Decision Support System

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1. Introduction

A Decision Support System(DSS) must be capable of presenting an integrated representation of diverse types of knowledge and manipulation of that knowledge. This depends on the effective management of two types of knowledge: 1. Descriptive knowledge(i.e., data, information) with which MIS is concerned, and 2. Procedural knowledge, also called a model, which specifies an algorithm that tells us how to derive new knowledge in the sense of facts, expectations, or beliefs. Popularity of personal computers and spreadsheets have proven that users will build and use models given the right tools. In addition, increased availability of relational database systems, 4th GL, and AI languages significantly facilitate user access to data resources. Senior organizational management should take advantage of these facts and technology to accommodate the organization's strategic planning in a timely fashion rather than relying on the outdated file structures and programming languages.

This paper discusses some of the problems that MIS is confronted with and recommendations for short-term and long-term approaches to integrate information into a cohesive framework with the ultimate outcome of becoming an integrated corporate knowledge across time and people.

2. Barriers to the Evolution of Information Management

Information management has been forced to grow in order to accommodate the increased variety of automated tasks for the operational control and the increased demands for information by varied users within the organization. These two trends have brought to the forefront a growing need for data control and management.

2.1 Data Control

It has always been assumed that the system which used the data automatically owned the data. Thus, if the same data resides in different systems with name, editing, and validation rules that could vary within the systems. Then, when a user wanted to perform data analysis and information planning through the use of the data that went across system boundaries, the extracted information would contain data inconsistencies that would need to be resolved. This has led to loss of credibility of MIS departments.

2.2 Data Management

When systems are usually developed without concern for overall requirements, it is difficult to share data for the organization's multiple needs. Thus, a lot of time and effort is spent in creating new files and programs for existing data. This results in management's lack of ability to obtain the required information for making timely and knowledgeable decisions. Figure 1 shows such an environment:

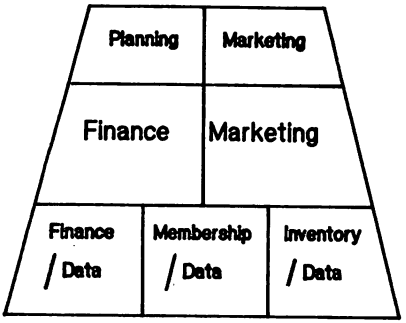

Figure 1

To overcome the above mentioned problems, there is a need for an organizational decision support system which would satisfy the need for data control and data management in the corporate environment.

3. Decision Support System (DSS)

For the purposes of this paper a summary of the objectives and basics of the DSS components and its implementation in Information Management environment is discussed.

3.1 Objectives and Goals

- Improve and increase management's access to data.
- Improve manager's ability to more quickly respond to ever changing organizational information.
- Reduce the level of effort for accessing information.
- Reduce the lead time for acquiring information.
- Integrating capabilities such as spreadsheets, graphics, and mathematical models which can predict, simulate, or optimize the consequences of decision.

3.2 Fundamentals of DSS

3.2.1 Dictionary

The primary control element in a information management services is the information dictionary. It has been estimated that the Federal Government can save $150 million over the next decade by adopting a standard dictionary system. The dictionary contains descriptions of, and relationships with other information resources. The dictionary is instrumental in the planning, administration and operation of an organization's activity. The concept of the dictionary has been used in the following major areas within the DSS:

a. Data Dictionary

The data dictionary is the logical place for sharing and centralizing the control of data. This part is the "active" dictionary, which means every request for data passes through the dictionary which is the arbiter of how the data is cataloged, where the data is located, the value transformation, edit validation, presentation characteristics, and so on. DSS would then direct the file handler, and the operating system to obtain the data items and apply the various operations on the item before final presentation to the user.

b. Reports, View tables, Models Dictionary

This dictionary is a logical place for defining, sharing and centralizing control of reports, view tables and models.

Reports, view tables and models consist of a general structure and its associated data. This dictionary is vitally concerned with how to orchestrate data in order to perform any kind of manipulation which turns into defining dynamic relationships.

c. Security Dictionary

In addition to the built-in security that the relational database contains as a global security, it may be necessary to create a security dictionary based on the organizational structure. Figure 2 shows an example of the security levels that can be incorporated into the dictionary.

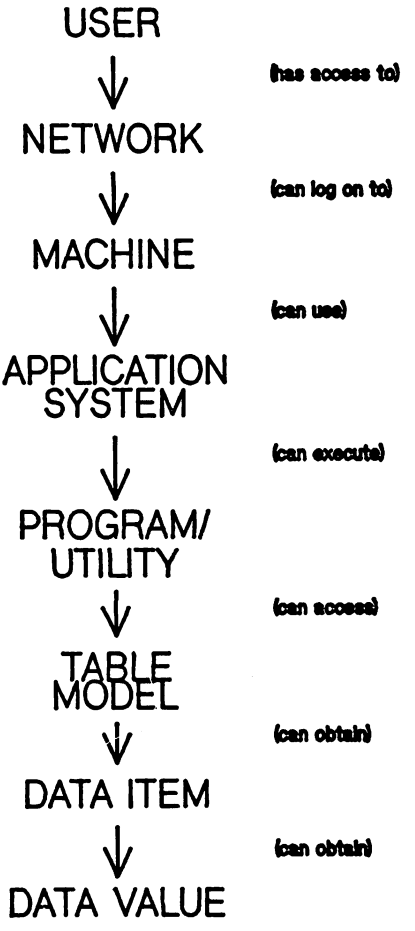

Figure 2

3.3 System structure

This is a customized on-line command processing system which manipulates data in response to functionality features implemented in the system. These functionalities are based on the nature of the organization's decision making applications.

The system design is based on a hierarchy of reducing the most complex functions to simple functions resulting in a series of single modules residing in program/module database. There are two types of single modules: directional and functional. Directional modules determines the availability of the other modules within the system hierarchy. Functional modules are responsible for processing input data to create output data. Since modules have been defined in the program/module database, automatic documentation would be generated initially and/or anytime there is a modification to the system.

This design provides an open-ended dynamic capability for implementation and/or integration of new features based on user needs.

This eliminates managements reliance on switching among separate software tools. Such an approach will reflect the nature of the business organization, and exhibit much of the flexibility inherent in a person's mental knowledge.

4. Implementation

Based on the organization's strategic plan, Senior management may decide on two different approaches: 1. Implementation of short-term and long-term plan; or 2. Implementation of long-term plan only. If the organization decides on selecting plan one, then there needs to be a parallel operation to incorporate both.

4.1 Short term

Refer to Figure 3. Since the existing structure is based on the application system owning the database, retrieval of the information can only be achieved through a vertical or one way access, restricting complete use of the system capabilities. Such will result in quicker access to information, however, lack of flexibility across databases.

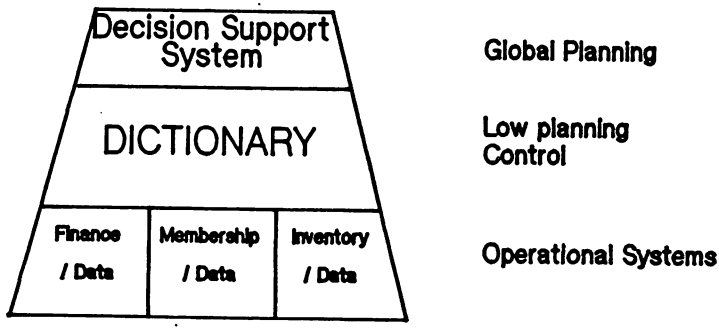

Figure 3

4.2 Long term

This step requires a total redesign and restructuring of the information at the corporate level rather than at the operational level. The redesign and restructuring would take place within relational data structure environment. The dictionary would be the sole communicator with the data area and the operational and planning systems. All systems should be designed independent of the data structure. Figure 4 shows such environment.

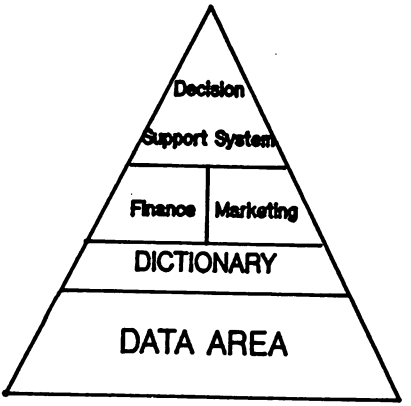

Figure 4