Decision Support System in Making Staff Redundancy Decisions

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Abstract – Decision support system (DSS) is an interactive computer based system, which helps to make decision by using communication technologies, data documents and knowledge or models to identify and solve problems. This paper explores the role and the input parameters to DSS in assisting human resource department of an organization for identifying the under performing units and terminating the jobs of non-performing staff. We also look into the options of outsourcing or off shoring some non-core and non-confidential services to outsourcing companies with expertise in handling them.


I. INTRODUCTION

Today DSS is being used by management of organizations to assist in making a decision. The decision can be related to finance, human resource, manufacturing, inventory and more. DSS can overcome human cognitive deficiencies by integrating various sources of information, thus providing access to relevant knowledge and help structuring the decisions. They can also employ Artificial Intelligence methods to heuristically address problems that are intractable by formal techniques.

This paper is organized as follows, in the second section; we describe the different types of DSS. In the third section we discuss the various inputs and outputs to DSS. In the fourth section we present the role of DSS for managers. In the fifth section we have the role of DSS in human resource management. In the sixth section, we propose our model for determining the goal of the paper, i.e. how will DSS help in determining which staff to be made redundant of non-performing or under-performing departments of an organization. In section seven we discuss about some already available DSS software. Finally we have the conclusion.

II. TYPES OF DSS

There are six types of DSS; they are explained as follows [2]:

1. Communications-driven DSS – This type of DSS uses network and communications technologies to facilitate decision-relevant collaboration and communication. Groupware, bulletin boards, audio and videoconferencing are the primary technologies for communications-driven decision support. With the advent of Internet in the past few years, voice and video delivered have greatly expanded the possibilities for synchronous communications-driven DSS.

2. Data-driven DSS – It is a DSS which emphasizes on access to and manipulation of a time-series of internal company data and sometimes external and real-time data. The file systems accessed by query and retrieval tools are the most elementary level of functionality. Data warehouse systems that allow the manipulation of data by computerized tools and cater to the needs of specific requirements or by more general tools and operators provide additional functionality. Data-Driven DSS with On-line Analytical Processing (Codd et al., 1993) [8] provide the highest level of functionality and decision support that is linked to analysis of large collections of historical data. Executive Information Systems are examples of data-driven DSS (Power, 2002) [12]. Previously these systems were called data-oriented DSS. Business Intelligence (BI) are a set of concepts and methods used to improve business decision making by using fact-based support systems and is sometimes used interchangeably with briefing books, reports, query tools and executive information systems. Fact-based support systems are considered to be an example of data-driven DSS.

3. Document-driven DSS - A document-driven DSS uses computer storage and processing technologies to provide document retrieval and analysis. The documents that might be accessed by a document-driven DSS are policies and procedures, product specifications, catalogs, and corporate historical documents, including minutes of meetings and correspondence. A search engine is a primary decision-aiding tool associated with a document-driven DSS (Power, 2002) [12]. These systems have also been called text-oriented DSS (Holsapple and Whinston, 1996) [10].
4. Knowledge-driven DSS - It is a kind of DSS that can suggest or recommend actions to managers. These DSS are human-computer systems with specialized problem-solving expertise. The “expertise” consists of knowledge about a particular domain, understanding of problems within that domain, and “skill” at solving some of these problems (Power, 2002) [12]. These systems have also been named as suggestion DSS (Alter, 1980) [6] and knowledge-based DSS (Klein & Methlie, 1995) [11]. Goul, Henderson, and Tonge (1992) [9] examined Artificial Intelligence (AI) contributions to DSS. Many medical diagnostic systems have been based on AI. In recent years, connecting expert systems technologies to relational databases with web-based front ends has broadened the deployment and use of knowledge-driven DSS.

5. Model-driven DSS – It is a type of DSS which helps to access and manipulate statistical, financial, optimization and/or simulation models. The Simple quantitative models provide the most elementary level of functionality. Model-driven DSS use limited data and parameters provided by decision makers to aid in analyzing a situation which does not require large data bases. Early versions of model-driven DSS were called model-oriented DSS (Alter, 1980) [6] or computationally oriented DSS (Bonczek, Holsapple and Whinston, 1981) [7]. It was later called spreadsheet-oriented and solver--oriented DSS. Many of the early decision systems, e.g., Sprinter, MEDIAC and Brandaid, are model-driven DSS (1996).

6. Web-based DSS – It is defined as a computerized system that delivers decision support information or decision support tools to a manager or business analyst using a Web browser (Power, 1998) [14]. A platform was provided for extending the capabilities and deployment of computerized decision support system by the Worldwide Web and global Internet. The break through in the development of web-based DSS came with the release of HTML 2.0. In 1995, a number of papers were presented on using the Web and Internet for decision support at the 3rd International Conference of the International Society for Decision Support Systems (ISDSS). Researchers were reporting Web access to data warehouses in addition to Web-based, model-driven DSS. DSS Research Resources was started as a web-based collection of bookmarks.

III INPUTS /OUTPUTS TO DSS

The input and output Information of a decision support application are [1]:

1. It would access the current information related to assets, including legacy and relational data sources, cubes, data warehouses, and data marts.

2. Comparative sales figures between one week and the next.

3. Projected revenue figures based on new product sales assumptions.

4. The consequences of different decision alternatives, given past experience in a context that is described.

IV DSS FOR MANAGERS

A manager has to execute the following tasks to capitalize on the capability of DSS [3]:

1. Pareto Analysis – It helps the manager to select the most important modifications or changes to make. A technique that helps us to choose or identify the most important problem to solve and make most effective changes is called Pareto analysis. It uses the Pareto principle - the idea that by doing 20% of work you can generate 80% of the advantage of doing the entire job.

   The steps followed in this analysis are as follows:
   a) The problems faced, or the options available are listed.
   b) Similar options or problems are grouped.
   c) An appropriate score is applied to each group
   d) The group with the highest score is worked on.
   e) Pareto analysis not only shows the most important problem to solve, it also gives a score showing severity of the problem.

2. Paired Comparison Analysis – It is used to evaluate the relative importance of different options available to the manager. It is particularly useful where there is no objective data to base this on. This makes it easy to choose the most important problem to solve, or select the solution that will give the greatest advantage. Paired Comparison Analysis helps to set priorities where there are conflicting demands on the resources.

3. Grid Analysis – Grid Analysis (also known as Decision Matrix analysis, Pugh Matrix analysis or MAUT which stands for Multi-Attribute Utility Theory) is a useful technique to use for making a decision. Decision matrices are most effective where there are many good alternatives having many factors to be taken into account. To use the tool, the options are laid out as rows on a table, whereas the columns show the factors. The weights show the importance of each of these factors.

   This tool is used in the following ways:
   a) The options along with the factors important for making decision is listed, with options as the row labels, and factors as the column headings.
   b) The relative importance of the factors is decided by giving weight to the factors according to their importance.
preferences. These values may be obvious. If they are not, then use a technique such as Paired Comparison Analysis to estimate them.

c) Score is given to the options for each of the important factors.

d) The value of the scores of the factors for each option is multiplied separately.

e) The weighted scores for each option are added, and the option that scores the highest, wins.

4. Decision Tree analysis – It allows managers to choose between different options by projecting likely outcomes. They are excellent tools for choosing between several courses of action. They provide a highly effective structure within which we can not only lay out options but also investigate the possible outcomes of choosing those options. They also help to form a balanced picture of the risks and rewards associated with each possible course of action.

5. Plus/minus/interesting (PMI) – It allows managers to weigh the pros and cons of a decision. It helps to check whether the option selected would improve the situation or it will be best to do nothing.

6. Force Field Analysis (FFA) – It helps in analyzing the pressures for and against a change. It is a useful technique for analyzing all the forces for and against a decision. Moreover, it is a specialized method of weighing pros and cons. By carrying out this analysis we can plan to strengthen the forces supporting a decision, and reduce the impact of its opposition. It also helps to decide whether a plan is worth implementing or not. At the same time when a decision has been taken to carry out a plan, FFA helps to identify changes for its improvement.

7. Six Thinking Hats – Edward de Bono (1985) [13] created this tool. It helps in the perception of decision-making process from all points of view. It is a powerful technique that helps look at important decisions from all possible points of view or a number of different perspectives. It helps to make better decisions by forcing us to think from a point of view, which is very different from our normal ways of thinking. It facilitates in comprehending the full complexity of the decision, while aiding in spotting issues and opportunities to which we might otherwise be blind.

Apart from being rational and positive, managers should treat a problem from an emotional, intuitive, creative and negative point of view. This gives equal importance to resistance thus, making the plan more creative, strong and successful.

The Six Thinking Hats technique can be used in meetings or on our own self. In meetings it blocks the confrontations that happen when people with different thinking styles discuss the same problem.

Each “Thinking Hat” has a different style of thinking. These are explained below:

a) White Hat: In this technique, focus is given on the available data. The past trends are analyzed, and decision is taken by extrapolating from historical data.

b) Red Hat: In this technique, emotions of people are considered in solving the problems with adequate importance given to the responses of people who do not fully know the reasoning of the management.

c) Black Hat: Black hat thinking looks at all the negative points of the decision. It allows eliminating, altering or preparing contingency plans to counter the negative aspects, hence making the plans tougher and more resilient

d) Yellow Hat: The yellow hat helps to think positively. It is the optimistic viewpoint that helps to see all the benefits of the decision and the value associated with it.

e) Green Hat: The Green Hat stands for creativity. In this creative solutions to a problem can be developed.

f) Blue Hat: The Blue Hat stands for process control. This technique also looks at problems from the point of view of different professionals or different customers.

8. Cost/Benefit Analysis (CBA) – CBA allows the manager to check the economic feasibility of a change. In this technique, the value of the benefits of a course of action is added up, and the costs associated with it are subtracted. Prior to making a decision on the proposed modification, the total cost over time to be incurred by the change is worked out followed by the ensuing benefit to be received.

V ROLE OF DSS IN HUMAN RESOURCE MANAGEMENT

The success of a company depends upon the skill, adaptability, knowledge and dedication of manufacturing employees. The information required to manage this asset is usually missing or incomplete. With the emergence of data warehousing technology coupled with decision support software the whole scenario has undergone a revolution. Each employee is considered a unique contributor, and the corporation counts on him or her to produce every day. Each individual possesses skills and knowledge, which is greatly valued by the corporation and needs to be preserved.

The data warehouse is a single repository of human resource (HR) information that consolidates and organizes data from all over the enterprise, regardless of source. This data warehouse
can be easily linked to existing transactional data, forming an information repository that is the foundation for further data exploration and analysis, thus protecting the daily operations of HR systems in the process.

The transactional systems automate daily transaction operations, but a system is needed to bring together data from different systems into one place. HR Vision, [4] a DSS software for Human Resource Professionals from the SAS Institute can read key information from the transactional data sources coming from separate computer systems that contain fragments of the data.

To optimize the data for reporting and analysis, and to protect the efficiency of transactional systems, data is reorganized and stored within a separate work force data warehouse.

Data from individual employee records is merged and massaged into an integrated information base to support decision-making.

VI DSS MODEL FOR HUMAN RESOURCE DEPARTMENT

The accuracy and usefulness of the representation of a decision tree can be judged by the following criteria (Goodwin and Wright, 1998) [15] provided by Keeney and Raiffa (1976) [16]:

1. Completeness: All the attributes of concern for decision making should be included.
2. Operationality: The decision tree should take into consideration all the lowest level attributes for the decision maker to make a decision.
3. Decomposability: The performance of individual attributes can be judged independently of other attributes.
4. Absence of redundancy: Removal of duplicate attributes or attributes that represent the same thing.
5. Minimum size: The number of attributes in the tree should be minimal such that a meaningful analysis is possible.

Behavioral parameters for consideration while judging the performance of staff are [17] [18]:

1. Decide quicker
2. Address problem quicker
3. Prefer working with people
4. Manage time efficiently
5. Task oriented
6. Move faster
7. Direct and emphatic when expressing opinions, making requests and giving directions
8. Risk oriented
9. Have intense eye contact
10. Exert pressure for a decision or for taking action
11. Gesture freely
12. Friendly
13. Often speak rapidly and loudly
14. Confrontational
15. Demonstrate anger quicker

The weight for the above parameters will vary from organization to organization and department to department.

The parameters which need to be used to evaluate the performance of manager’s, commencing in the departmental heads and culminating in Chief executive officer of organizations are as follows [17] [19]:

1. What is the desired situation versus the actual situation?
2. What is the performance gap or difference?
3. Who is affected by the performance gap? Is it one person, a group, an organization, or a work process?
4. When and where did the performance gap first occur?
5. When and where were its effects, side effects and after effects first noticed?
6. Have they been noticed consistently and inconsistently?
7. How has the gap been affecting the organization?
8. Have the effects been widespread or limited?
9. Is the performance gap traceable to individuals, work groups, locations, departments, divisions, suppliers, distributors, customers or others?
10. What is the immediate and direct result of the gap?
11. How much has the gap cost the organization?
12. How can the tangible economic impact of the gap be best calculated?
13. How can the intangible impact of the gap be calculated in lost customer goodwill or worker morale?

Based on the above criteria, we will use Simple Multi-attribute Rating Technique (SMART) developed by Edwards [20] [21] to construct our value tree, given in figure 1. Each attribute in the value tree will be assigned appropriate weights which can be used for decision making by competent decision making authority. Each non leaf node has a manager who manages the staff lower in the hierarchy and reports to the level one up in the hierarchy.
VII DECISION SUPPORT SOFTWARE

Decision Support Software is software that supports in the decision-making process. With the help of HR Vision’s graphical interface, HR professionals can generate reports in the format, style, and language they need to communicate effectively with other professionals across the enterprise. There is no need for users to understand where the data is being pulled from. Topic area and Data Warehousing organize information. HR Vision’s robust reporting facility includes ad hoc reporting capabilities multi-dimensional analysis, and pre-built analysis functions. Through this, HR professionals can produce reports to present both details and summaries on employee populations, compensation, turnover rates, and other elements of human resources management. It can provide answers to “What if” questions and model future environments.

VIII CONCLUSION

A decision system has great impact on the profits of the company. It forces the management to rationalize the depreciation, inventory and inflation policies. It warns the management against impending crises and problems in the company. It specially helps in following areas [5]:

1. The management knows exactly how much credit it could take, for how long (for which maturities) and in which interest rate. It has been proven that without proper feedback, managers tend to take too much credit and burden the cash flow of their companies.

2. A decision system allows for careful financial planning and tax planning. Profits go up, non-cash outlays are controlled, tax liabilities are minimized and cash flows are maintained positive throughout.

3. As a result of all the above effects the value of the company grows and its shares appreciate.

4. The decision system is an integral part of financial management. It is completely compatible with western accounting methods and derives all the data that it needs from information extant in the company.
Our research will provide an insight into complex decision making process by human resource department for staffing individual departments. Since DSS is a very critical software for an organization, it is one of the best investments that a firm can make.

We will broadly classify our research into individual type of organizations and assign weights to the attributes (based on specific types of the organization) of the value tree developed by us in figure 1.

REFERENCES


