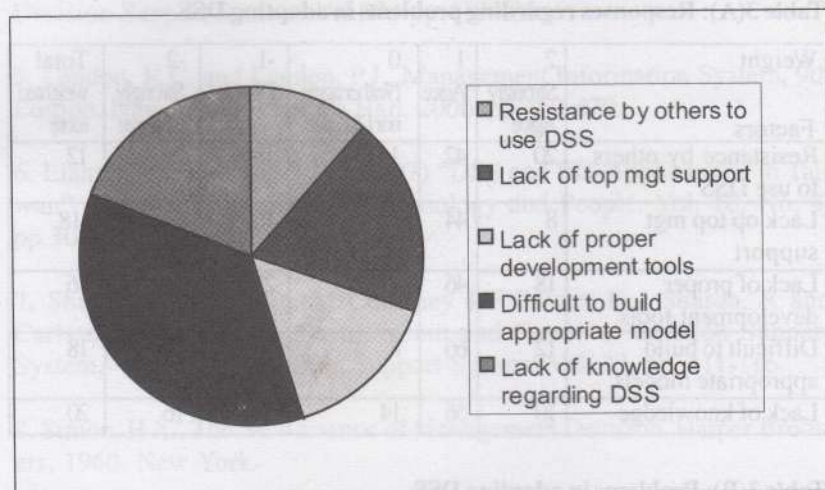

Figure 6: Problems in adopting DSS

6. Conclusion

Information system is one of the most important integral parts of business. Different types of information system are essential to support major business functions. Today's business is agile in nature and demands prompt decisions. DSS is such a tool that accelerates the pace of decision-mak-

ing. As for example to do what if or optimization analysis manually, it will take hours after hours but with the help DSS it will take only a few minutes. Survey finds that business executives are using DSS to some extent. They are using it for different purposes like developing model, doing some mathematical calculation. The respondents also have some limitations such as, lack of knowledge regarding information system, meager knowledge in different types of model and difficulty in building model. Above all training and professional knowledge regarding computer application in business can overcome those limitations. The survey findings have also some limitations because it is done only in Khulna city. More accurate result would be derived if it were conducted in all major cities in Bangladesh.

Appendix

Table 3(A): Responses regarding problems in adopting DSS

Weight Factors	2 Strongly Agree	1 Agree	0 Neither agree nor Disagree	-1 Disagree	-2 Strongly Disagree	Total weighted score
Resistance by others to use DSS	20	42	14	18	26	12
Lack op top mgt support	8	44	20	16	32	-18
Lack of proper development tools	18	46	12	22	22	16
Difficult to build appropriate models	12	66	8	16	18	18
Lack of knowledge	10	56	14	24	16	20

Table 3(B): Problems in adopting DSS

Factors	. Calculation	Result
Resistance by others to use DSS	20*2+42*1+14*0+18*-1+26*-2	12
Lack of top mgt support	8*2+44*1+20*0+16*-1 +32*-2	-20
Lack of proper development tools	18*2+46*1+12*0+22*-1+22*-2	16
Difficult to build appropriate model	12*2+66*1+8*0+16*-1+18*-2	38
Lack of knowledge regarding DSS	10*2+56*1+14*0+24*-1+16*-2	20

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