

Adapting PROFES for Use in an Agile Process: An Industry Experience Report

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Abstract. Background: Agile methods are starting to get established not only in new business organizations, but also in organizations dealing with innovation and early product development in more traditional branches like automotive industry. Customers of those organizations demand a specified quality of the delivered products.

Objective: Adapt the PROFES Improvement Methodology for use in an industrial, agile process context, to ensure more predictable product quality.

Method: An explorative case study at BMW Car IT, which included several structured interviews with stakeholders such as customers and developers.

Result: Adapted PROFES methodology with regard to agility and initial product-process dependencies, which partially confirm some of the original PROFES findings.

Conclusion: The cost-value ratio of applying PROFES as an improvement methodology in an agile environment has to be carefully considered.

1 Introduction

Agile methods have a reputation for being faster, more customer-related, and more flexible in the case of unknown or changing requirements. As a result, agile methods are being established not only in new business organizations, but also in organizations dealing with innovation and early product development in more traditional branches, like automotive industry. Nevertheless, customers of those organizations demand a specified quality of the delivered product. It is here that software process improvement (SPI) promises to contribute to an organization's process maturity and, therefore, to obtaining stable and predictable product quality. Today, it is widely accepted that SPI, similarly to software development, has to be performed in a systematic and managed way. The PROFES (ESPRIT project no. 23239: "PROduct Focused improvement of Embedded Software processes") improvement methodology [1] provides a framework of methods and tools that supports industries in their product-driven process improvement. In contrast to traditional process-driven improvement

approaches that are mostly based on process capability and maturity models (e.g., [2]), PROFES starts with the product and especially with product quality to identify improvement potential. The quality attributes are preferably defined by the customer and used to drive improvement activities. This does not mean that, for example, process assessments are not used, but they are not the only source for improvement initiatives. Another important aspect of the PROFES approach, and especially of the idea of systematically managing experience with technology application, is to base decisions on a comprehensible and documented basis, or, in other words, on empirical evidence [3], [4], [5].

On the other hand, agile software development approaches have also become more and more important today (e.g., [6]). Two of the main characteristics of agile development approaches are short cycle times and less documentation in usually small teams. Nevertheless, certain development activities including necessary documents are explicitly demanded and set up.

So far, not much experience exists in improving agile software development processes and maturity. Basically, two scenarios are possible for coming up with a software process improvement (SPI) approach for agile software development: a) define an agile-specific SPI approach from scratch, or b) use an existing SPI approach and adapt it to the specific needs of an agile approach.

For this work we have chosen the second scenario, since the aim of the company, BMW Car IT, was to get a pragmatic solution with early results. The main reason to do so was the expectation to come up with initial results in a shorter period of time. Therefore, an existing software process improvement approach was chosen as the starting point, namely PROFES, since it is especially designed for and used in the embedded domain (due to the automotive background of the company). Before PROFES could be used for an existing agile development process, PROFES had to be adapted.

Research question: Is PROFES, although developed as an improvement method for more traditional software development processes, transferable (after the typical, organization-specific adaptations) to an agile process environment?

To answer this question, we started with the identification of major quality issues and product-process dependencies across eight projects. With regard to the quality issues, we documented the shortcomings mentioned by the customers and provided related Goal-Question-Metric-based quality models. To identify product-process-dependencies (PPD), we performed structured interviews. The findings from the quality models and the PPD interviews were combined with information we were able to obtain from a previous CMMi assessment. This led us to the areas with major improvement potential. Finally, we extended the agile process framework with the necessary concepts to keep the PROFES continuous improvement cycle running.

The research question can be answered positively. In addition, we were able to confirm that PPDs found in traditional processes are also valid in agile processes.

The remainder of the paper is structured as follows. First, in chapter two, we give the necessary background to understand the case, a brief insight into the company, the development process at hand, and a sketch of the PROFES methodology. Chapter three gives a summary of related work. The methods used during the study are described in chapter four. The steps performed to adapt PROFES to the agile environ-