

Use of Patterns for Knowledge Management in the Ceramic Tile Design Chain

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Abstract. Knowledge Management (KM) is a complex objective, especially in the instance of extended enterprises consisting of SMEs, and critical in new product design and development (NPD). The use of patterns is essential to get KM in collaborative NPD processes. This paper presents the use of patterns adopted in the CE-TILE project to standardize information and knowledge in collaborative work. The different types of patterns and models established for the knowledge capture, formalization and configuration are also described.

Keywords: Collaborative Knowledge Management, Reference Model, Patterns, Design Process, Project Methodology, Collaborative Cluster, Product Lifecycle Management.

1 Introduction

In recent years, tools for integrated information management are aimed at increasing performance in collaborative environments. Specifically, tools like PDM (*Product Data Management*), cPDM (*collaborative Product Definition management*) and PLM (*Product Lifecycle Management*), which allow simplifying and unifying the flows of product information, operating with data from all departments of the company [1]. The fact that the most modern of those tools are Web-compatible also facilitates the inter-enterprise communication, allowing the consideration of the extended enterprise concept. Nevertheless, the implementation of design environments based on these tools is not a trivial question: it requires the introduction of cultural and organizational changes in the enterprise. In this paper we want to emphasize the changes that affect knowledge management (KM), which is defined by Ergazakis et al. [2] as the process of creating value from the intangible assets of an enterprise; it can be related to the internal knowledge of the enterprise, and also to customers and stakeholders. In general, capture, classification, storage and continued update of the knowledge are fundamental actions in every continuous renovation process. In particular, the need to acquire knowledge is critical in new product development [3].

Knowledge management is a particularly important bottleneck for SMEs. When SMEs work in an isolated way, they do not have sufficient economic or technological capacity to promote procedures based on the management of processes addressed to collaborative environments. On the contrary, they do fulfil enough capacity when they work in an Extended Enterprise environment, but in this case, they lack the organizational structure as much as the leadership for driving the process, it is to say, for managing the necessary changes. Besides, it is particularly significant that SME's lack the mutual confidence necessary to share knowledge, and they lack too the experience to implement mechanisms of knowledge management to share knowledge within the Extended Enterprise without running the risk of bringing out all his know-how into the open.

Within this context, the authors are participating in a project (CE-TILE) aimed at establishing a network of knowledge to allow collaborating and sharing information among ceramic tile sector companies (SMEs, most of them), with the aim of solving the knowledge management problems related in general to the product lifecycle processes, and in particular, to the design process. The commercial applications Collaboration Projects and Collaboration cFolders [4] were selected for their utilization within the project. They allow all the extended enterprise partners to join the design process and to share knowledge. But the implementation of these tools is complex: patterns of behaviour that can support the commercial applications, that respond to the roles and tasks of the different members from the extended company, and that guarantee the privacy of the internal knowledge management for each enterprise must be defined. In this sense, this paper tries to show the relevance of the use of patterns to get knowledge management. Next, in section 2, the need to establish patterns that standardize information and knowledge in collaborative work is justified. Section 3 points out the specific aspects in the CE-TILE project development where models or patterns have been used, whereas section 4 presents the use of different types of patterns: the forms for capturing knowledge and the representation techniques to formalize it (4.1.), and the patterns created in the chosen software application for the management of the processes (4.2.). Section 5 presents the results. A section for the conclusions closes this paper.

2 About the Need of Reference Models and Patterns for Knowledge Management

The ceramic tile design process involves different types of companies that work and collaborate together with a common objective: the new product development (NPD). Nevertheless, collaboration is frequently inefficient, as guidelines for a suitable management of relations and processes have not been settled down. It has been argued that initiatives for KM will result in an improvement in the processes execution [5]. Hence, the use of reference models and patterns for the processes and activities is essential, since these processes suppose a critical connection between the KM and the results obtained. Thus, the establishment of reference patterns allows the access and conservation of the possessed knowledge. Instances of certain tasks or processes take place by means of the execution of these patterns, and like this, it is allowed the use of the knowledge [6]. Patterns and models can feed themselves with