Process Models for the Development of Mobile Applications for the Automotive Sector

Bachelorarbeit

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1. Introduction

Process models are an important factor in software engineering in order to gain competitive advantages over other companies (see Jabangwe et al. 2018: 100). The methodology specifies the phases, tools, procedures, rules and techniques to be adhered in the development to give the development team clear structure and to be able to develop software effectively with regard to the requirements of the customer and the software in general (see Ramsin, and Paige 2008: 3-4).

Due to the strong growth of the market for mobile devices, the development of mobile applications associated with process models for the development are increasingly coming to the fore. Although this importance continuously increases, there are many research gaps in the area of special process models for the development of mobile applications (see Flora et al. 2014a: 1). It has been assumed that the development process of mobile applications is similar, in most respects to that of traditional software engineering. However, mobile applications have many additional requirements that are not strongly focused in traditional software engineering (Flora, and Chande 2013: 10). These requirements are not addressed by the traditional process models or are not addressed with the necessary attention and lead to demand of further research in this area (see Pastore 2015: 20-21). Furthermore, the rapidly increasing number and diversity of mobile platforms leads to further major challenges in the development of mobile applications, which are not covered by the process models and common practice in the industry and thus lead to an ineffective development (see Ahmad et al. 2017: 464).

Although some agile process models that have been developed specially for the development of mobile applications exist in the literature, these models are not popular and are barely used in practice (see Jabangwe et al. 2018: 19-21). Despite the great opportunities and the constantly growing market in this field, there is still very little scientific work that addresses the specific problems and challenges developing software for mobile devices (see Flora, and Chande 2013: 16-17).

The development of process models that consider and address the specific challenges in the development cycle of mobile applications will help the industry to efficiently develop the software in a growing market. This problem area leads to the following research question:

> **RQ1:** *Which problems arise in the software development of mobile applications according to existing process models and which approaches are there for the improvement of existing and developing of special process models for the development of mobile applications?*

To answer this research question, this work includes qualitative research method. Expert interviews were conducted with software developers for mobile applications, which were then evaluated and discussed with the current state of literature and research.

In general, this work is structured as follows. Chapter 2 gives an overview of the theoretical background of mobile applications and process models in software engineering, especially for mobile applications. The following chapter presents the research method and the evaluated results. In Chapter 4, these results are discussed with the literature and the current state of research and initial approaches to problem solving are presented. Chapter 5 then presents the limitations of this work and gives an outlook on further possible research work. The last chapter concludes this work by summarizing the results and providing a brief conclusion.

6. Conclusion

The aim of this thesis is to identify the problems in the development of mobile applications that occur in connection with existing process models. In addition, initial approaches to solving these problems are to be shown, how they can be addressed and implemented in process models. First, the current state of research and the theoretical background were presented, whereby agile process models developed for traditional software development as well as models specifically designed for app development were discussed. Subsequently, a qualitative research method was applied on the base of expert interviews and the interviews were subsequently evaluated and discussed.

Results of qualitative research show that there are mainly problems in upstream phases before the actual development, which are not covered by agile process models for traditional software development. If these models are adapted, they are often adapted regarding these problems. It is particularly important to deal with the user interface and user experience at an early stage, which should take place in close coordination with the customer and the potential end user. Furthermore, it is important that the foundation for the technical architecture should be laid before the actual development phase in order to reduce the technical risk and not run in the wrong direction. This is particularly important regarding integration into an existing system environment. In addition, governance aspects are hardly considered in the process models, although they can play an important role depending on the application to be developed. However, the agile approach of the models themselves can also pose a problem. Although agile process models are in principle very well suited for the development of mobile applications, there is often a lack of framework conditions in the company that promote this agile way of working. If this agile methodology is not promoted and not thought beyond departmental boundaries, even the best agile process model does not bring any advantages. Furthermore, it was found that these problems could be considered in some process models, which were developed and optimized especially for the development of mobile applications and could provide an important approach. However, these process models are little known in practice and are therefore hardly used. As a possible solution a combination of different process models is proposed, which combines the strengths of the respective models. In addition, a completely new process model can be developed, for which a suitable approach is presented in this paper.

This is also where future research work can start in order to identify and specify further problems and to develop a process model for the development of mobile applications based on these findings, which is specifically tailored to the needs.