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# Automation Support for Mobile App Quality Assurance – A Tool Landscape

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**Abstract**

Competitive pressure in app stores, as well as direct and transparent feedback of app store reviews have resulted in an increased demand for outstanding app quality and user experience. At the same time, reduced time-to-market, decreased budgets and time available for quality assurance, and careful user experience design have to be considered. In response, an enormous market for mobile app quality and user experience measurement tools has grown around the mobile app store ecosystems. Developers following lean and agile development approaches continuously produce new features and ready-to-ship software increments. In those settings, budgets for evaluation and familiarization into new tools are very limited. Currently there are alone more than 28 tools and frameworks for functional test automation and more than 16 different device clouds available. For most of the software developing companies, it is impossible to evaluate and test all of them. In this paper, we present a classification in order to help navigation through the mobile app quality tools landscape for easier selection and more targeted evaluation of tools.


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Keywords: Mobile Applications, Quality, Quality Assurance, User Experience

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## 1. Introduction

The market for mobile devices is growing rapidly and new mobile applications are being developed and shipped continuously. For instance, the number of mobile applications available in the Apple App Store rose from 800 applications in the year 2008 to 1.5 million applications in the year 2015[27]. Until 2020, the mobile application market will grow from 70 billion US dollars in 2015 to 189 billion US dollars according to current market research forecasts[28]. The high pervasiveness of mobile devices and their constant presence have led to mobile application development happening in almost all domains. Of course, also quality assurance has to cope with the new needs of such app development. There exist some inherent characteristics of the mobile app development: For example, there are technological peculiarities of mobile applications, such as context awareness and limited resources, and peculiarities of their development process, such as the consideration of minimal quality assurance overhead and short development time. Missing mobile-specific testing methods and time and effort constraints are challenges that companies developing mobile application have to cope with nowadays[29].

A trend to address such challenges is to use automation support during app development. Tools can be used for several purposes, respectively in many development steps, for example during development, during quality assurance, or during the deployment process. In all of these areas, new tools emerged during the last years, or existing tools were further developed to better address the mobile development. However, in this "zoo of tools", it is difficult to keep the overview. However, this is important to know in order to be able to decide whether the existing tool landscape is still up to date, and to select new tools that address new challenges.

In this publication, we want to share some insights into the tool support for mobile app quality assurance. Especially for testing activities, tools are usually used in a broad way for different activities. We present a classification and give a number of selected tools, which are most common. Of course, a tremendous number of tools exist and new tools also emerge. However, our classification presents a schema how also future tools can be sorted. For practitioners, such a tool map gives a good overview whether all relevant parts in the development and quality assurance process are considered already for automation, and provide a baseline for a discussion whether new tools might be considered in the future. Besides comparisons of tools, as for example given by Gartner[36] or Forrester[37], we considered a much broader set of tools and tool vendors, and provide a structured classification of the tools. However, the mentioned studies might be helpful when one tool vendor needs to be analyzed in more detail.

Section 2 presents our tool map, starting with an overview and followed by a description of every category together with the tools. We also discuss some lessons learned. Section 3 concludes our article.

## 2. The Mobile App Quality Tools Landscape Map

### *2.1. Overview*

Based on existing tool comparison such as given by Gartner or Forrester as mentioned above, a search via google, and own experience from the testing field, we identified several commercial and open source quality assurance tools focusing on mobile apps. During our research, we identified five major clusters of tool support that cover different aspects of how today's mobile app quality assurance is mainly supported:

- **Functional Test Automation**: Functional test automation tools are at the center of the map with more than 28 tools. The large amount of tool support underlines the importance of test automation in mobile specific app development projects, which are most often performed in an agile manner. Agile projects have always been stressed by agile pioneers like Mike Cohn and concepts like the agile testing pyramid[1].