

Successful Mobile Application Development: Towards a Taxonomy of Domain-Specific Process Models and Methodologies

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Abstract

Mobile applications and mobile application development issues receive an increasing attention for practitioners and academics. The development of mobile applications is connected with a number of domain-specific issues and challenges (e.g., fulfilment of customer requirements or the prevention of high development costs). Consequently, the decision of the most effective process model to develop a mobile application plays a crucial role for software and mobile application development teams. With the help of a structured taxonomy-building methodology, we contribute to the extant literature by creating and presenting a taxonomy for process models and methodologies in software engineering and the mobile application development domain. The taxonomy enrich the existing knowledge base and can help mobile application developers to choose the most suitable process model or methodology. Based on our examination, our results indicate new directions for mobile application research and implications for mobile application development.

1. Introduction

In the last ten years, mobile applications have received an ongoing interest in both the private and the professional area, resulting in an exponential growth in mobile application development [1]. Until 2018, the number of mobile applications has raised to nearly four million applications in Google PlayStore or two million in Apple's App Store [2]. Because of this raising number and huge supply of mobile applications, the market had become very competitive because since users can switch easily to another application [3]. Therefore, developers have to consider and ultimately meet customer requirements (e.g., usability [4] or improve the experience [5]) adequate and quick [6].

As Majchrzak et al. [7; p. 5735] already stated “the basic requirements of developing mobile applications can be said to have become less complex and more complex at the same time”. Various customer requirements are followed by a raising number of special technical issues for mobile applications and should therefore be taken into account in the development process.

Methods from classical software development like iterative, parallel or sequential process models can be used by some extent, but new processes are necessary because of the distinctive nature and the characteristics of mobile applications, e.g., characteristics related to hardware (e.g., compatibility, performance restrictions, battery life), characteristics related to software (e.g., integration, interaction, error notification, convenience, reachability), and characteristics related to communication (e.g., network connectivity) [8,9,10]. The differentiation of process models into a few generic archetypes leads to a sometimes meaningful reduction in complexity, we argue that for some purposes, such as the development of a mobile application, a more detailed domain-specific perspective is necessary. This increasing importance and complexity makes it necessary to implement more flexible and specialized procedures that meet the specific needs regarding the development of mobile applications.

To our understanding, there is limited academic literature that incorporates and investigates process models and methodologies into the mobile application domain. This pressing problem for practitioners is reflected in research, where studies have emphasized that the selection of an appropriate process model for the development of a mobile application represent a current dilemma in theory and practice [11]. However, the role of process models and methodologies in the context of mobile application development has been considered in only a few research studies. Therefore, the aim of this research is to organize and structure the amount of knowledge from academic literature in order to create and present a taxonomy of process