An Enterprise Management Decision Making System based on Possibility Theory

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ABSTRACT

One of the substantial problems in large scale enterprises is lack of the integrity of the operational systems. The information flow among different departments is aiming at integrating data, applications and business processes in an organizational platform. In this research, the authors propose to design a process of decision support system for the integration of three corporate units: purchasing, sales and production. Here, they examine the process in two steps of information flow in each enterprise unit for decision making. While in the second step and according to data from the previous step and due to the uncertainty in the enterprise data it was determined to implement the rules of the system by the possibility theory. Thereby, the events that have effective role in the integrity of organization for each unit are known and enterprise should focus on them to achieve goals. Also, to use actual data of enterprise and to be able to use the results of the work objectively, the authors conducted a case study for implementation purpose.

Keywords: Decision Support System, Organizational Management, Possibility Theory, Rule Base

1. INTRODUCTION

Frequently, an application that involves decision making in any conditions is often classified as a Decision Support System (DSS). Many advances in computer technology are dynamic and these changes are effective on information systems like DSS. It should be noted that since nature of DSS changes in parallel with the advances in the development of computer technology, therefore there is a suite of DSS applications that is dynamic and constantly changing which makes it virtually impossible to limit such changes to a static set of DSS applications. It was also

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reported; Moore’s Law (doubling of computer power every 18 months) is on track for at least the next five years (Kren, 1978). This would indicate that information systems technology will continue its advances in new and diverse directions (Roger et al, 2004).

We can say that a decision is an output of a productive activity that is obtained from many intellectual efforts of an individual, computing hardware and software, data, etc. Developing of DSS is caused of many advances in computer technology and also in the computer based techniques in order to handling information than can be key in a business (Bonczek et al, 1981). Nowadays business environment is highly competitive and fast, correct and best decisions of managers in the shortest possible time are an absolute requirement for any organization. The notion of ‘learning from mistakes’ has left its place to ‘one strike and you’re out’ reality. In fact, in this global environment that marked by mergers, acquisitions, and ever-increasing economic instability, there is no room for the slightest mistake in the making decision. Success and survival of organization depends on that be able to quickly meeting and exceeding the actual and perceived needs and wants of the customer. To succeed in such a brutal environment, existence of an integrated intelligent decision support system that are capable of using a wide variety of models along with data and information resources available to them at various internal and external repositories, is very vital for managers (Delen and Pratt, 2006). In other words lots of managers are faced with high rate changing and highly competitive marketing environment. Marketing managers, have no way to become more competitive through better decision making because they are faced a high raised competitive marketing environment every day (Alexouda, 2003).

Sales, production and procurement departments are the crucial units for an enterprise, so the decisions that are taken in these units have a great impact on the success and growth of an organization. Given the importance of the decisions that are taken in these units, timely and accurate decisions are very important. Also, integrity of information and being correct information between different parts of the units is an important requirement. To achieve this goal, existence of an integrated information system that be able to creates the integrity of information and in addition in the shortest possible time provides the right information for decision makers is very important. One of the strong information system to support management decisions as previously mentioned is Decision support system (DSS). Also we know one of the crucial problems in the field of information technology organization is lack of the integrity of complex systems and the so-called island view. Its goal is sharing efficient and integrated data, applications and business processes in an organizational platform. In this research, we aimed to design a process of decision support system for the integration of three corporate units: purchasing, sales and production since the information of organization usually are vague and uncertain, it was decided that put computational core system to the Possibility theory. Possibility theory is a mathematical theory for dealing with certain types of uncertainty and is an alternative to probability theory. Professor Lotfi Zadeh first introduced possibility theory in 1978 as an extension of his theory of fuzzy sets and fuzzy logic (Zadeh, 1978).

The paper is organized as follows. Section 2 gives a brief review of the related literature. Section 3 deals with the proposed problem process and modeling. In Section 4 an implementation study is given to emphasize the applicability and effectiveness of the methodology. We conclude in Section 5.

LITERATURE REVIEW

Little (1970), designed a system and proposed some criteria for DSS. Also in 1975, Little expanded the frontiers of computer-supported modeling and called DSS as ‘Brandaid’ which was
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