Chapter II
Achieving Sustainable Tailorable Software Systems by Collaboration Between End–Users and Developers

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ABSTRACT

This chapter reports on a case study performed in cooperation with a telecommunication provider. The telecom business changes rapidly as new services are continuously introduced. The rapidly changing business environment demands that the company has supportive, sustainable information systems to stay on the front line of the business area. The company’s continuous evolution of the IT-infrastructure makes it necessary to tailor the interaction between different applications. The objective of the case study was to explore what is required to allow end users to tailor the interaction between flexible applications in an evolving IT-infrastructure to provide for software sustainability. The case study followed a design research paradigm where a prototype was created and evaluated from a use perspective. The overall result shows that allowing end users to tailor the interaction between flexible applications in an evolving IT infrastructure relies on, among other things, an organization that allows cooperation between users and developers that supports both evolution and tailoring.
INTRODUCTION

In most business areas today, competition is hard. It is a matter of company survival to interpret and follow up changes within the business market. The margin between success and failure is small. Possessing suitable, sustainable information systems is an advantage when attempting to stay in the front line of the business area. In order to be and remain competitive, these information systems must adapt to changes in the business environment.

Keeping business systems up to date in a rapidly and continuously changing business environment such as, in this case, the telecom business, takes a lot of effort. Owing to the fast pace of change, flexibility in software is necessary to prevent software obsolescence and to keep the software useful. This inevitably means that the system has to evolve (Lehman, 1980). One way to provide the necessary kind of flexibility is end-user tailoring. End-user tailoring enables the end user to modify the software while it is being used, as opposed to modifying it during the initial development process (Henderson & Kyng, 1991). Software development, which is mostly done by professional software developers, involves transferring some domain knowledge from users to developers (Bennett & Rajlich, 2000) which may take some time and effort. End users, however, already possess the domain knowledge, so by providing support for end-user tailoring, enabling end users to make task related changes, alterations can be made immediately, as needed. Since time is money, a company can gain advantageous competitiveness if the business software can be at the forefront of the market changes. Can tailorable software support developing business practices over a long time? In our research project we had the possibility to address and evaluate the sustainability of tailorable software: The tailoring possibilities themselves have to evolve. Tailoring has to be supported by cooperation between users and developers to allow for the evolution of the tailoring functionality.

Tailoring research so far has focused on flexible stand-alone systems. In earlier projects, we too focused on the design of flexible and end-user tailorable applications (Lindeberg et al., 2002). However, interaction with other systems turned out to be a bottleneck, since business systems in telecommunication are part of an IT-infrastructure consisting of heterogeneous data sources. Other research also indicates that software and IT-infrastructures pose new challenges for software engineering (Bleek, 2004). Normally, the data exchange between different systems is the realm of the software developers, but in this article we use the evaluation of a prototype to explore what is necessary to allow end-users to tailor the interaction between flexible applications in an evolving IT-infrastructure. Our results support the claim that end-users can even tailor the interaction between business applications. The analysis of a user evaluation of a case-based prototype results in a number of issues to be addressed regarding the technical design, the know-how demanded of the users, and the organizational setting, particularly the cooperation between users and developers. These issues both confirm and extend existing research on end-user development and tailoring.

We start by presenting how our research relates to others’ work. In the following section (The Case Study), we describe our research approach in detail, the relevant work practices and business systems of our industrial partner is briefly described and the design of the prototype is presented to provide a basis for the evaluations and discussions. Thereafter, we present the outcome of the evaluation, which points out three different categories of issues that are important when providing end-users with the possibility to manage interactions between applications in an evolving IT-infrastructure. The discussion relates these results to the state of the art.