Chapter 2.9
An Ontological Approach to Managing Project Memories in Organizations

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ABSTRACT

Knowledge Management (KM) is considered by many organizations a key aspect in sustaining competitive advantage. In the mechanical design domain, the KM facilitates the design of routine product and brings a saving time for innovation. This chapter describes the specification of a project memory as an organizational memory to specify knowledge to capitalize all along project in order to be reuse. Afterwards it presents the design of a domain ontology and a multi agent system to manage project memories all along professional activities. As a matter of fact, these activities require that engineers, with different specialities, collaborate to carry out the same goal. Inside professional activities; they use their know-how and knowledge in order to achieve the laid down goals. The professional actors competences and knowledge modeling allows the design and the description of agents' know-how. Furthermore, the paper describes the design of our agent model based on an organisational approach and the role of a domain ontology called OntoDesign to manage heterogeneous and distributed knowledge.

INTRODUCTION

In today's challenging global market, companies have to innovate in order to improve competitiveness and business performance. They must bring innovative products to market more effectively and more quickly to maximize customer interest and sales. The pressure to reduce time, improve product quality, and lower costs have not gone away; they are being reaffirmed and folded into programs that focus on delivering the "right" product. Product leadership companies must continue to enter new markets with innovative products. This requires leveraging and reusing the product-related intellectual capital created by partners working together. Business innovation must occur in several dimensions including project organization, product definition, production engineering, ergonomics design, environmental impacts, and so forth.

In addition, the information technology explosion led to a shift in the economy and market rules forcing corporations to adapt their organization and management in order to improve their reaction and adaptation time. Information systems became backbones of organizations enabling project-oriented management and virtual teams, therefore the industrial interest in methodologies and tools enabling capitalization and management of organizational knowledge grew stronger. An organizational memory is "an explicit, disembodied and persistent representation of knowledge and information in an organization, in order to facilitate their access and reuse by members of the organization" (Gandon, 2002). The stake in building an organizational memory management system is the coherent integration of this dispersed knowledge in a corporation with the objective to promote knowledge growth, promote knowledge communication and in general preserve knowledge within an organization (Rabarijaona, 2001). This memory, explaining the organizational knowledge may be considered as a knowledge base of the organization. Such knowledge base can be restricted to the project world and so be called project memory. The project memory is a memory of knowledge and information acquired and produced during the realization of the projects (Matta, 2000). Thus, project memories constitute a basis for knowledge capitalization and reuse (Bekhti, 2003).

It is necessary to define the nature of this organizational knowledge before to present a knowledge management system. Starting from the bottom, we use the definition of knowledge information and data of Weggeman (1996) and Fukuda (1995):

- Data is a perception, a signal, a sign or a quantum of interaction (e.g., '200' or 'L' are data). Data is symbolic representation of numbers, fact, quantities; an item of data is what a natural or artificial sensor indicates about a variable;
- Information is data structured according to a convention (e.g., L=200mm). Information is the result of the comparison of data which are situationally structured in order to arrive at a message that is significant in a given context. Information is obtained from data which have been given significance and selected as useful.
- Knowledge is information with a context and value that make it usable (e.g., 'the shutter line out as a length L=200mm'). Knowledge is what places someone in the position to perform a particular task by selecting, interpreting and evaluation information depending on the context. Knowledge is an information which was interpreted (i.e., the intended meaning of which was decided) in context and which meaning was articulated with already acquired knowledge (Fukuda, 1995).