Chapter 5.1
A Knowledge Integration Approach for Organizational Decision Support

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ABSTRACT

This study proposes a new methodology that facilitates organizational decision support through knowledge integration across organizational units. For this purpose, this study develops a decision support loop and explains how to organize individual knowledge related to a specific business problem and formulate and test the organized knowledge using cognitive modeling techniques for decision support. This study discusses the proposed approach in the context of an application case involving a beverage company. The application case shows the validity and usefulness of the proposed approach.

INTRODUCTION

Knowledge management (KM) can be defined as the uncovering and managing of various levels of knowledge within individuals and teams and within an organization. The aim of KM is to improve organizational performance. One of the prerequisites for successful KM is an appreciation of what Nonaka (1994) described as "tacit" knowledge. Effective KM requires such "tacit" knowledge to be transformed into "explicit" knowledge and then organized accordingly (Brown & Dugid, 1998). Integrating individual knowledge from diverse areas into organizational knowledge leads not only to new knowledge but also to new understanding (Cai, 2006; Huber, 1991; Siau 2000). This in turn helps decision makers choose the appropriate action to

achieve organizational goals (Brown & Dugid, 1998; King, 2006; Stein, 1995).

However, competitive advantage results from applying knowledge, rather than knowledge itself (Alavi & Leidner, 2001). However, most KM research (Davenport, De Long, & Beers, 1998; Grover & Davenport, 2001; Kankanhalli, Tan, & Wei, 2005; Lee & Kim, 2001; Sambamurthy & Subramanu, 2005; Xu, Tan, & Yang, 2006) has focused on identifying, storing and sharing knowledge for efficient and effective transaction processing. There has been little research into the application of organizational knowledge or KM in the core business management tasks of decision making and strategy development. Yet the scope of knowledge application in these top-level tasks is organization wide. Knowledge application at this level, therefore, would influence organizational performance even more than knowledge management in transactions processing, where the scope is more localized. The research gap shows the need to shift the focus away from obtaining and storing knowledge to using it appropriately for business decision making.

Based on the research needs outlined above, this study aims to propose a new methodology for organizational decision support through knowledge integration across organizational units. Bridging the gap between having knowledge and using it is a very valuable endeavour, both for theorists from the descriptive perspective and for practitioners from the normative perspective. For this purpose, this study develops a decision support loop. The developed decision support loop explains (1) how to organize individual knowledge related to a specific business problem using cognitive modeling, and (2) formulate and test the problem reflected in the organized knowledge using cognitive matrix and causal path identification for decision support. We apply the proposed approach to a decision support case of a beverage company. The application case shows the validity and usefulness of the proposed approach.

This paper is organized as follows. First, we propose a decision support loop formed by integrating individual knowledge as it resides in mental models into an organizational model. Next, we compare the approach of this study with other approaches. We then discuss the proposed model based on its application to a real-world managerial problem.

DECISION SUPPORT THROUGH KNOWLEDGE INTEGRATION

This study proposes a decision support loop through knowledge integration across multiple knowledge sources, as illustrated in Figure 1. Based on an identified managerial problem, individual knowledge is gathered and then integrated into organizational knowledge, which captures and defines the problem. This constitutes the problem formulation phase. Managerial problems commonly entail two stages in their resolution: problem formulation and problem solving (Smith, 1989). To provide a linkage between knowledge integration and decision support, the organizational knowledge model is formulated and tested, and then decision guidelines are generated based on the knowledge model. This constitutes the problem-solving phase.

To facilitate this decision support loop, we propose a cognitive modeling methodology. Table 1 illustrates an overview of the proposed methodology. We will discuss the goal, tasks, and details of each step in the following sections.

Individual Knowledge

Knowledge is useful only when it is related to a target task or problem. If the knowledge is not helpful in a given situation, it can be deemed not knowledge at all in that situation, even though it might be in another situation. Individual knowledge means individual and partial mental model knowledge related to the target problem. As a

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