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Review on Agile Approach to Mobile Application Development

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Abstract - Mobile technology has emerged as a necessity from luxury in day todays lives. This rapid increase in mobile telecommunication has also increased large number of mobile application development strategies. As mobile Application development has distinct requirements which drive several challenges, the appropriate methodology need to be adopted. The unique characteristics of mobile devices and applications alter the decisions while developing the app design phase and other phases. Existing literature has many mobile application development approaches. Most of them are existing development process models used for traditional soft wares which are adapted to mobile apps. Agile methodologies were thus introduced to meet the new requirements of the software development companies. The agile methodologies aim at facilitating software development processes where changes are acceptable at any stage and provide a structure for highly collaborative software development. This paper provides a brief overview of some agile approaches for mobile application development. It provides an overview how agile approach is suitable to fit mobile needs for building high quality mobile apps.

Keywords **- Agile, Software Engineering, Mobile Application Development.**

1. Introduction

As we all witness the incredible growth of mobile device all over the world, the software running on these devices have also increased rapidly. According to a new report from research firm eMarketer, the popularity of smartphones will continue to increase worldwide by 2018 as shown in figure 1.The number of smartphone users worldwide will beat 2 billion in 2016 as compared to 2015. Next year, there will be over 1.91 billion smartphone users across the globe, a figure that will increase another 12.6% to near 2.16 billion in 2016[1]. The analysis of growth of mobile market shows the need of standard process for mobile application development. This can be achieved through the use of proper software process models and the appropriate usage of software development methodologies. According to Gartner analyst Van Baker said in his recent blog that traditional practices will not work for mobile application development and companies must instead adopt agile development. The traditional methods used to define and develop desktop applications will not work with mobile application development (AD), according to Gartner, Inc. Gartner said that as demand from business units in enterprises puts increasing pressure on IT organizations to deliver large numbers of mobile applications, AD teams will have to employ practices that are different from traditional AD [2].

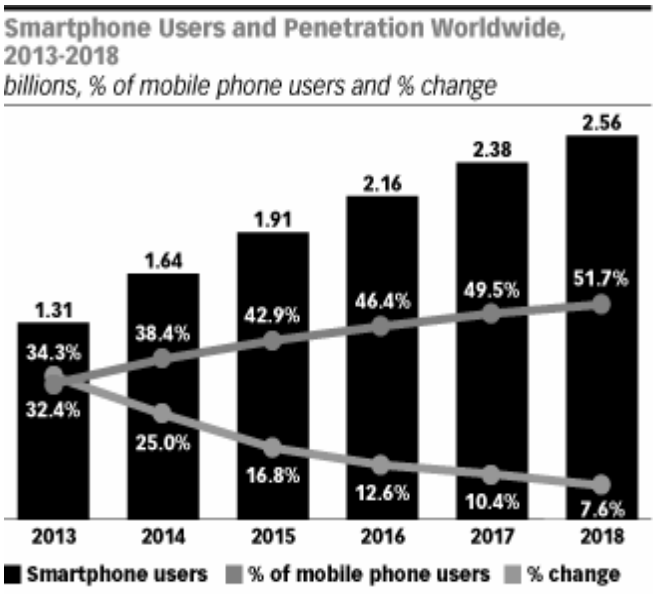

Figure 1: Increase in smartphone popularity analysis by eMarketer

2. Mobile Application Development Process

Mobile Application Development is the process by which mobile applications are developed for smartphones or mobile devices. These applications are available to be downloaded from app stores or are pre-installed by the mobile manufactures. A general adopted Mobile Application Development Process is shown in the figure. There are five phases in this process namely Initiation, Design, Development, Acceptance, Support.

3. Agile Methodology for Mobile Application Development

The term agile was introduced in the 1990s to refer to flexible production systems [3]. To provide a solution to the issues and challenges, it has been constantly proposed that agile principles and practices are best suitable and can be tailored for the development of software products for mobile devices. The agile approach is seen as a natural fit for mobile application development.

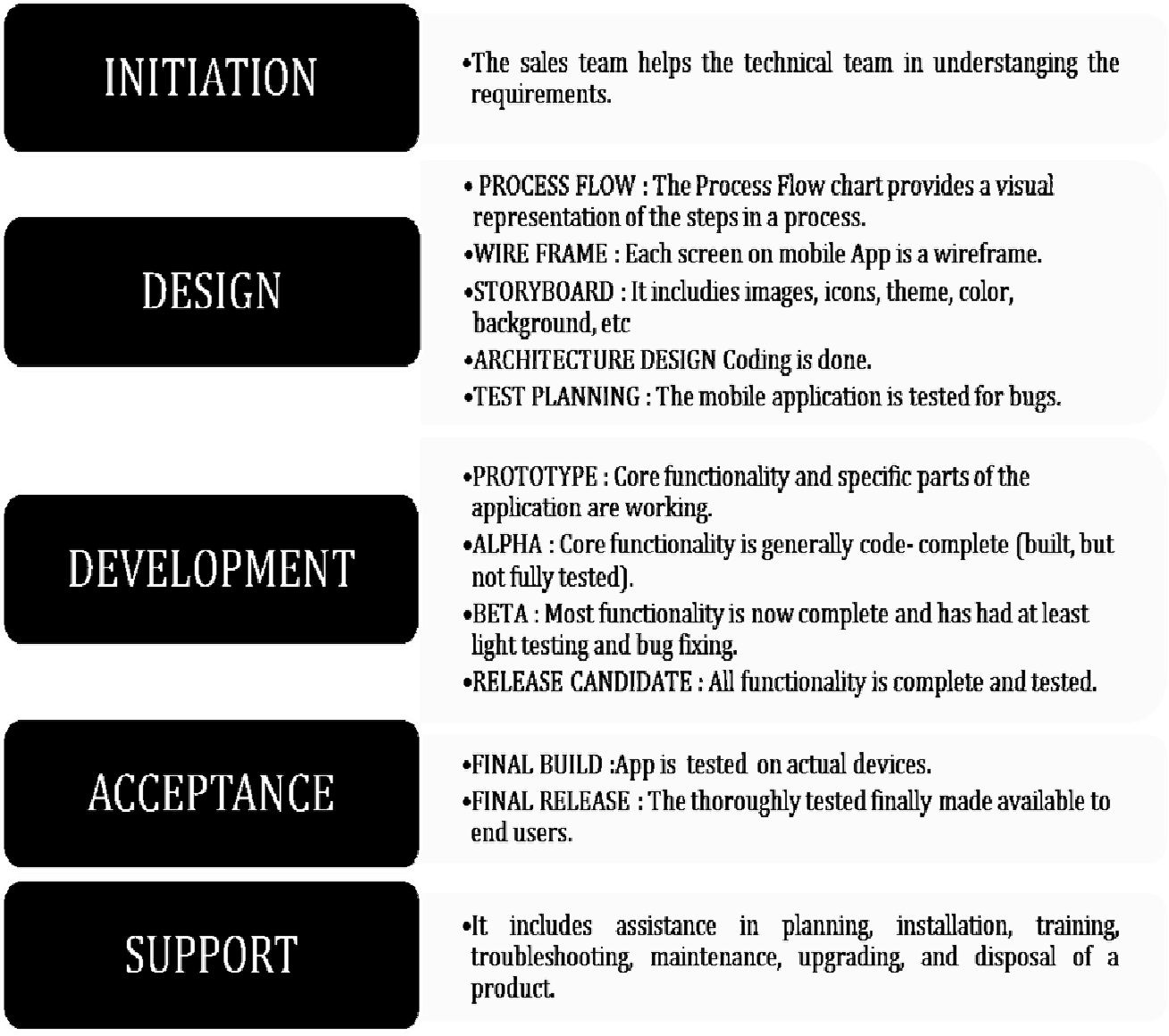

Figure 2: A General Mobile Application Development Process

Studies carried out for the application of agile development approach to mobile application development indicates the need for software development processes couturier to suite the mobile application requirements [9].

There are many mobile app development processes based on agile practices. Many mobile app development processes based on agile practices were proposed by different researcher.

Sr. No	Agile Mobile App Development Approaches	Year	Description
1.	Mobile-D[4]	2004	This approach is drawn from agile practices and can meet the needs of changing mobile environment. Architecture Line, an architectural concept, was introduced to produce framework for future mobile app development. It works on 9 principle elements extracted from agile practices and is tested on some development project and effectively evaluated against CMMI level 2. Mobile-D is good for small teams and short projects.
2.	RaPiD7[5]	2005	It was developed within Nokia in the 2002-2003 timeframe. The idea was simple - to create reality based document with as minimum effort as possible. We know that by better human interaction and documentation better quality product can be developed. So, workshops are conducted to facilitate documentation and plan human interaction for the project.
3.	Hybrid methodology [6]	2008	This is based on many practices like agility, review meeting, reusability support, market awareness, market base architecture, etc. this methodology is completed in four iterations, development starts with generic SDLC, firstly agile practices are incorporated into it. In second iteration market analysis is done and activities from New Product Development are integrated to gain competitive advantage. Adaptive software development ideas are included in third phase and to reduce the level of risk in the product fourth iteration adds prototyping to the project development life cycle. But this methodology is high level and no case studies or test result can be found from literature studies.
4.	MASAM[7]	2008	This is based on swift production and delivery of mobile applications using Extreme Programming, Agile unified Process, RUP and SPEM. It has some variation, from Mobile-D rather shows strong tie with it - like follow up tools and project management. It has three process assets i.e. roles, tasks and work product. It undergoes four phases namely Preparation, Embodiment, Development and Commercialization Phase.
5.	Lean Six Sigma(SLeSS)[8]	2011	Lean Six Sigma (LSS) along with scrum helps in reducing defects and eliminating waste provide better quality product. It provides continuous process improvements. So SLeSS help in handling requirement evolution throughout project lifecycle. SLeSS believes in incremental development, firstly scrum is implemented and when it is well establish in any organization then LSS is implemented as quality framework.

Figure 3: A review of the existing scientific literature on mobile application development using agile methodologies

The Agile approach to mobile application development refers to an iterative and incremental strategy involving self-organizing teams and cross-functioning teams working collaboratively to create software. Some of the well-known existing agile mobile application development methods are MOBILE-D, RaPiD7, Hybrid methodology, MASAM, Scrum with Lean Six Sigma (SLeSS). The figure 3 provides a review of the existing scientific literature on mobile application development using agile methodologies.

4. Traditional Vs Agile Methodology

Traditional Approach	Agile Approach
Process-oriented with formal hand-offs between roles	Emphasizes values and principles rather than process
Sequential approach: Requirements > Design > Development > Test	Iterative approach produces working software early
Changes are nearly impossible without starting over	Project properties and requirements are re-evaluated at the end of each iteration
Risks mitigated later in the development lifecycle	Risks mitigated earlier in the development lifecycle

Figure 4: Traditional Vs Agile methodology

5. Conclusion

The challenges that are faced by developers in mobile applications development can be eased if they follow suitable approach in development process. The choice is right approach helps in timely delivery of app and avoid unnecessary errors. As mobile applications have volatile requirements, agile methodology can be most appropriate for mobile application development.

There are different approaches which are based on agile in literature. This paper gives a brief review of various agile approaches used in mobile application development.

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