

Chapter 10

Ontology-Based Knowledge Management for Enterprise Systems

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ABSTRACT

Companies face the challenges of expanding their markets, improving products, services and processes, and exploiting intellectual capital in a dynamic network. Therefore, more companies are turning to an Enterprise System (ES). Knowledge management (KM) has also received considerable attention and is continuously gaining the interest of industry, enterprises, and academia. For ES, KM can provide support across the entire lifecycle, from selection and implementation to use. In addition, it is also recognised that an ontology is an appropriate methodology to accomplish a common consensus of communication, as well as to support a diversity of KM activities, such as knowledge repository, retrieval, sharing, and dissemination. This paper examines the role of ontology-based KM for ES (OKES) and investigates the possible integration of ontology-based KM and ES. The authors develop a taxonomy as a framework for understanding OKES research. In order to achieve the objective of this study, a systematic review of existing research was conducted. Based on a theoretical framework of the ES lifecycle, KM, KM for ES, ontology, and ontology-based KM, guided by the framework of study, a taxonomy for OKES is established.

INTRODUCTION

The Enterprise System (ES) has emerged as possibly the most important and challenging development in the corporate use of Information Technology (IT). Organisations have invested heavily in these large, integrated application software suites expecting improvements in business processes, expenditure management, customer service, and more generally, competitiveness. Forrester survey data consistently show that investment in ES and enterprise applications in general remains the top IT spending priority, with the ES market estimated at US\$38 billion and predicted to grow at a steady rate of 6.9% reaching \$50 billion by 2012 (Wang & Hamerman, 2008).

Due to its complexity, managing ES-related knowledge is a crucial task that involves many stakeholders (e.g., managers and operational and technical staff), diverse knowledge capabilities (e.g., software knowledge and business process knowledge) and a range of activities (e.g., managing organisational performance with ES, supporting new requirements, selecting a new business process, data analysis and conversion, customisation) across the complete ES lifecycle (e.g., implementation, post-implementation). As a result, many researchers (O'Leary, 2002; Volkoff, Elmes, & Strong, 2004; Ko, Kirsch, & King, 2005; Jones, Cline, & Ryan, 2006; Wang, Lin, Jiang, & Klein, 2007; Sedera & Gable, 2010) have suggested that knowledge management (KM) can be used for a range of activities across the ES lifecycle.

It is also recognised that an ontology is an appropriate methodology to accomplish a common consensus of communication, as well as to support a diversity of KM activities, such as knowledge repository, retrieval, sharing and dissemination e.g., ontologies for KM (Jurisica, Mylopoulos, & Yu, 2004); ontology-based knowledge creation (Cezary & Jarosław, 2010), ontology-based knowledge repository (Sourouni, Kourlimpinis, Mouzakitis, & Askounis, 2010), ontology-based

knowledge sharing (Edgington, Choi, Henson, Raghu, & Vinze, 2004) and ontology-based knowledge integration/use (Falbo, Menezes, & Rocha, 2006).

Although there are synergies in the role of KM for ES as well as numerous benefits and significant contributions the ontology can offer in KM such as clarifying the knowledge structure, reducing conceptual and terminology ambiguity, allowing the sharing of knowledge, facilitating communication, supporting interoperability, supporting information search and operating as artifacts in software systems, there have been a little work that addresses ontology-based KM for ES. It is useful to have a clear framework that would inspire more ideas about ways to integrate ontology-based KM into activities across the ES lifecycle. However, no such frameworks appear to be available to understand this integration. Therefore, this paper suggests ways to tightly integrate ontology-based KM into a range of activities for the ES lifecycle.

This paper is organised as follows: First we provide the motivation and background for ontology-based knowledge management in ES; we outline the strategy employed for the review of literature; we provide a brief theoretical background of the ES lifecycle, KM, KM for ES, ontology and ontology-based KM; and offer a taxonomy for classifying ontology-based KM for ES research based on ES sub-domains. Finally, we present the conclusions drawn in this study.

REVIEW STRATEGY

A systematic literature review approach proposed by Tranfield, Denyer, and Smart (2003) was used to identify the relevant literature studies. This approach was adopted since it promises the thoroughness, completeness and quality of the review results. It consists of three sequential stages: (1) planning the review; (2) conducting the review; and (3) reporting and disseminating. The first stage identifies the aim of the review, list of

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