Chapter 6.12
Improvement of Software Engineering by Modeling Knowledge-Intensive Business Processes

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ABSTRACT

The Knowledge Modeling and Description Language (KMDL®) allows analysts to identify process patterns, which leads to improvements in knowledge-intensive processes. After modeling the business processes, knowledge and process potentials in daily business processes can be unleashed. The following contribution presents a specification of KMDL® for software engineering (KMDL®-SE). A real-life example is used to explain KMDL®-SE.

INTRODUCTION

Software development is a knowledge-intensive business process. Until now, no adequate methods were available to improve knowledge management in software engineering by appropriate models, analyses, and concepts. It seems useful to combine more than 10 years of experience in the modeling and analysis of information processing tasks, applying methods like event-driven process chains and establishing a new modeling paradigm focused on knowledge creation. Its application in

the area of software engineering is described in the following contribution.

The main focus of the contribution refers to two principal objects: First, knowledge-intensive business processes in software engineering can be identified and improved using an adapted modeling language. Second, the specification of the Knowledge Modeling and Description Language (KMDL®) is used to model an exemplary software engineering processes. In the section "Theoretical Foundation of KMDL®," the theoretical framework of KMDL® is presented. The modeling language is used to describe knowledge-intensive business processes, tacit and explicit knowledge, and knowledge and information flows. In the section "Analysis of Potentials with KMDL®-SE," potential improvements for software engineering processes are proposed. In the section "Real-Life Application of KMDL®-SE," a real-life example of using KMDL® is described. "Identification of Process Patterns" describes the conclusions and identified process patterns that can be found and used to reorganize the software engineering processes in software engineering companies as well as for the specification of KMDL®. The last section gives future prospects of further developments of KMDL®-SE.

QUESTIONS AND PROBLEMS OF KNOWLEDGE MANAGEMENT IN SOFTWARE ENGINEERING

The dynamic behavior of the actual business environment will gain speed and complexity. The market for software products will transform very quickly, and the pressure due to competition is expected to increase massively. Especially small and medium-sized enterprises have to cope with the high pressure in the software engineering sector consisting in the rivalry between themselves and major players (Groff & Jones, 2003). Therefore, methods and applications are needed to identify potentials in daily business processes (Hamel & Prahalad, 1990). The knowledge and use of these potentials can be a decisive competitive advantage. The management and processing of organizational knowledge increasingly are being viewed as critical to organizational success (Inkpen & Dinur, 1998).

The contribution is based on the central thesis: The productivity of software engineering will be increased using appropriate knowledge management applications.

Software engineering processes have to be improved in a way that relevant information and knowledge have to reach the appropriate employee at the right time. If so, employees reduce unnecessary waiting time for information and knowledge; therefore, tasks can be completed more quickly. Another way to increase the productivity of software engineering is a constant documentation and optimization of recurring subprocesses and a reuse of these as patterns in other projects. Knowledge management activities in software engineering can be effective only if they are implemented and applied consequently throughout the company. Even the greatest strategies will be unsuccessful without the support of employees. Staff members have to deal with knowledge management, and its advantages have to be made clear.

In the following sections, the central thesis will be discussed, applying it to a real-life example of software engineering in a small and medium-sized enterprise. A German software engineering firm was analyzed within the research project M-Wise[1]. M-Wise is based on the German federal government's software engineering research initiative 2006. The interdisciplinary organized project aims to promote knowledge management in software engineering. Existing methods and applications to model knowledge-intensive business processes were improved, and a new specification of a modeling language in software engineering could be developed and tested in a real-life environment.