

Chapter 21

Structuring Knowledge for Enterprise Resource Planning Implementation through an Ontology

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ABSTRACT

The purpose of this research is to consolidate and formalize as ontology, on the basis of an extensive literature review, the key processes and skills required for successful implementation of ERP in an SME. Using the Protégé software, the research identified and formalized 395 terms, each of which has its own definition. Exploitation of this ontology could take multiple and varied forms, including the creation of a learning system, an on-line collaboration platform, or a project management process mapping tool contributing to successful implementation of ERP in SMEs.

INTRODUCTION

Small and Medium-Sized Enterprises (SMEs) are increasingly likely to introduce Enterprise Resource Planning (ERP) packages, and in fact, this is the new market for major vendors of integrated software packages. They already introduced a wide range of software packages at affordable

prices and that can be quickly implemented with methods termed 'accelerated' (Kirshmer, 1999). SMEs, on the other hand, strive in an intense competition environment. More than ever before, these companies are required to reassess and re-structure their business processes and to keep up the of the new world's economic order. They see in ERP-type packages an opportunity to sustain their competitiveness, and sometimes, a must to maintain their survival.

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However, ERP projects are particularly difficult to carry out in SMEs. Often inadequately provided with human and financial resources, SMEs are less well prepared for ERP than large companies. Their chances of surviving or getting back on track after a failed ERP implementation are lesser than for large firms. In addition, when they undertake ERP implementation projects, SME managers carry out their role only to the extent permitted by their level of skills and knowledge. The literature, nonetheless, is quite explicit regarding the healthy management practices that can lead to the success of an ERP project. This research project is a first step towards overcoming this deficit. By adopting a holistic approach, it intends to consolidate and formalize as ontology, on the basis of an extensive literature review, the key processes and skills required for successful introduction of ERP in an SME. The research led to identification and formalization of 395 terms, each with its own definition. The hierarchical structure of the formalized classes is presented as ontology and is exploited with the Protégé software program. Using this tool, which provides interoperability and support for the semantic Web, exploitation of the ontology could take multiple and varied forms, including creation of a learning system for SME owners, an on-line collaboration platform, or a project management process mapping tool contributing to the successful use of ERP in SMEs.

THE CONCEPTUAL FRAMEWORK

An ontology is a specific organization of knowledge in a given area based on the idea of class, or concept, and relying on a generally taxonomic organization of classes. Its goal is to formalize and manage knowledge. To build an ontology, it is necessary to define the scope of the knowledge to be captured and processed. In this research, our objective is to capture and formalize the concepts and the procedures that are critical to the success of an ERP implementation in a SME. Hence, to be

adequately guided in this process, we developed the conceptual framework that we describe in the next section. The framework is built on ideas of valuation theory by Kauffman, Chircu, and Kesky (2001) and the IT conversion theory by Henry Lucas (1999). Let us start by describing these two theories.

The Valuation Theory

Kauffman et al. (2001) argue that any IT initiative rests on three axes:

1. The flow of values,
2. The potential value, and
3. The realized value.

The flow of values is a set of IT-based values that are carried by the company's environment and that one ultimately aspire to reach if a technology is properly implemented and used. These values are usually associated with enhancing performance or competitive advantage. They can also be related to leveraging the company's relationship with the customers, the suppliers and the partners. The potential value, on the other hand, is an instance of an ideal value identified within the flow of values. In a perfect world, they should be identical. However, this is rarely the case because of the cultural, organizational, and technological specificity of each organization, on one side, and the constraints imposed by the environmental landscape on the other. These elements act as barriers to valuation. The barriers can usually be identified as belonging to one of two types: environmental barriers and organizational barriers. The potential value, then, would be limited and can only be the best that an organization is able to achieve given the internal and external constraints. Finally, the realized value is the real value that the organization obtains as a result of its investment. It is often discovered later on during the usage phase. Having said that, it is worth noting that the IT conversion contingencies play a pivotal role when determining how the

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