Chapter 4.1
A Hierarchical Model for Knowledge Management

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INTRODUCTION

Knowledge management (KM) is a multidisciplinary subject, with contributions from such disciplines as information systems (IS) and information technology (IT), strategic management, organizational theory, human-resource management, education science, psychology, cognitive science, and artificial intelligence. In order to take full advantage of these various contributions, the necessity of a multidisciplinary approach to KM is currently widely acknowledged, particularly in the IS and IT, management, and artificial-intelligence communities (Alavi & Leidner, 2001; Dieng-Kuntz et al., 2001; Grover & Davenport, 2001; Nonaka & Konno, 1998; O'Leary & Studer, 2001; Zacklad & Grundstein, 2001).

Several KM models have been proposed in the literature. These models reflect the diversity of disciplines contributing to KM. By describing KM concepts and investigating their relationships, they provide a useful conceptual tool for KM research and practice. However, they suffer from three major limitations.

- They are often incomplete. This may be intentional (in the case of models focusing on a specific aspect of KM) or reflect disproportionate emphasis on one of the disciplines contributing to KM, for example, IS and IT.
- They are inappropriate for navigating between abstraction levels of KM topics ("drill down" or "drill up").
- They do not provide a structure for the quantitative assessment of KM research and/or practice (e.g., for auditing KM practice in a specific company).

This article presents a KM model that aims at providing a solution to these three problems. The model is formalized and structured as a hierarchy, which enables navigation between the abstraction levels of KM topics. Furthermore, by combining this hierarchical structure with the analytic hierarchy process (Saaty, 1980), the KM model may be applied to quantitatively assess KM practice and/or research. The model is organized into three components: knowledge types, KM processes,

and KM context. It integrates the contribution of previous models and reflects the multidisciplinary aspect of KM.

The article is structured as follows. The next section provides an overview of extant KM models, that is, the background of our work. Then the article presents our hierarchical KM model, develops its three components, and discusses and illustrates how the model may be applied to KM research and practice. Before concluding, we present our view of future trends and research opportunities regarding KM models.

KM MODELS

ISO (2004) defines a model as a "limited representation of something suitable for some purpose." This definition applies to KM models. In broad terms, the purpose of these models is to provide conceptual tools for KM research and/or practice.

Figure 1 proposes a classification of KM models. This classification elaborates on and refines the classification criteria proposed by Holsapple and Joshi (1999) for KM frameworks. Figure 1 uses the UML (unified modeling language) formalism (OMG, 2003) for representing classes, generalizations, and generalization constraints. We classify KM models according to four complementary criteria (the first two criteria are those defined in Holsapple and Joshi).

- A KM model is either descriptive (i.e., describing the nature of KM phenomena) or prescriptive (i.e., proposing methodologies for performing KM).
- KM models are either broad or thematic. Broad models attempt to cover the whole of KM, while thematic models focus on a specific topic.
- A KM model may be abstract, detailed, or both (as indicated by the generalization constraint in Figure 1). This classification complements the distinction between broad and thematic models. For example, a broad model may be both abstract (providing a global view of KM concepts or topics) and detailed (enabling navigation into the details of a topic).

Figure 1. A classification of KM models