A Literature Review on Web to Mobile Application Journey

Muhammad Afrizal Munawas[1]
[1]*Jurusan Magister Ilmu Komputer, Universitas Budi Luhur, Jakarta, Indonesia*
2111600843@student.budiluhur.ac.id / afrizal @gmail.com

Abstract

The availability of low-cost mobile phones and the already broad coverage of GSM networks in Developing Countries are a huge opportunity to provide services, based on Information and Communication Technologies (ICT), that would trigger development and improve people lives. A first step in that direction has been the apparition, last two years, of numerous success stories using mobile phones in development. However, there is still a gap between the development of few services that demonstrate the proof of concept, and the availability of thousands of services in all Developing Countries of the World. The advancement of mobile technology and the internet network and their rapid adoption has enabled instant information access without relying on desktop or notebook computers. By using this technology, can provide an unimpeded interaction for their users and promote awareness for any information updates. It is crucial to develop mobile application for each major mobile platform to reach most of the user.

Keywords: GSM, Mobile Apps, Mobile Web, PWA, Progressive Web, Web Evolution

I. INTRODUCTION

As we have witnessed a revolution in the consumer space toward mobility, most analysts have identified that mobile devices are the major gateways to Internet as compared to desktop browsers. Mobile device is replacing all traditional channels to access the information. To align with this trend, enterprises too are designing the digital applications to cater to wide array of mobile devices and platforms. Mobile application development involves the process of developing the applications for mobile devices such as Personal Digital Assistants (PDA), tablets and smart phones and other mobile devices. Native mobile apps are designed to run on a specific mobile platform, sometimes specific mobile operating system and supported hardware. Mobile applications are part of main stream digital strategy for Business to Consumer (B2C) enterprises. Most of the enterprises are now adopting "mobile-first" strategy wherein the digital applications are designed, developed and tested for mobile devices; mobile users attain the primary focus in the digital strategy. Disruption in mobility space has major impact on the revenues for the enterprises. Mobile apps are shaping user experiences and are providing real-time information and offer more engaging experiences for the users. Mobility based digital strategy considers various things such as user experience, performance, interactivity, device form factors, device limitations, location needs and personalization.

In this research it will be discussed several evolution of mobile application and development tools used from several research papers. The objective of this research is to compare each research paper result and get the findings, limitation, and areas for improvement.

II. LITERATURE REVIEW

In this research there are five research paper that already collected. Each discuss about load test and performance test with different aspect and mobile apps developent tools. Four research paper for review are as below:

1	Title: *The Effectiveness of Web Systems and Mobile Applications for their End-Users (2020)*
	Author: Arif Hussin, Abdul Kadir, Mohd Ghazali, Md Hanafiah, Zakaria
	Review Summary: Nowadays, people are turning to the internet to search for information and are completing their work using web systems or mobile applications as their medium. This study was conducted to determine the relationship between web systems and end-user effectiveness and performance. This study collected information using primary data, with a population of 200 students from University Sultan Zainal Abidin (UniSZA) in the Faculty of Informatics and Computing. According to Krejcie and Morgan's 1970 table, the sample size is 132. By using SPSS software, the Pearson Correlation formula tests the input. Based on the testing data, the effectiveness of the user using a web based system is 0.633, whereas the effectiveness of using a mobile application is 0.973. In conclusion, there is a moderate relationship between using web systems and the effectiveness of the end-user. Furthermore, there is a strong relationship between using mobile applications and the effectiveness of the end-user. This study recommends that future researchers and the developers of web systems or mobile applications should design better and more suitable questionnaires to achieve excellent results. Developers need to be aware of the relationship between web systems and mobile applications and their end-users so that they can improve their systems and applications.

2	Title: *Testing Approaches for Web and Mobile Applications: An Overview (2020)*
	Author: Hamza, Mustafa, Hammad
	Review Summary: Software testing is one of the main phases in the software development lifecycle. Each software is being tested to ensure its conformance with the software requirements. Web and mobile applications are considered among the software that should be tested carefully. Such applications are heavily used by different people for different purposes. There are many research endeavors in the field of software testing. Many approaches are proposed for the three types of testing, black, grey, and white box. It is important to survey the literature of the testing approach to help the software engineers/ developers/ testers in choosing the right testing approach and methodology based on the software scenarios and needs. In this paper, we surveyed some of the black, grey, and white box testing approaches along with some tools. This survey helps the software engineers to choose the appropriate approaches for the different web and mobile applications

3	Title*: Framework for Developing Secure Converged Web and Mobile Applications (2020)*
	Author: Nyambo Devotha et. al.
	The emerging need for web and mobile applications in service delivery information platforms has rapidly resulted in a bulk of applications in use with little concern about their security. Researchers in web and mobile applications security have proposed a number of solutions to security threats in these computing platforms such as 'in device' and 'in network' level security. However, little has been done in assisting developers of web and mobile applications build secure applications. This paper proposes SeC-WeMA framework which, is a holistic security framework for guiding the development of converged web and mobile applications. SeC-WeMA framework has four building blocks which provide guidance to application developers on conducting system threats modelling, identification of security requirements, conducting security controls assessment, and conducting system security testing. In addition, the paper presents SeC-WeMA framework validation results as subjected to developers of web and mobile applications.

4	Title: *Evolution of Mobile Applications (2018)*
	Author: Phongtraychack,Dolgaya, Siemens, Mehtiyev, Syryamkin, Yurchenko, Darya
	Review Summary: Currently, we can see the rapid evolution of mobile technology, which involves mobile communication, mobile hardware, and mobile software. Features of mobile phones largely depend on software. In contemporary information and communication age [1–4], mobile application is one of the most concerned and rapidly developing areas. At the same time, the development of mobile application undergoes great changes with the introduction of new software, service platforms and software development kits (SDK). These changes lead to appearance of many new service platforms such as Google with Android and Apple with iOS. This article presents the information about the evolution of mobile application, gives some statistical data on the past and present situation, demonstrates how individual users of mobile devices can benefit, and shows how mobile applications affect society from the ethical perspective.

To get better overview of the literature review, below are the SOTA table per each research paper as mentioned on the last section.

Source Information	M. Arif Hussin M. F. Abdul Kadir Mohd Ghazali Hanafiah Zakaria (2020)	A. Phongtraychack Dolgaya (2018)	Devotha (2020)	Z Hamza M Hammad (2020)
Research Topic	The Effectiveness of Web Systems and Mobile Applications for their End-Users,	Evolution of Mobile Applications	Framework for Developing Secure Converged Web and Mobile Applications	Testing Approaches for Web and Mobile Applications: An Overview
Methodology/ Aspect	- Survey : quant - 200 students from University Sultan Zainal Abidin (UniSZA)- - Based on Krejcie and Morgan method	Survey : quant - > 850 million people in china	Survey : qual Measurement-comparison of approaches. a. Size of installation b. Launch time c. Time from app-icon tap to toolbar render d. Feature comparison	Survey : qual Measurement-comparison of approaches. a. Size of installation b. Launch time c. Time from app-icon tap to toolbar render d. Feature comparison
Findings/ Aspect	The result shows that mobile application is more effective towards the effectiveness of end-user than web systems.	- Almost 80% of people are online through mobile devices. Most of these people prefer mobile applications because they are easy in use and perform tasks instantly. - Teenagers contribute a considerable part to mobile communication market. A large proportion of teenagers in Korea (80.6%) and Japan (77.3%) own mobile phones. In China, 48.9% of teenagers aged between 12 and 18 are mobile users.	-SeC-WeMA framework is easy to follow, from requirement engineering to system testing. -SeC-WeMA is a holistic framework because it has covered all major development stages of web and mobile applications. The framework includes the best security practices in all the stages of web and mobile applications development.	current testing approaches and available tools, which are based on the black, white, and grey box, have been surveyed using four test-key factors. Such a survey assists the software engineers/ developers/ testers in deciding on the needed testing approach/tool. It also highlights the possible ways of preparing test sequences and test cases to be used for the black box white box and grey box testing.
Limitations	This study collected by using primary data and the population is 200 students from Faculty Informatics and	Need to deep survey which effective and easily to implement and best user experience for end users Specific types of services by	there is a need to test the applicability of the some framework on acquired information systems. Some companies do rely on acquired systems and	limit the survey are related to the testkey factors. There are other methods, which should be considered as test-key factors, such as object-oriented models.

	Computing. With the different objectives, this study has to use only one method of data analysis, which is a Pearson Correlation	means of mobile application a. Browser Access: The applications, which we use through native browser. b. Hybrid Apps – Web: You need to install an application in your device; function of the particular application requires Internet. c. Hybrid Apps – Mixed: You need to install the application in your device and function of the application may require Internet. d. Native Apps: The applications, which are install ed in the device.	can hardly customize the security features in these systems. So, there is a need of defining guidelines on how security features should be customized in acquired information systems	
Areas for Future Research	Need leverage samples with bigger audience and more method to data analysis, and also more variative object to determine more devices to access web or mobile apps	One of the biggest challenges of mobile application s is their platform capability and limitation. In addition to interesting usability of mobile applications, they have some problems connected with platform and limitations. Need to find best framework to get better UI/UX in mobile platform and can running in varios devices	Need time to demostrated best framewrok which fit	more approaches are to be surveyed along with the ones that are in this paper to study the majority of the current approaches.

III. Review Result

Key Drivers for Mobile Applications Development

The following are the key drivers of mobile apps:

· Innovation in mobile space such as proliferation of smart phones, higher bandwidths offered by 3G (Third generation) and 4G (Fourth generation) technologies are coupled with higher capacity storage technologies with higher speed chips would keep powering mobile devices.

· Consumer behaviour: Customers are more used to mobile devices and is easy for them to access information on the move.
· Personalized content delivery: Enterprise can leverage the location and sensors to offer more contextualized, relevant and personalized content, offers and advertisements.
· Mobile ecosystem: An explosive growth in Mobile Applications stores such as Apple store, Google Play store, Windows marketplace store was coupled with availability of games, utilities and other apps. · Social Networking: With the popularity of web 2.0 and social media technologies such as Facebook, Twitter users are increasingly using the location based features in the social media platforms.
Attributes of Mobile applications
The following are the key attributes of mobile applications:
· Ubiquity: Mobile applications are always available and connected and enable users to access information anytime anywhere
· User friendliness: Mobile applications provide responsive and interactive user interface with essential information. They utilize the 9 Introduction to Mobile Applications camera, sensors, media output, touch/multi-touch/voice interface for providing simplified actionable information.
· Location awareness: Mobile applications provide location sensitive information using Global Positioning System (GPS) and other sensors. · Minimalistic: The content and features in mobile apps are minimal which are essential for the functionality.

IV. CONCLUSION

From literature review we agree almost 80% of people are online through mobile devices. Most of these people prefer mobile applications because they are easy in use and perform tasks instantly. Teenagers contribute a considerable part to mobile communication market. Mobile application has some limitation like :

- Various environment , Operating system and Hardware devices Connectivity is often slow and unreliable on mobile devices

- Small Screen Size: In order to provide portability mobile devices, contain very limited screen size.

- Different Display Resolution: The resolution of mobile devices is reduced from that of desktop computers resulting in lower quality images.

- Limited Processing Capability and Power: In order to provide portability, mobile devices often contain less processing capability and power.

- Data Entry Methods: The input methods available for mobile devices are different from those for desktop computers and require a certain level of proficiency.

Beside that security factor is most important parts on mobiles apps because our personal identity and some critical data will embed on mobile device, nowadays most of people convenience to perform transaction from mobile apps.

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