Chapter X
KnowledgeEco: An Ontology of Organizational Memory

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ABSTRACT
This chapter presents KnowledgeEco, a domain ontology for organizational memory (OM). Based on extant theories of the domain, KnowledgeEco defines static and dynamic aspects of OM as a basis for formulating an evaluation framework, which can be used by organizations irrespective of their specific field. A key innovation in the KnowledgeEco ontology is the introduction of the concept of structural memory (SM). SM aggregates Type, which defines types of organizational memory, and Component, which aggregates Content (i.e., Knowledge Resource and Meta-Knowledge) and Means (i.e., Agent and Process) that manage the SM content. We demonstrate the considerations of ontology conceptualization in two stages of developing KnowledgeEco. The first is analysis and structuring of the ontology and the second is the assessment of its conceptual coverage. For researchers, KnowledgeEco provides a model that can be used in the evaluation of OM. For practitioners, the ontology offers a unified framework of objects and processes that need to be considered in the design of OM.

INTRODUCTION
This chapter presents KnowledgeEco, a domain ontology for organizational memory (OM). We base our ontology on the interdisciplinary literature on OM. The ontology includes static and dynamic aspects of OM. The first represents the concepts that compose an OM, and the latter represents a spectrum of tasks...
and challenges rooted in extant theories of the domain. The KnowledgeEco ontology covers theoretical and practical aspects, human and technology dimensions, as well as operational and strategic viewpoints.

Since “emphasis has shifted from static to an active interpretation of memory” (Maier, Hadrich, & Peinl, 2005, p. 33), OM is a critical aspect of implementing knowledge management in learning organizations (Alavi & Leidner, 2001; Argyris & Schon, 1978; Dieng, Corby, Gibon, & Ribiere, 1999; Jennex & Olfman, 2004; Lehner & Maier, 2000; Nevo & Wand, 2004; Wijnhoven, 1999). In their influential review, Walsh and Ungson (1991) observed that OM is designed to enable “stored information from an organization history that can be brought to bear on present decisions” (p. 61). Stein and Zwass (1995) extend this work by stressing the role of Information Systems (IS) as an integral part of OM. Other much cited publications refer to OM structure (Abecker, Bernardi, Hinkelman, Kuhn, & Sintek, 1998; Edington, Choi, Hensen, Raghu, & Vinze, 2004; Walsh & Ungson, 1991), OM processes (Davenport & Prusak, 1998; Dieng et al., 1999; Marcus, 2001; O’Leary, 1998), OM socialization tactics (Anand, Mantz, & Glick, 1998), and OM content (Holsapple & Joshi, 2004; Wijnhoven, 1998).

Fortunately, the literature of the OM domain is a rich resource, which takes into account its various perspectives. Unfortunately, the OM literature lacks a structured approach and also lacks a comprehensive framework for the evaluation of OM. Indeed, researchers have called for systematic, replicable, and theoretically-based evaluation of systems and practices for managing knowledge (King & Ko, 2001; Zhang & Zhao, 2006). The need for evaluation is obvious, particularly considering enterprise’s current interest in domain-specific models that allow for representation of dynamic aspects. This implies the need to specify potential means and methods for evaluation; for instance, one that is based on a descriptive and prescriptive framework, thus providing a description of a domain and design guidelines (Frank, 2007).

In order to provide the IS community with a basis for a new management tool for OM, there is a need for an ontology and an evaluation methodology. Against this background, the goal set for this research is two-fold. On one hand we introduce KnowledgeEco ontology as a prescriptive and comprehensive representation of OM, and on the other hand we suggest KnowledgeEco as a road map that yields a methodology to inform OM design and guide its evaluation. Our treatment of OM creates a unified framework of the structure, content, and means, as well as behavioral and social constraints, to form an evaluation framework that specifies the characteristics of OM (Holsapple & Joshi, 2004), based on domain ontology. For researchers, the ontology provides a model that can be used in evaluation of OM and learning processes in organizations. For practitioners, it offers a unified perspective on concepts and processes that need be considered in the design of OM.

The KnowledgeEco ontology is a generic account of the entities and processes of the OM domain, as well as their relationships. A key innovation in our proposed ontology is the introduction of the concept of structural memory (SM), which is an abstraction of several types of memory and includes diverse knowledge structures as well as the means required to manage the knowledge (Figure 1).

Our approach to developing KnowledgeEco follows the design science paradigm (Havner, March, Park, & Ram, 2004). March and Smith (1995) identified two design processes and four design artifacts specified by design-science research in IS. The processes are build and evaluate, and the artifacts are constructs, models, methods, and instantiations. Of the research activities outlined in this framework, this chapter covers build (i.e., this research is limited to building of a model, rather than an IT artifact) and evaluate, of an artifact, also using techniques mentioned by March and Smith. For the research outputs, this chapter is about a model (i.e., an ontology), which informs a methodology (i.e., for evaluation). The latter paves the way for instantiation of the model.

The next section describes the KnowledgeEco ontology. The section following outlines the ontology development methodology and presents the natural language analysis techniques applied to the ontology conceptualization and modeling. This is followed
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