Chapter 2
Semantic Wiki for Tracing Process and Requirements Knowledge in Small and Medium Enterprises

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ABSTRACT

Although the early phases in software development are important to project success, there are only a few lightweight tools for the integrated management of core software entities. Especially, small and medium-sized enterprises (SME) often lack knowledge and resources to use complex development environments. In this chapter, the authors present a wiki-based approach which allows multiple stakeholders to develop a shared understanding of business elements as well as software design elements. Business processes, requirements, and the architectural design are documented and modeled in a common wiki platform, which provides the foundation for semantic traceability. This allows users to react to changes and track down affected elements on both sides. Finally, the wiki platform supports real-time collaborative modeling of process and design models natively integrated into the Web browser.

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INTRODUCTION

Managing the software development life cycle is a complex endeavor which requires different stakeholders to work together in a systematic, structured process. Many large organizations follow industry standard processes, such as the Rational Unified Process (RUP), or have adopted agile methods in recent years. For each life-cycle phase specialized tools are used, e.g. for project management, requirements management, software modeling, programming, testing, and configuration management. However, most developed tools and methods are hardly suitable for Small and Medium-sized Enterprises (SME), because they are too complex and require extensive training as well as high qualification of employees. SMEs often do not have the knowledge and resources at hand for systematic life-cycle management and use therefore individual solutions and tools that are usually incoherent and not linked together. This leads to inconsistency and information asymmetry between business and IT experts. Furthermore, the realization of traceability through the development process can be negatively affected.

Recently, SMEs increasingly follow the trend of outsourcing parts of their development to partnering software companies abroad (Richardson et al. 2008; Boden et al. 2007). One key problem here is the transfer of the knowledge to the partner that is needed to understand the requirements and the business domain. To this date, misunderstood requirements present a major source of development inefficiency and project failure (Maalej et al. 2009). Further, SMEs should have suitable methods and tools at hand to manage the global software lifecycle. As software development is an iterative and incremental process, the collaborating partners should be able to get a constant overview of the state of the project and to trace requirements knowledge to the software architecture and vice versa. It becomes more important through geographic distance between project management and developers. In this context, existing software lifecycle approaches do not sufficiently address the specific needs of SME.

Within the scope of the GlobaliSE research project, we have studied the current problems of SME in software life-cycle management (SLCM). The domain in question is enterprise software. In case studies with eight SMEs we interviewed developers and customers and identified the following problems:

- Common software process models as well as underlying software tools do not meet the needs of SME. Most of them are commercial, too complex and often too expensive for SME purposes.
- Customers document their business processes either deficiently or not at all. However, the lack of business process and requirements knowledge is stated as a frequent cause for failure, especially in near- and offshoring development.
- The relationships between business processes, requirements, and software components are usually not documented and cannot be traced.

Regarding the use of tools for supporting the global software process (business process modeling, requirements engineering, change management, communication), we found that most companies use a wide range of products, partly individual developed solutions. However, we could also identify a small number of common used tools. The most widely accepted are different kinds of wikis (c.f. Louridas 2006). Majority of respondents use them mainly for documentation reasons, knowledge, customer or project management. More frequent use of wikis in SMEs is desirable, since they are inexpensive, flexible, and easy-to-use. On the downside traditional wikis are very limited when it comes to business process and requirements management. For example, the