

# Mobile Business Applications must be thoroughly engineered!

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Ralf Carbon works in applied Software Engineering research since 2002 after he received his diploma in computer science from the University of Kaiserslautern, Germany. He performed many projects in the area of software architecture, especially in the domain of large, workflow-based information systems. Since 2009, he performs projects on mobile business applications covering their complete life-cycle. Since 2010, he is the head of the newly established research area “Business Goes Mobile” at Fraunhofer IESE. The research area currently consists of a team of 10 researchers working on mobile software engineering projects.

Steffen Hess works at Fraunhofer IESE in the field of usability and user experience since 2004. He worked first as a student employee and after receiving his diploma in industrial engineering as researcher and practitioner. Already in his diploma thesis he worked in the field of mobile software engineering – comparing different mobile open source and proprietary operation system ecosystems. Since 2009, he performed many projects on mobile business applications for different customers in different areas. Performed work in this context covers especially conception and prototyping of apps using a lightweight engineering approach.

## 1. How does traditional software engineering relate to the engineering of mobile applications and systems?

In the research area “Business Goes Mobile” at Fraunhofer IESE, we develop methods to systematically engineer mobile business applications (apps) and transfer them to industry. Mobile business apps are provided by organizations to offer valuable mobile services to their customers (B2C scenario) or equip their own mobile workers with appropriate workflow support (B2B scenario). We supported, for instance, customers in the agricultural domain to develop mobile business apps for farmers, contractors, and field workers and in the airline domain to build mobile business apps for passengers, pilots, and service personnel. The examples show, that mobile business apps are used in business-critical situations and therefore need to provide the required functionality with guaranteed quality. Especially a great user experience, security, but also flexibility with respect to future extensions are beyond the key quality requirements.

In our industrial projects we experienced many insufficient apps. The main reason for mobile business apps of poor functionality and quality is that such organizations do not thoroughly engineer them. Driven by tough time to market constraints, they suppose mobile business apps can be implemented quickly without precisely specified requirements and without thorough UI, interaction, and architectural design.

Our approach is reuse parts of “traditional” Fraunhofer IESE software engineering approaches we applied in many domains for many years, but to tailor them where required and to complement them by, for instance, solution patterns and lessons learned from the mobile domain.

We decided on certain guiding principles for mobile software engineering that support us in tailoring our existing methods to address key challenges of mobile business apps:

**Be user-centric:** Heavily involve the end-user throughout the engineering process of mobile business apps.

**Be lightweight:** Run through all major activities of a typical software engineering approach, but focus on the production of key artifacts.

**Be iterative:** Perform short iterations to get quick and continuous feedback (especially from end-users) and continuously improve your mobile business apps based on that feedback.

**Be integrative:** Take care of close interaction between major stakeholders in the development team, for instance, requirements engineers, UI and interaction designers, and architects.

While these principles are generally valuable for all kind of Software Engineering projects, we want to specifically point out the importance of them in the case of Mobile Software Engineering projects.

## 2. What are the distinguishing features of mobile software specification, architecture, development and testing that need special attention, skills, or innovation?

Currently, our research in mobile software engineering mainly focuses on requirements engineering and architectural design.

Requirements engineering for mobile business apps must be performed quickly, must focus on the main stakeholders, especially the end-users and their main requirements, and results must be documented precisely but in a lightweight fashion. We try to accomplish this, for instance, by performing a one day requirements engineering workshop with the major stakeholders per release (especially involving the end-users), with a fixed agenda, and a documentation template that is reduced to the essential requirements artifacts.

Architectural design for mobile business apps should be focused based on typical quality requirements of the mobile domain. If such typical domain requirements and potential solutions can be represented adequately in a reusable form, the quality of the architecture and the efficiency of the architectural design process can be improved to better fulfill the tough time to market constraints of mobile business apps and guarantee a certain quality of the product. We try to capture quality requirements and architectural solutions in a platform independent way and if required describe iOS or Android specific instances.

### **3. What should be the suggested focus and agenda for mobile software engineering research and education? What new knowledge and skills do practitioners need most?**

Mobile software engineering research and education should focus on developing and teaching methods considering the specific challenges of mobile application development. Such challenges are, for instance, short time to market and high quality, especially user experience, security, and flexibility. According to our philosophy mentioned above, requirements engineering, UI and interaction design, or architectural design approaches for mobile business apps should be user-centric, lightweight, iterative, and integrative.

Mobile software engineering methods need to provide answers to practitioner, for instance, with respect to the following questions:

- How can we achieve a great user experience?
- How can we design for multiple platforms?
- What is the right scope of an app?
- What do we need to consider when integrating an app in an existing IT infrastructure?
- ...