

The use Decision Support Systems and its effects on Individuals, managers and organizations

Information systems are being used extensively in almost all organizations. The impact of computer technology on organizations is increasing as new technologies evolve and current technologies expand. The importance of using information systems in management arises since new types of systems have been developed and being available for management like Decision Support Systems DSS.

The proposed research will examine the effects of using the new technologies and Decision Support Systems on the organizational performance, accuracy, productivity, decision-making, and strategic planning. It will include and discuss to what extent the information systems plays a role in an organizational decision-making, and the impact of Decision Support Systems on the individuals, managers and the organizations.

What is DSS?

Most organizations started with data-processing systems that support transactions processing and evolve to management information systems to support tactical and strategic decision-making. In the past few years a new type of systems called a Decision Support Systems (DSS) has gained popularity in the information system field.

Gorry and Morton (1971) first illuminated the promise of decision-making assistance in 1971 with the coining of the acronym “DSS”, for “Decision Support System”. Such a system was described as one which would interact with the user to help with decision-making, rather than simply store or quickly calculate data.

(Hicks, 1990) defined DSS as “an integrated set of computer tools that allow a decision-maker to interact directly with computers to create information useful in making decisions.”

(Power J. 1998) defined Decision Support System (DSS) as “an interactive computer-based system intended to help managers make decisions .It helps manager retrieve, summarize, and analyze decision relevant data .Decision-making is the process of evaluating two or more options in order to reach the best possible outcome.”

Regarding management and decision-making, (Turban, Jay, and Ting-Ping, 2005) argued that managers considered Decision-Making purely an art. They considered it as a talent acquired over a long period through learning and experience. They considered Management as an art as a variety of individual styles could be used in approaching and successfully solving the same types of management problems. These styles were often based on creativity, judgment, intuition, and experience rather than on systematic quantitative methods grounded in a scientific approach.

Historical evolution of Decision Support Systems

Information Systems researchers and technologists have built and investigated Decision Support Systems for more than 35 years. DSS began with building model-oriented DSS in the late 1960s, theory developments in the 1970s, and the implementation of financial planning systems and Group DSS in the early and mid 80s.

Decision Support Systems evolved early in the era of distributed computing. The history of such systems began in about 1965. In the late 1970s, both practice and theory issues related to DSS were discussed at academic conferences including the American Institute for Decision Sciences meetings Conference on Decision Support Systems in San

Jose, CA in January 1977. The first International Conference on Decision Support Systems was held in Atlanta, Georgia in 1981.

By the late 1970s, a number of researchers and companies had developed interactive information systems that used data and models to help managers analyze semi-structured problems. These diverse systems were all called Decision Support Systems. From those early days, it was recognized that DSS could be designed to support decision-makers at any level in an organization. DSS could support operations, financial management and strategic decision-making.

Since the mid-80s, many research studies have examined the impacts and consequences of DSS. Also, a number of companies have commercialized Decision Support Systems. In 1992-93, some vendors started recommending object-oriented technology for building re-usable decision support capabilities. In 1994, many companies started to upgrade their network infrastructures. In 1995, data warehousing and the World Wide Web began to impact practitioners and academics interested in decision support technologies. Web-based and web-enabled DSS became feasible in about 1995.

The history of Decision Support Systems covers a relatively brief span of years, and the concepts and technologies are still evolving. The Internet and Web have speeded-up developments in decision support and have provided a new means of capturing and documenting the development of knowledge in this research area. (Senn, J (1987, pp. 532-540)

Decision Support Systems pioneers came from a wide variety of backgrounds and faced many challenges that they successfully overcame to demonstrate the value of using computers, information technologies and specific decision support software to enhance and in some situations improve decision-making. The DSS pioneers created particular and distinct streams of technology development and research that serve as the foundation for much of

today's interest in building and studying computerized decision support systems. The legacy of the pioneers must be preserved. Check the Decision Support Systems Pioneers list at DSSResources.com/history/pioneers/pioneerslist.html

Types of problems being solved using DSS

(Reynolds, 2002, page 214), categorized and defined organizational problems into three types. Structured problems are those that are routine and repetitive. For such problems, it is likely that policy standards or guidelines already exist to help and direct the decision-maker like the daily operational decisions. Semistructured problems are those in which one or two phases are unstructured. Tactical decisions mostly deals with such problems. Unstructured problems are those that have no defined solution process. The problem solution process must be developed using judgment, intuition, experience, rules of thumb and any general guidelines that may apply. Strategic decisions mostly handle and deal with such problems.

According to (Turban 2005), and (Senn, J. 1987) DSS can handle and deal with either semistructured or unstructured problems.

Effects of DSS on Individuals, Managers, and organizations

There is a very little published information about the impact of pure DSS technologies on management because the techniques are frequently integrated with other information systems. One more problem is that the rapid changes in DSS implementation. However, DSS systems have some unique implications, which can affect particular management. It can also have significant long-term effects on organizations, industry as a whole.

Decision Support systems has been used by managers. It has a good impact on the overall judgment where huge data to be analyzed or there exist ambiguity of alternatives. A DSS can help by reminding the decision-maker what methods of choice are appropriate for the problem and by helping to organize and present the information. It creates new information about the past, present, and future. It permits individual judgments, what-if capabilities, some choice of dialogue style. Decision support systems support the decision-making process by helping the user explore and analyze alternatives through different modeling techniques. Effects on organizations may result in some dissolutions of organizational structure as for virtual teams that can meet anytime anywhere.

However, it is reasonable and has effects only on semistructured where human judgment is still desired or required, unstructured, ad hoc decisions and some repetitive decisions.

Effects on Individuals

- Inflexibility and dehumanization

Such systems have negative effects on people's individuality. These systems are criticized as being impersonal: they reduce or eliminate the human element that was present in noncomputerized systems. Many people feel loss of identity; they feel like just another number.

- Stress and anxiety

An increase in work load and responsibilities can trigger job stress. Although DSS increases productivity, it has also created an ever-increasing workload. Some workers feel overwhelmed and begin to feel anxious about their jobs and their performance.

- Cooperation of experts

Human experts may have reservation to give their knowledge to an organization or problem-specific knowledge as being afraid of being replaced by the system, being less important, or even thinking that the system may reveal that he is not as great an expert as people think.

Effects of DSS on Managers

The computer-based information systems have had an impact on the job of manager for over 3 decades. However, this impact was felt mainly at the lower and middle managerial levels. Now DSS are affecting top managers as well. DSS technologies can change the manner in which many decisions are being made and consequently change manager's jobs. The impacts of DSS on decision-making are numerous; the most probable areas are the following:

- Automation of routine decisions or phases in the decision-making process (e.g., for frontline decision-making)
- Less expertise (experience) required for making many decisions
- Faster decision-making because of the availability of information and the automation of some phases in the decision-making process.
- Less reliance on experts and analysts to provide support to top executives; managers can do it by themselves with the help of intelligent systems.
- Power redistribution among managers
- Support for complex decisions, making them faster and of better quality.
- Information for high-level decision-making is expedited or even self generated.

Security:

Impact of DSS on organizations

(Gupta, J, Forionne 2006 pp. 468-478) mentioned some of the impact and effectiveness of DSS on organizations like Veracity and reliability as the growth and

improvement of procedures for verification and validation of the results. Increase in Profits by helping managers to build a cost benefit sum in terms of how models will be built.

Organizational agility which enabled organizations to adapt to changing circumstances easily and quickly.

(Hicks, 1990 pp .97-102) mentioned some other benefits of having DSS in an organization.

Some of these benefits include:

- **Model Building:** Building a model of the decision-making problem is a central purpose of most decision support systems. Models are constructed so that the user can better understand the real world object by manipulating the model.
- **What-If Analysis:** The ability to show the impact of changes in data and assumptions is perhaps the most useful feature of a DSS. Most DSS systems can show instantaneously on the display screen the impact of any changes in assumptions.
- **Goal Seeking:** A DSS is able to show what value a particular independent variable, such as advertising expense, would have to be in order to produce a certain target value of a product.
- **Risk Analysis:** A very useful piece of information for a decision-maker is the probability distribution, which is obtained through risk analysis. This provides the probabilities that a particular critical measure, such as profit, will reach a certain level.
- **Statistical Analysis and Management-Science Models:** A good DSS will be able to provide several useful management-science models such as regression, time-series analysis. These two modules may be used to project historical data, such as, sales, into future.

Usually programmed financial functions for commonly used calculations are found in DSS packages. One important feature of DSS is the graphics capability. The system can depict any of the data contained in the system in various graphics forms.

Impact on performance

According to (Cascante et al, 2002) DSS was found to improve the performance of both existing and new managers and employees. It helped managers to gain more knowledge, experience, and expertise, and consequently enhanced the quality of their decision-making.

Effects on strategic planning

Power, D (2006) listed some benefits of using DSS on performance as:

- DSS can speed-up access to plans and a computer-based strategic planning work flow process can improve responsiveness to non-routine stimuli. A document-driven DSS integrates a variety of storage and processing technologies to provide complete document retrieval and analysis.
- Data-driven DSS intended for performance monitoring can help identify problems that require strategic analysis. Also, unstructured problems can sometimes benefit from structuring them using general purpose decision analysis tools.
- The larger an organization, the more important DSS of various types become to the success of strategic planning processes. Information technologies can help manage planning processes that extend across the functions of an organization.
- Model-driven DSS can help managers capture and analyze subjective assessments quickly and meaningfully, but senior managers must be willing to record their subjective assessment using computer-based systems.
- Whether the choices are associated with strategy content or resource allocations, DSS can help managers make such choices. Computerized brainstorming using group DSS

has been available for 20 years and such systems have become Web-based in recent years.

- Computerized model-driven decision support can include risk and uncertainty in calculations. Excel add-ins like Crystal Ball can assist in analyzing risk in special studies related to strategic planning.
- Model-driven DSS can simulate results for many periods into the future. Also, prior plans can be monitored, revised and reassessed more quickly in a computerized planning and decision support environment.
- DSS can facilitate sharing of planning information, support collaborative planning and link strategic and tactical planning processes.

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