DECISION SUPPORT SYSTEM (DSS)

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Abstract:

Today's decision making importance to manage organizations is clear as management decisions couldn't rely on ingenuity, intuition and personal judgments but should be on the basis of scientific and statistics studies. As know one of the main managers duties in organizations is decision making. To make a true decision, it is necessary on time and precise information that decision support systems help managers in this area to make true decisions even in unpredicted positions. These systems by using data resources correctly create better realization on work area and develop communication procedure. Due to this could express decision support systems as they are very flexible and interactive computer systems that use to support all decision making process in conditions that problem is semi-structured. One decision support system in fact is as a counselor beside a decision maker and provides this possibility that could run with huge information mass and use them arbitrarily and in suitable models frame to improve decision making.

Keywords: organizations, decision support systems, managers, semi-structured problems.

1- Introduction:

Managers as any organization main layers are decision making responsible in all issues and one of the most important management challenges is different decisions that should make every day by managers. These decisions have different levels such as short-term decisions that should make every day or guiding long-term decisions that make for several years. Regarding to suitable decision making necessity on suitable time it is useful a system to provide consultation and help manager in decision making (10).

Decision making is all management activities substance. (2) One of the decision making realization methods is study of decision structure. Made decisions on performance management level more trend to structuralism, decisions on tactical levels are more semi-structured and on strategic management level are more unstructured. Therefore, information systems should design as produce different information products for decision maker's variable needs through organizations (3).

Systems that only don't satisfy by information providing and participate in even simple decision makings are called decision support systems (10).

One decision support system protects three decisions making as follow: (9).
1- Independent decision making:

Such decision making is when decision maker has general authority and complete executive ability for made decisions. Decision support system that could do such decision making is known personal support.

2- Sequential dependence decision making:

Such decision making is when decision maker only conducts a part of decision making and provide his decision making results another person for future decision makings. Decision support system that could protects such decision making is known organizational support.

3- Convergent dependence decision making:

Such decision making is when a group as a council is decision making responsible. Decision support system that could protects this decision making is known group support.

Regarding to three types of decisions making observes that second decision making is the most important and usual one and therefore a decision support system should support such decision making.

DSSs are computer based systems that use in all organizational levels to make decision and solve semi-structured problems. They help manager in all decision making stages even play effective role to know and evaluate displaceable solutions and select the most important ones by manager(12).

2- Decision support systems concept and some theorist view:

There is not a common view about what is DSS. Not only expert managers but also users provide different opinions about a decision support system organization (14). Decision support systems are computer information systems that during decision making supply information active support for managers and workers (3). DSSs are a sub-collection of information management systems that help planners, analyzers and managers in decision making process. These systems could provide a different concept from decision making and different decision making status. Main DSS property is their concerning on computer ability to help decision making to introduce problem and increase understanding about decision making environment through access to data and decision making suitable models (8). Hardware and software used in DSS planning parts help DSS enforcement (1). Decision support systems are Herbert Simon model use. This model has three steps intelligence, design and selection. At all DSS uses in intelligence step that its aim is to know problem and then design to find a solution (7). A DSS is an interactive, flexible, and adaptable computer based coupled with a comprehensive database and the decision maker's own insights leading to specific, implementable decisions in solving problems that would not be amenable to management science models per se. thus, A DSS supports complex decision making and increases its effectiveness (6). DSSs have designed as users could work them directly. These systems have good software. DSS is mutual and user could changes hypotheses, arises new questions and enters new data (11). Sprague and Carlson define DSS as such: decision support system is a system that:
- Are active in the basis of computer systems.
- Help decision makers to decision making.
- Could help to solve semi-structured problems and/or unstructured.
- Have direct interaction to user.
- Have data and analytical models.
- Are active on the basis of computer systems.

Two last elements include decision support system technology base. Such two indicators are three elementary elements of decision support system. Converse, data and model (DDM). Sprague and Carlson believed that a good decision support system has balance among above three elements. Using decision support system should be easy for each unfamiliar user with computer and this necessity is a suitable interaction and in term user-desirable decision support system. One who uses decision support system deals with high data volume. This system should meet this availability. In addition decision support system should conduct analyzes and modeling by different methods. Many systems say that are a powerful decision support system. This is when they only in one presented axis from Sprague are strong but in other axis have not high power. Regarding to Sprague statements could express decision support system in another form: decision support system is a conversational computer system to use data and models to solve unstructured and/or semi-structured problems that helps decision makers to make decision aiming to increase their efficiency (9).

Early 1981 keen has summarized DSS as: decision support systems have designed to help efficiency and out put improvement of managers and expert individuals. They are mutual systems

that use frequently by individuals that have little experience in computer and analytical methods and have more supportive dimension rather than displacement. One DSS is an assistant worker that manager gives him activities including recovery, calculation and report making (8).

3- Decision support systems history:

Along with development of using management information system in organizations, some scientists of information science in Massachusetts Institute of Technology (MIT) followed another procedure and designed decision support system that produces information to solve a certain problem (15). DSS has a long history (1). At first in 1970, management decision systems concept introduced by Missile Scot. Then in middle 1970's decision support system introduced by peter keen and et al, in MIT University to express a system that supports managers decision but does not displace by managers. Very soon this concept became common and produced different software's for decision support system. First these software packets made for mainframe systems but by providing PCs and IBM PC using decision support system became very common and enforced its using motivations (9).

4- Decision Support System and its place in related to information systems:

Information System (IS) is a collection of related elements that collects handles and disperses data and in formation and provides a purpose access feedback. One branch of information systems especially in management decision is affective through meeting needed information and data is business information system that this system includes TPS, MIS and DSS. From this classification this paper concerns on management decision support system. This system supplies manager needed information and data by using outputs obtained from Transaction Process Systems (TPS) and Management Information Systems (MIS). Using information systems in order to add value to organization, this is affected by cultural structure, and organizational changing. Information systems role is important in two field's continuous improvement and reengineering (4).

5- Comparing decision support systems and other information process systems:

Decision support systems to support organizational decisions process combine in other information systems such as management information systems and provide middle managers possibility to examine problems solving by provided information and make necessary decision (5).
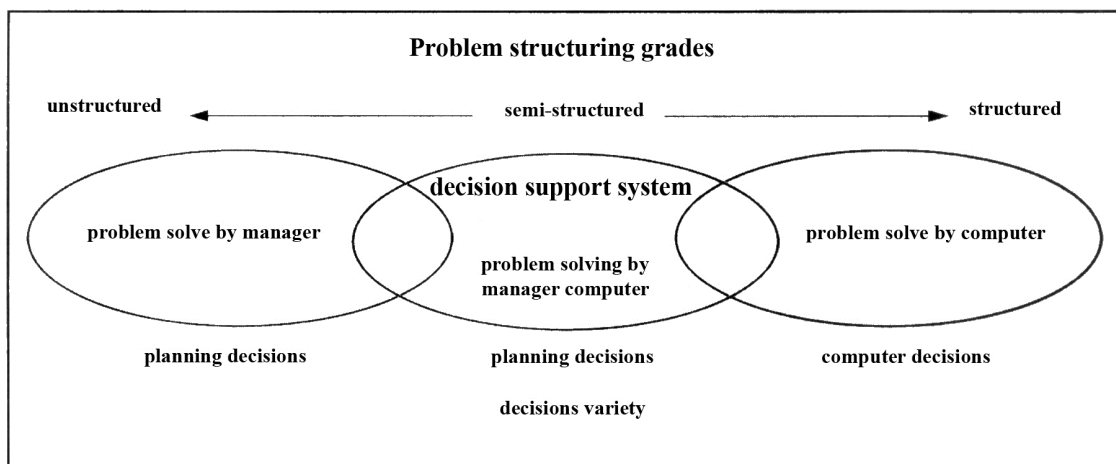

Figure 1: problem structuring grades and using decision support systems

Table 1: examples of decision support systems and their using

Application	Decision support systems
Pricing and direction select	American Airlines Company
Planning and prediction	American Petrofina Central and Southwest Corporation Champlain Petroleum Gifford-Hill Company
Investments evaluation	First United Bank Corporation
Pricing, advertisements and rising select	Frito-Lay, Inc
Price evaluation	General Dynamics

Also among different and common information process systems such as transaction process system, office automation system, management information system and executive support system they have designed for middle manager using that comparing to them decision support systems use to help semi-structured, single and quick changing decisions. This subject has shown in figure (2) (5).

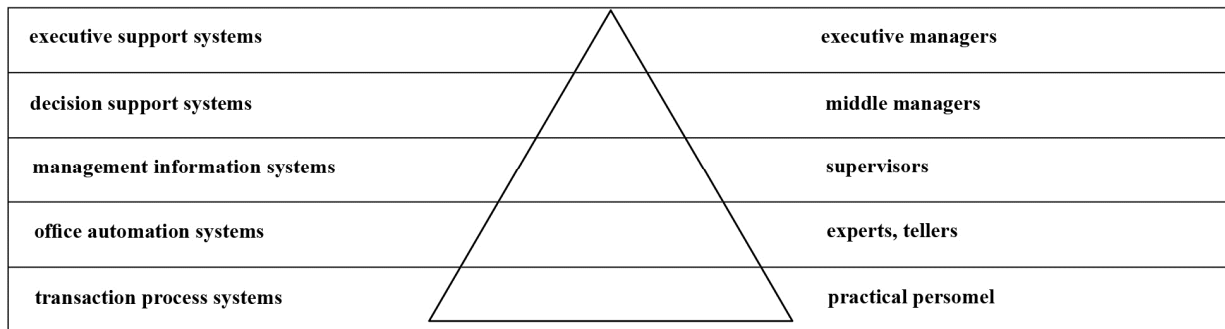| executive support systems | executive managers |
decision support systems	middle managers
management information systems	supervisors
office automation systems	experts, tellers
transaction process systems	practical personel

Figure 2: different organizational levels support by different information process systems

DSSs have advanced analytical abilities over others that allow users to use different decision makers' models to analyze information. They obtain information from transaction process systems and management information systems and return to managers as reports frame. Decision support systems are user friendly and easy information access (5).

Table 2: Comparing information process systems

Users	Output info	Processing	Input info	system type
executive managers	response to searches	networks, graphs and interactional simulation	total data (inside, outside)	executive support systems
experts, institutional managers	special reports, decisions analyzes and response to searches	interactional simulation analyzes	low mass data	decision support systems
middle	summary and	repetitive	summary, mass	management

managers	especial reports	reports, simple models, low analyzes	and simple transaction data	information systems
Tellers	documents, work scheduling and email	documents management and communication	documents	office automation systems
supervisors, practical personnel	expand reports, lists, summaries	ordering, listing, combining, updating	transactions, events, accidents	transaction process systems

6- Obtaining information methods from decision support system:

These methods are grouped in 3 sets that the most important are such as: (5).

6-1- Reports: the oldest method of obtain information is reporting. Reports could make as regular daily, weekly, monthly … and provide managers. Also could make them especially for certain subjects and issues as summary or expand. Expanding reports use in low levels and summary reports use in high management levels.

6-2- Data base search: it's possible through question plan and transfer. Questions could post by terminal and their response that is similar to a report could receive terminal.

6-3- Simulation: it uses to provide real behavior and using models. Through simulated model could know and evaluate model type, how and behavioral or practical processes during different assumptions determine and effects. Simulation plan could enter through terminal and receive its results in same terminal or print by printer and provide manager.

7- Decision support system duties:

Decision support system should conduct following duties (13):

7-1- Prepare results quickly to provide suitable model on the base of aims relationships to provided variable.

7-2- By using flexibility in using system causes to create different models to decision and commercial decisions suitable decreasing.

7-3- By preparing different positions to solve problem enables managers to create subjects to u se "what if" variables.

8- Decision support system aims:

Each decision support system has three aims: (10):
8-1- Help manager to decide about semi-structured problems.
8-2- Supporting made decision by manager not its displacement.
8-3- Decision efficiency improvement and attention to its effectiveness.

9- Types of Decision support systems:

In general uses three kinds of decision support system organizational, generator and tool DSS. (16).

9-1 Organizational DSS:

They are complete practical systems. Such systems construct by information system expert individuals and include many Facilities. Organizational DSS aim is that uses permanently. So they design as include equipments that to be useful in different and variable conditions (16).

9-2- Generator DSS:

Generator DSSs have designed as use to create or produce quick using. They are not complete using such as organizational DSS and have not especial language. It includes different languages, user interface, reporting ability, graphical equipments and some same facilities to use. When need, it could create a new DSS. These systems making does not need programming. When consider needs generator DSS do works(16).

9-3- Tool DSS:

Tool DSS is a certain item from generator DSS. Its aim is making using DSS but has limitations and concern points and certain power (16).

10- Decision support system components:

Despite of management information systems, decision support systems in addition data station rely on model stations as system life resources. A model station for DSS is software that uses models in calculations and usual analyzes and variables relationships introduce mathematically. DSS software's include analytical modeling problems. Many DSS packets now are available in sub-computers and web versions (3).

At all DSS includes three mechanisms element user connector, subsystems models and subsystems data.

10-1-User connector:

User connector provides a method to do mutual act by system by user. One simplest user connector is lines and wide pages columns. This is a tool to enter data in to system and model characteristics. User should collect a computer program including orders, their run rank and describe through this model and consider processing (11).

10-2- Subsystems models:

Subsystem models manage main part of decision support system, saving models and recovery and also help users to make models. In a wide page environment models include one or more wide page including variables and parameters and formula that relate them to each other models allow user to define system and save wide page (11).

10-3- Subsystems Data:

Subsystems data include a tool to recovery and process data from formal information banks to manage data. Some data that are needed have produced by other systems. Other data from outside resources could describe competitor activity, economic horizons or future predictions of a certain industry (1).

11- Decision support system software:

Often sub-computer software such as Microsoft Excel, Lotus 123, FoxPro visual, Analytical Hierarchy Process (AHP) and other interactive software are in this group. (5).

12-Conclusion:

Decision support systems process mass data and provide managers a decision options. DSS does not decide and manager judgments are important. These systems use to run complex statistical, mathematical models, data analyzes and support decisions. In this paper mentions to comparing decision support systems and other information processing systems that observed decision support systems use to help semi-structured decisions and single and having quick change and use by managers in user friendly and easy access to information.

Decision support system has tools to support that these tools groups into software and hardware parts that these tools combining help managers to decide in certain practical fields.

Decision support system should help decision maker in all levels, supports decision makers in all management levels individually and group and in semi-structured decisions, provide simulating and analyzes tools for decision maker to relate into general data station and has sufficient flexibility to coordinate different management methods.

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