

Understanding the Importance of Roles in Architecture-Related Process Improvement - A Case Study

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Abstract. In response to the increasingly challenging task of developing software, many companies turn to Software Process Improvement (SPI). One of many factors that SPI depends on is user (staff) involvement, which is complicated by the fact that process users may differ in viewpoints and priorities. In this paper, we present a case study in which we performed a pre-SPI examination of process users' viewpoints and priorities with respect to their roles. The study was conducted by the means of a questionnaire sent out to the process users. The analysis reveals differences among roles regarding priorities, in particular for product managers and designers, but not regarding viewpoints. This indicates that further research should investigate in which situations roles are likely to differ and in which they are likely to be similar. Moreover, since we initially expected both viewpoints and priorities to differ, it indicates that it is important to cover these aspects in SPI, and not only rely on expectations.

1 Introduction

Constraining factors such as time and budget make software development a challenging task for many organisations – a challenge that is leveraged by the fact that software plays an increasingly large role in society. In order to handle the challenge and to turn the software industry into an engineering discipline, it is necessary to put the processes in focus [27]. The goal of Software Process Improvement (SPI) is to create an infrastructure that enables effective methods and practices to be incorporated into the business [1].

The success of SPI depends on a number of factors, one of which is user (staff) involvement [21]. It has been reported that process users' attitudes often are disregarded in quality initiatives, and that putting them in the spotlight when designing SPI is an important step towards success [1, 10]. To involve process users and to regard their attitudes can be far from trivial, because process users do neither necessarily have the same viewpoints, nor the same priorities. This paper presents a case study in which we examined the viewpoints and priorities of process users at Ericsson AB, Sweden, to pinpoint differences and similarities among roles. We selected the role perspective since a number of publications report that role can be a discriminating factor when it comes to views in SPI [2, 4, 5, 6, 10, 14, 25].

Generic SPI frameworks, such as SEI's IDEALSM [17], Quality Improvement Paradigm (QIP) [3], and PROFES [20], all contain two important ingredients: a characterisation (or assessment, or appraisal) of the current process, and an improvement plan (or roadmap, or actions). The viewpoints of the process users are crucial in the characterisation phase, because the more diverse they are, the harder it becomes to form a baseline. Similarly, the priorities of the process users are crucial in the planning phase, because the more diverse they are, the harder it becomes to create a plan that satisfies everyone.

1.1 Background and Research Setting

Ericsson AB, Sweden, is one of the largest suppliers of mobile systems in the world, and has as customers some of the world's largest mobile operators. The study was conducted at one of Ericsson's offices (hereafter referred to as the company), which at the time had about 400 employees.

The objective of the study was to prepare improvement of the architecture documentation process at the company by examining process users' viewpoints and priorities with respect to their roles. By doing so, we were able to create an awareness of the need for and scope of SPI. With "architecture documentation process", we refer to the process of documenting the software architecture and keeping the documentation up-to-date. This is not necessarily an explicitly defined process of its own, but could, for example, be part of the development process. Our tool for examining viewpoints and priorities was a questionnaire with quantitative questions about architecture documentation.

In advance, we expected to see both diverse viewpoints and diverse priorities among process users regarding the architecture documentation process. The reason for this was mainly that architecture documentation typically has different stakeholders, such as project managers, product managers, designers and testers, most of whom have different needs and knowledge. Both needs and knowledge are factors that tend to affect how you view things and what you think is important. This is one of the reasons that software architectures should be designed and documented using multiple architectural views [5]. Since the organisational role most likely affects both needs and knowledge, we anticipated differences in both viewpoints and priorities.

We apply statistical methods to test for differences among roles. For this purpose, the following statistical hypotheses are evaluated (independently for viewpoints and priorities):

- Null hypothesis, H_0 : *There are no differences among roles.*
- Alternative hypothesis, H_A : *There is a difference among roles.*

This paper is justified by two main reasons. First, it adds to existing research about similarities and non-similarities among roles, which is necessary to better understand the impact of roles in various research contexts. Second, it provides an example of empirical SPI research targeted at industry, with the focus on creating an understanding of process users' viewpoints and priorities.