Organizational Memory Formulation by Inference Diagram

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ABSTRACT

Knowledge management (KM) is emerging as a robust management mechanism with which an organization can remain highly intelligent and competitive in a turbulent market. Organization memory (or knowledge) is at the heart of KM success. How to create organizational memory has been debated among researchers. In literature, a wide variety of methods for creating organizational memory have been proposed only to prove that its applicability is limited to decision-making problems which require shallow or non-causal knowledge type. However, organizational memory with a sense of causal knowledge is highly required in solving complicated decision-making problems in which complex dynamics exist between various factors and influence each other with cause and effect relationship among them. In this respect, we propose a new approach to creating a causal-typed organizational memory (CATOM), which has a form of causal knowledge and is represented in a matrix form, by using an inference diagram. An algorithm for CATOM creation is suggested and applied to an illustrative example. Results show that our proposed KM approach can effectively equip an organization with semi-automated CATOM creation and inference process which is deemed useful in a highly competitive business environment.

INTRODUCTION

Recently, business environment is experiencing unprecedented changes- (1) marketplace is becoming globalized as well as highly competitive, (2) enterprises are dispersed geographically much more, (3) the Internet-related technologies such as Intranet, Extranet, Web Information Systems, etc. are prevailing in daily management activities, information systems design and implementation, and strategic management, etc. To cope with this phenomena, most of enterprises are driven to increasingly convert information and individually available knowledge into group or organization available knowledge (O'Leary, 1998a) under the name of knowledge management (KM). Main contribution of KM is to make companies realize that organizational available knowledge, usually called organizational memory or knowledge, is one of a company's most important intangible assets, decisively influencing its competitiveness. Then the remaining problem is to define the detailed process of KM so that the company can adopt KM as a management strategy- knowledge creation, knowledge preservation, knowledge dissemination, and knowledge

reuse.

In literature, two perspectives for discussing this KM-related topics exist: (1) learning organization and (2) IT applications. Learning organization metaphor extends back at least to Haire (1959) and Bennis (1966). Now this view of learning organization recently served as a foundation for the concept of the intelligent organization (Mardsen and Pingry, 1988; Paradice, 1988; Mason, 1992), the concept of the adapting, surviving organism-like organization envisioned by Huber (1984) and Huber & McDaniel (1986), the underlying concept for the notion of organizational learning (Hedberg, 1981; Fiol and Lyles, 1985; Levitt and March, 1988; Stata, 1989; Senge, 1990; Huber, 1991). Especially, according to Stata (1989) and Senge (1990), learning is the only sustainable competitive advantage for organization, and learning ends up with leaving either "organizational knowledge" or "organizational memory".

The importance of IT applications to KM is stressed by several researchers (Stein & Zwass, 1995; Abecker et al., 1998; O'Leary, 1998abc). Technological approach to KM like this tries to answer questions about what technical IT should be provided to support the whole process of KM (O'Leary 1998c). Davenport (1996) showed that effective KM requires a hybrid solution, one that involves both people and technology. The IT approach to KM also recognizes organizational memory as a crucial part of successful KM. Stein & Zwass (1995) proposed OMIS (Organizational Memory Information System) with which organizational memory essential for KM can be acquired, maintained and disseminated effectively through the company.

Therefore, literature recognized that the central role of KM depends on organizational memory. Before proceeding further, we'd better define the concept of organizational memory. Walsh and Ungson (1991) has defined organizational memory as "stored information from an organization's history that can be brought to bear on present decisions". Schatz (1991-1992) suggests that organizational memory can enable the organization to continue to function effectively at present, indicating therefore that the organizational knowledge can allow organizations to remain effective in present decisions despite of the environmental changes. El Sawy et al. (1986) suggested that organizational memory consists of both semantic and episodic information. Semantic information includes a wide variety of organizational operating practices contained in manuals and handbooks, while episodic information represents contextually situated decisions and their

outcomes. Stein and Zwass (1995) stressed that the core competence of organizations using KM as their major management strategy stems from episodic memory and from an "evolving" semantic knowledge base. However, KM using the organization knowledge by itself does not necessarily lead to organizational effectiveness managers want to acquire. Rather, they can obtain a corporate performance by an IT-supported organizational memory design for KM.

However, from the discussions so far, little attention has been paid to the topic of obtaining a unified organizational memory in case of conflicts. Organization is considered a system which is composed of a lot of humans and departments aiming for a common goal. Major hindrance to accomplishing a goal in an organization is conflicts among humans and/or departments. In this case, a unified organizational memory cannot be acquired and disseminated through the organization unless conflicts are resolved objectively. To resolve this problem, we propose a new approach to overcoming conflicts objectively and obtaining a unified organizational memory. Main recipe is using an inference diagram which has been used in decision analysis for representing and solving decision problems. Inference diagram is a graphical representation of a decision problem under uncertainty that explicitly reveals probabilistic dependence and flow of information. Also it can be used as an intuitive framework in which to formulate problems, as perceived by decision makers, and to incorporate the knowledge of experts. Therefore, it has a great potential to be used as an integrative framework for creating an organizational memory in a company. Potentials of inference diagram for knowledge management can be summarized as follows:

(1) It can represent a causal knowledge in a matrix form. Therefore, causal inference is allowed in a particular backward or forward chaining with a clear sense of simple matrix algebra.

(2) Causal knowledge is useful for representing a part of tacit knowledge in analyzing a target problem.

(3) Different inference diagrams mean different types of causal knowledge base with respect to a given target problem. Therefore, inference diagram can be used as a useful vehicle for denoting causal knowledge which a decision maker wants to describe for a given problem.

The remaining problem is to unify different inference diagrams (or causal knowledge base) into a single causal-typed organization memory base with which KM can be performed effectively

throughout the organization. KM with causal-typed organizational memory can complement the weakness of KM using a non-causal typed organizational memory. Therefore, the objectives of this paper are threefold:

(1) To present how to represent causal-typed organizational memory (CATOM) by using inference diagrams.

(2) To suggest a knowledge integration algorithm for creating a unified CATOM.

(3) To investigate the performance of our knowledge creation algorithm for obtaining a unified CATOM.

In the next section, characteristics of inference diagram is discussed briefly. Section 3 addresses KM literature review and an importance of CATOM in making KM more successful in a turbulent situation. Our proposed CATOM creation algorithm is discussed in section 4, and its performance is tested with an illustrative example in section 5. This paper is ended with a concluding remark in section 6.