Challenges and Best Practices in Mobile Application Development

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Abstract: The mobile phone market has beheld a rapid industrial development over the past few years. The swift growth of this latest computing platform has nearly outdone the software industrial processes adapted to mobile application development. Yet, there are still some defects and lack of research activities in development process of the mobile apps. There still remains some deficit in the development criterions and implementing the best policies which signify the mobile device for some probable attacks. These deficiencies need to be analysed carefully and additional effort is required.

Our study capitalizes in the direction of better understanding of the current mobile application development processes, also inspects actual issues and challenges provoked, and explores the best and ideal practices that can be effectively applied and implemented to assess and exaggerate the production of the mobile app development process.

1. Introduction
As the mobile systems continue to expand over time, users are supposing their cellular devices to function almost similar to the desktop computers. But there are various methodologies and technologies that are complex which makes mobile application development challenging than that of desktop development.

Traditional methodologies that are used in the desktop application development possibly might not be directly applicable in the context of a mobile gadget [2]. Thus it’s very important to implement suitable methods for effective development of mobile apps as there is a need to overcome many challenges and methods that differ from the traditional applications.

Nevertheless, the development of mobile applications software is quite cumbersome and methodologies adopted concerning the advancement of such mobile applications is also scarce. There is still a deficiency in the research methods and also in understanding and analysing of concerns and challenges that may occur in the process of mobile app development. This discloses the cellular information to eventual attacks which is required to be handled quickly and carefully, hence requires additional effort that motivates this study.

This paper discourses a few main points progressively. Our current study aims to substantiate a superior understanding of current mobile app development process espoused by the developers and a numerous problems and challenges related to it.

The current study aims to work on issues and challenges faced in mobile app development currently, the methodologies adopted currently and the best practices that should be adopted in supplanting the problems and challenges in the current app development process.

This paper is structured as follows. Section I describes the abstract and introduction. Section II discusses the related works within this study. Section III mentions the issues and challenges of the study. Section IV designates the best practices of the mobile application development process. Section V is summary and Section VI concludes our discussion.

2. Literature Review
Although the mobile application development practice is much alike to that of software engineering process, it also adds some other requirements for which the conventional software development process has to be modified. There are some characteristics that distinguishes a mobile application from a traditional desktop application.

There are a lot of important things that are identified when examining the complete cycle of the procedure of emerging a mobile application from business encounter and progress to provision and advertising. A few studies have recognized and acknowledged the essential challenges in mobile development.

The research performed by Anthony. Wasserman [2] spotted many issues that are associated with mobile application development which are based on development procedures, front end design, portability of the app, privacy and security.

Harleen K. Flora et al [3] from an online survey, enquired about the entire mobile application development process lifecycle. From
these results based on the survey, they presented work on the primary characteristics which segregate the mobile applications from the traditional ones. Also their study contributed towards better understanding of the current methodologies in mobile application development.

V. Rahimian et al [1] examined the challenges in mobile app development by investigating the current status of mobile software development techniques. They identified an application development procedure on which a new agile procedure is constructed. This can be used for efficient development of mobile application software.

These challenges are imperious and must be taken into account during the early stages of the app development procedure in order to reduce the effect of deprived selections made. Nevertheless, lesser number of researches are known to have scrutinized and emphasized the best policies and practices for mobile application development processes. The most complex software development projects have stimulated from a normal financial resourcing approach towards more agile ways.

3. Challenges Faced in Mobile Application Development and their Best Practices

The increasing demand for mobile gadgets, the accelerating territory for the mobile apps, and the mounting competition for wireless networks altogether make the app development a production with immense capability. The wireless communication system has been turned out to be more dependable on mobile application development and the problems encountered is also high.

Careful scheduling and production of a definite mobile application development course can result in successful outcome of the app. However, there are still numerous challenges which are viewed and discussed by the developers in the current field. The most conspicuous challenges and concerns faced by the app creators which are associated with hardware and software are discussed. Also the ultimate practices that should be considered to overcome these challenges are mentioned below.

3.1. Compatibility with various platforms:
With a number of mobile operating systems existing these days, developers need to plan and make their apps in such a way that the app runs on other various devices and thus compatible with all operating systems. Many industries limit their emphasis only to one platform which decreases the range of their app to the users. Sustaining and to keep the apps efficient across various platforms is moderately tough and challenging.

Best practice: We should have a steady look across platforms so that it creates familiarity across devices and platforms and encourages higher adoption and ensure that main logic of the app remains unchanged across the platforms and it is recommended to integrate with other management solutions.

3.2. Incongruity of hardware utilities:
The power of processor for the mobile gadgets like computing energy, processor efficiency, inadequate power supply and memory availability is restricted when compared to that of the desktop computers. This is challenging to a certain extent because while creating an app, some of the functions that are used by mobile apps must be disabled as they demand a hefty volume of memory space and very firm processor swiftness.

Best Practice: The actions of the app development in the marketplace need to be supervised. It helps in knowing other features that can be added to make the app more effective to use. It also helps to check the features which are not used in the way that the app creators expect them to work and thus they can be modified in a way that it works according to the processor power of the mobile device.

3.3. Improper estimation of requirements:
One more challenging aspect is the deficiency and improbability in the essential requirements as the ongoing project can be easily deviated if the business is not sure about its requirements. A few developers find it considerably challenging in analysing the requirements.

Best practice: Business plan and logic must be conferred after meeting, examining and recording the customer's necessity and the planning approach must include better user communication, performance, and partial resource operation, followed by frequent and fast repetitions of necessities assessments to have respect for situation.

3.4. Total cost and scheduled time:
The cost is also a main factor why most of the mobile app projects become unsuccessful, primarily due to low funding. A common myth about mobile app development projects is that these app development tasks are trivial and therefore involve a very low cost. But creating and to develop a mobile app is a very intricate process and may also can cost very much for app developing groups. A low quality
product is likely to be delivered from the developer who is working on limited budget for those which require a high budget.

Best practice: Before evolving the real mobile application, companies must have a precise cause to generate one. In addition to this earlier study has to be done to guarantee that it is just not only regeneration of a current app and enhance extra feature, utility and productivity. For this resolution, an appropriate idea must be intended with a definite set of activities, thus letting effective plan to appeal the possible users and so proper cost estimate can also be done.

3.5 User Convenience: Mobile device is not similar to desktop PC as it implicates many gesture signals, sensor switches and present location. The minor display screen, drafts, styles of user collaboration have a huge crucial impact in creating and design an app. A few app creators neglect these facts and just perceive the mobile as another gadget screen and continue with their enterprise applications. This makes an irrational and clumsy familiarity among the users resulting in a little acceptance and less extension of the application.

Best practice: Mobile developers have to spend some time on concentrating on the user convenience doing some research on graphics and effective text so to avoid this problem they have to use some frameworks so that it allows the application to change easily and can be reconfigured easily the design must be proper and easy to implement and work through, if we provide some instinctive buttons and content which can be loaded fast can help the users feel comfortable.

3.6 Front End Design: The user front end design model ideas for the mobile apps may be taken from current existing applications. But, they need to be restructured to more commendably use the screen and the design pattern such as touch screen, physical movement and keypad, including the input gestures and the location information. It is also very tough and challenging for developers to possibly maximize the use of the little screen area.

Best practice: In order to give the best solutions, the team must keep the design humble without using so many resources, examine it and generate a simple appropriate design for the mobile applications. Flexible fragments for each stage should be constructed where alike business rules and application logic should be reserved.

3.7 Input methods: Giving input through a keypad is difficult for the users as it is small and limits user efficacy to input the data. Also, mobile gadgets have enough power to take input from the in-built applications. The inputting methods are not so easy to deal with. Identifying the ways that doesn’t use keyboard for providing input is reasonably challenging when building a mobile app.

Best practice: By using touch gestures we can provide consistent, intuitive experience to the users, though the app will not depend on guest gestures for basic behaviour, but by adding this touch-based method it will be very easy to handle and so many will attract.

3.8 Accessing data: A mobile device is capable of accessing data, from a browser and also from the app itself. If the data of a running app exists in the database, the application must be created in such a way that it tracks the disconnected network connection and can again process to its last existing data as soon as it reconnects and updates the app data.

Best practice: Encapsulation is the solution for this. By encapsulating database access, we can make sure that even though network connection is lost and when it regains it goes back to the side where we have stopped i.e. it synchronizes and return to last data where we have accessed and updates it.

3.9 Developing worthy applications: Mobile users always presume high valued and worthy applications to be created considering the design and form factor which is pretty challenging for most of the developers. To meet the user requirements, thorough testing and proper evaluations are essential to make sure that the app has those qualities that satisfies the customers.

Best practice: The developers must recognize each and every mobile platform and the application requirement must be targeted. There must be cross-platform development as much as possible by generating reusable codes to increase the speed of application development. Developers must join in product design to choose built in features and determine other features which can be added for cross platform development.

3.10 Difficulty in testing: As there exist several platforms and many operating systems, testing these days becomes very challenging. Also there are numerous factors that need to be considered like wireless networking, VPN drop, and altering the applications. Process of testing for success or failure must be executed on actual devices by detecting the difficulties due to network connection or device hardware.

Best practice: Testing has to be done quite often it should be tested on various platforms and anywhere irrespective of location then we can
confirm that it is working properly even we need to check in different browsers to check the difference between those and finally cross platform compatibility different network connections etc. based on all these we have to come to a conclusion that app is effective.

3.11 Targeting Users: Mobile app developers usually need to target a certain group of users and then develop the app according to their interests. So lack of foresight to analyse the interests of probably targeted users and their choices which may direct the developers to create an app that has least value in the market.

Best practice: Gathering of feedback is the best solution for this problem to become successful. So we need to get proper feedback from the users. Combining this response will tell which features or abilities, most users wants. This will also decrease concerns regarding technical support, will result in developments and will deliver vision for later app updates.

3.12. Privacy and Security: A least secured mobile can be misrepresented by a user who is not an authorized personality. This issue of application security is quite challenging to manage as there exist many different devices and operating systems.

A responsible app developer would work on the issue of preserving, protecting and securing data in the mobile app as well as the data transmission and servers.

Best practice: Basic methods advised by members towards building privacy into mobile apps are: practice privacy using design, use clear and simple language, communicate openly and effectively, use enhanced notice, make privacy policy easily accessible, provide users with choices and controls, allow users, secure users data and guarantee accountability

4. Summary
Since mobile phones are evolving rapidly, mobile apps with long planning will be outdated and will be inappropriate. Though numerous techniques in software engineering can be used in domain of mobile app. recently the complex projects are using agile approach instead of intensive approach. We need agile approaches to implement these projects and with this we can move these features one after the other, instead of looking only on development process, companies should look in increasing their agility so that it will be in a good position to respond quicker according to changes of market.

To give an explanation to challenges which are discussed, it has been suggested continuously that implementing agile approaches are best suitable for the development of software products for mobiles. The correctness of the agile methods for the growth of mobile apps which was discussed in the past. Then after that the relation between the agile themes and other development procedures were seen and shown in mobile software’s. This mapping explained that why agile methodologies are most suitable methods for applying development processes in the area of mobile due to minor sides, quickly changing requirements and small development cycles.

Now a day’s agile approach is considered as a best fit for the mobile app development and studies are being done for agile approach. Many more research works have proved that agile approaches are one of the best practices which are to be followed by the mobile software and app development process.

Now a day’s agile practices and approaches are considered as a best approach for the development of mobile app so studies are being done for agile approach many surveys have proved that practicing through agile methodologies is the best way for the mobile software and app development process.

5. Conclusion
This paper has suggested more understanding of real challenges and best practices faced by the mobile app developers. These consequences will help in better understanding of challenges and its solutions in development of mobile software. These can be successfully implemented to alleviate the challenges which are implemented and this will increase the act of mobile applications.

In mobile application development, the best practices and challenges which are discussed are the main research topics and these can help us to better app development. We do not say that the practices which we suggested are exhaustive, but these will help to find the new challenges and better development and it will make a knowledge and reference for future research on app development even there are huge number of mobile apps there are also many compound problems where some future work is required. This paper contains more detailed explanation of some mobile app development process and we may use this as a reference and we can review it by taking help of experts and can be able to solve many problems.
6. References:


