CHAPTER ONE

INTRODUCTION

1.1. Introduction

This dissertation aims to investigate the influential factors on mobile banking adoption in Sudan, drawing on the information system technology acceptance theories. Therefore, the introduction chapter will act as an overview of the main issues of the dissertation. This chapter will provide an overview about the study starting with the background of the study, followed by a discussion of the problem statement, research objectives, research questions, and significance of the study. The chapter also offers an overview of the scope of the study, theoretical framework, definition of terms, as well as the chapter outlines.

1.2. Background of the Study

Technology is playing a great role in today's daily activities, making the life easier and human transactions faster. Business entities widely utilized the technologies for service delivery, efficiency, customer satisfaction and retention. The new trend in today's business goals is to provide services through self-service technologies (SSTs) (Hsieh, 2005). STTs play a great role in customer relationship management, where the goal of the business entity is to provide fast, efficient, convenient and reliable service. Implementing Self-service technologies has great potential and advantages for the company including customer convenience, saving time for the customer, and operation cost reduction (Dabholkar & Bagozzi, 2002; Hsieh, 2005; Nysveen & Pedersen, 2011).

There are several SSTs that implemented in different industries and have been given a considerable attention from the academic scholars. The popular SSTs types include airline ticket machines, Automated Teller Machines (ATMs), package tracking, car rental machines, hotel checkouts, automated telephone services, gambling machines, electronic blood pressure machines,

pay-at-the-pump terminals, and internet based services (Nysveen & Pedersen, 2011). In the banking industry, ATMs, bank by phone, and online banking have been in existence for quite long time, facilitating the customers' engagement with the banks (Curran & Meuter, 2005), however, the current and most recent Self-service technology in today's banking industry is mobile phone banking (Hanafizadeh, Behboudi, Abedini Koshksaray, & Jalilvand Shirkhani Tabar, 2014; Shaikh & Karjaluoto, 2014).

Due to the technological advancements in mobile devices, there is an exponential growth of mobile phones adoption among world populations. Telecommunication industry and mobile phone service providers are one of the fastest growing industries and markets as large populations adopt mobile devices every year particularly in the developing countries. International Telecommunication Union (ITU, 2014) estimated world mobile phone users as4.6 billion. In addition, ITU recently announced that mobile broadband penetration is expected to reach 2.3 billion by the end of 2014, where 55% of them are coming from the developing countries. According to a recent report by ITU (2014)African continents is leading the world in terms of mobile broadband growth. Driven by the latest developments in the telecommunication sector such as third generation (3G) mobile telecommunication and wireless network technology, mobile banking is attracting the attention of scholars and practitioners in the information systems research stream.

There is a growing adoption of banking services and products by diverse consumers with different demographic characteristics. The banks offer a plenty of services including savings, payment bills, ATM service, advancing loans, payments, remittances, credit card payment, deposit, and many other services. Customers have also a variety of options to open several accounts whether they are for business, personal or saving purposes.

With the advanced technologies and innovations, banking industry has been transformed and traditional banks had begun to offer additional services in order to be in line with the new

developments and cater the increasing customer demands. Banks are competing each other to offer the customers the best services and products with the ease and little mental efforts (Aghdaie & Faghani, 2012) and business models are being changed with the emergence of the digital and sophisticated technologies (Capgemini, 2013b). Several factors contribute to the adoption of the new technologies in the banking industry. These factors include: 1) banks' willingness and readiness for enhancing their huge data of customers through big data technologies which can bring later customer satisfaction and loyalty; 2) banks are adopting analytical techniques in order to cope with the increasing customer demands and needs, improve their services and products, and create awareness and loyalty among their customers; 3) the emergence and popularity of digital technologies and channels (i.e., internet, mobile phones, tablets and social media) forcing the banks to adopt and converge with their systems for better performance. 4) banking environment had become too competitive which may compel the managements of banks to adopt the latest technologies and high quality systems in order to offer better services and products and reduce the costs (Capgemini, 2013b).

Several challenges are facing banking industry which needs to be addressed by relevant authorities. A recent report (Accenture, 2014) mentioned ten challenges that face banking industry particularly those driven by investment purposes. These challenges were grouped into three main categories namely 1) fundamental restructuring challenges; 2) improving the basics; and 3) readiness for growth. Among these challenges, adopting new technologies especially digital technologies and telecommunication technologies are mentioned with special emphasis.

Furthermore, it has been speculated that industrial revolution in the banking sector is likely to happen in the near future due to the influence of the technologies as well as the internet(Banking tech, 2014). The report of Banking tech suggested several recommendations for further improvement and customer satisfaction. These recommendations are "24/7 operation; access to banking services via mobile, internet or any channel so desired; instant decision making;

immediate payments; transparency of cost; unbundled services; communication via email, phone, text or live chat; seamless cross border operation and more importantly constant innovation and enhancement" (Banking tech, 2014). The challenges are not only facing the conventional banks, but also Islamic banks. Among the top challenges, technology adoption and investment is a key challenge for Islamic banking industry (Shah Foundation, 2014), where it is strongly recommended for the industry to adopt advanced technologies and make rapid changes in the technology departments.

The recent crisis of the western financial banks had also contributed and had a feasible impact on the rest of the world. As outlined by Capgemini (2013b, P.8), several challenges are still facing numerous banks, which include: 1) evolving customer demands and the need for developing new products and services to cater to new customer segments; 2) increasing cost of operations due to heightened regulatory and compliance pressure; 3) changing customer channel preferences with increasing adoption of mobile [phones] and social media; 4) rising competition from non-banks (such as retailers and telecom firms). The recent financial crisis in the west also raised the interest of non-Muslims in the Islamic banking products and services(Abdullah, Sidek, & Adnan, 2012). In their study about perceptions of non-Muslim customers towards Islamic banking products in Malaysia, respondents mentioned that they have chosen the Islamic banking products due to its reliability, efficient, and stability. The respondents speculated the dominance of Islamic banks in the country in the near future.

Among the new technologies adopted by both conventional and Islamic banks industries, online (internet) banking and mobile phone (cellular) banking technologies are shaping the industry's development and continuous progress. The internet was considered as a major revolutionary technology in the banking industry during the past decade(Ratten& Ratten, 2007).The internet provided the industry to minimize their costs and increase the efficiency, speed and quality of their products and services. Through the internet, a new concept emerged (e-

commerce), which has grown with the rapid adoption by companies that targets international markets (Ratten & Ratten, 2007).

The proliferation of information technologies and IT innovations are key drivers of the banking industry development and rapidly reshaped the entire business environment (Akturan & Tezcan, 2012; Anderson, 2010; Laukkanen, 2007). The banking industry is considered as the pioneering industry to offer their services and products through the Internet and mobile technology (Laukkanen, 2007). The growth and widespread availability of mobile devices to considerable segments of the world populations had allowed the banking industry to offer basic banking service to the unbanked segments (Anderson, 2010) and has been considered the best platform to reach rural inhabitants and pastorals in remote areas (Ayo, Ukpere, Oni, Omote, & Akinsiku, 2012; Bosire, 2012).

Mobile banking had become a necessity for almost all banks which is due to the rapid growth in the telecommunication industry. Mobile banking adoption which is referred as "a wireless service delivery channel providing increased value for customers' banking transactions" (Laukkanen, 2007, p.798) is determined by numerous factors including associated risk, perceived benefits, reliability, complexity of the systems involved, compatibility, and trust in the service provides (Al-Jabri & Sohail, 2012; Daud, Kassim, Said, & Noor, 2011; Dineshwar & Steven, 2013).

Although the rapid growth of the innovations and greater attention from the banking industry, there is still some resistant or reluctance from the customers to adopt these innovations and technologies (Laukkanen & Kiviniemi, 2010). These authors mentioned information gap where the customer had little information on the banking products particularly the mobile banking option, recommending for further attention to customers by providing them information through their mobile devices regarding the availability, timing, working hours and related matters (Laukkanen & Kiviniemi, 2010).

Furthermore, considerable segments of African populations have no access today to banking services and products (Dovi, 2008; Kimenyi & Ndung'u, 2009; Ondiege, 2010). The estimated populations without access to financial services in the developing countries in Africa, Asia and Latin America had reached more than two millions(Dovi, 2008), with over a billion of these populations had a mobile phone device but without bank accounts(Ondiege, 2010). However, only twenty percent of African families were reported to have bank accounts (Dovi, 2008), where the Sub-Saharan African countries had the lowest penetration in terms of deposit institutions in the world (Kimenyi & Ndung'u, 2009; Ondiege, 2010).

To serve better for their customers and also serve to the customers, Alsalam Bank and Faisal Islamic Bank introduced mobile banking in the country(M. Ismail & Osman, 2012; Karma, Ibrahim, & Ali, 2014).The service is fast, secure, and user-friendly, with a title mental effort made by the customer. This is in line with the rapid technological advancements and widespread availability of mobile devices; mobile banking is essentially growing with rapid adoption among Sudanese.

Against this background, the current study attempts to identify the influential factors that contribute to mobile banking adoption in the country. The study will highlight these factors in light with the information systems theories and service quality theory.

1.3. Problem statement of the study

With the increasing customer demands, institutional banks started to utilize the new self-service technologies (SST) in order to provide efficient and convenient services. Among the new technologies, internet is a pioneering technology in the banking industry. In addition, among the latest technologies adopted by the banking industry include providing their services through standard mobile phones as well as smartphones. Through their devices, the customers do not need to come to the bank office to do their financial transactions; they can perform several financial transactions using their mobile phone devices.

Mobile banking usage is exponentially growing worldwide. A recent survey predicted that more than 60% of customers worldwide to use mobile banking in 2015 and more than 90% will likely be using online banking(Capgemini, 2013a). This is due to the highly competitive environments particularly in the developing countries which give special attention to the ICT innovations. Therefore, mobile banking is of great importance to both banking industry and unbanked populations. As outlined by Anderson (2010), mobile banking has great potential particularly for the unbanked segments of the society, where These customers "have a core requirement for basic features: airtime recharge, airtime transfers between subscribers, micro-payments for goods and services, current account facility and cash-withdrawals" (p.22).Most of rural dwellers are considered unbanked segments with high penetration of mobile phones, which has the potential to serve them better(Ayo et al., 2012). Another advantage of mobile banking is that it offers the service to those who do not use the internet in the developing countries (Cruz, Neto, Muñoz-Gallego, & Laukkanen, 2010).

In the context of Sudan, there are only two banks currently providing mobile banking services in the country. Faisal Islamic Bank (FIB_Sudan) provides AL-Rowwad Mobile services (FIB_Sudan, 2014). Al-Rowwad is a convenient service providing its users several services such as transfer between customer accounts, donation for charities, top up, bill payment, buying electricity for individual or agents, as well as the service provides information related Branches and services, bank news and activities, and contact details. While Alsalam Bank provides mobile banking services; however it has no specific name(Alsalam Bank, 2014). It provides several services such transfer money, inquiry services, payments, access to information and news and account management service.

Customers adopt these financial services based on several factors that shape their attitude, intention, and perception about the service and the service providers. Early studies in this context suggested that customers were driven by usefulness, associated easiness, credibility, cost, self-

efficacy, trialability, associated risk, banking needs and relative advantage(Brown, Cajee, Davies, & Stroebel, 2003; KS Lee, Lee, & Kim, 2007; Luarn & Lin, 2005).

As a new phenomenon in the banking and telecommunication industries, scholars had paid a considerable attention to this issue, exploring it from diverse contexts and settings. Scholars were interested to examine the factors behind the people's adoption, acceptance, and usage of mobile banking services. As shown in table 1, there were numerous studies conducted to examine the driving factors for the acceptance and adoption of mobile phone among different segments of world populations. Diverse factors affecting mobile banking emerged from these studies (see table 2 for review) drawing on several theories and models. The most salient factors which were frequently reported in these studies and has been said to be the most adoption determinants, include perceived usefulness, perceived risk, perceived trust, social influence factor, perceived ease of use, perceived credibility, compatibility, relative advantage, and attitude towards adoption among others.

A recent meta-analysis conducted by Shaikh & Karjaluoto (2014) revealed an evolving body of knowledge about mobile banking phenomenon. Fifty five studies included in this met-analysis covering January 2005 to March 2014 period and were published in 33 international peer-reviewed journals and conference proceedings. Among the journals, *International Journal of Mobile Communications* had published most of the articles followed by *Computer in Human Behavior*, and *Journal of Internet banking and Commerce.* In addition, more than 60% of these articles were published between 2010 and 2012 and almost every year witnessed a publication on this topic except 2008 where reported no study published in the said journals.

In terms of methodological techniques, majority of the studies in this meta-analysis were reported to have used quantitative approach with survey instruments for data collection, whereas very few of them used qualitative analysis with mainly interviews. However, some of the studies have used mixed methods combining mostly survey and interviews. Shaikh &Karjaluoto (2014,

p.5) contended that “among the most frequently investigated regions were Southeast Asia (e.g., Malaysia and Singapore), East Asia (e.g., Taiwan, China, and Korea), and Africa (e.g., Ghana, Zimbabwe, and South Africa); a few studies applied to Europe (e.g., Finland, Germany, and Turkey) and South Asia (e.g., India)”. There were many studies conducted in developing countries as compared to developed nations. Even though there was a growing interest by scholars since 2009, however the literature was criticized for being “fragmented, constituted by various theoretical frameworks, with relatively small sample sizes (average N = 365) drawn from both developed and developing countries” (Shaikh & Karjaluoto, 2014, p.9).

Several theories were used to investigate the attitude, acceptance, adoption and usage of mobile banking among various profiles. As outlined by Shaikh & Karjaluoto (2014), eleven theories, models and frameworks from information systems usage and social psychological paradigms provided theoretical grounds for these studies. The studies used either specific theory, or its extension, or integration of two or more theories and models. Technology Acceptance Model (TAM) was the most cited model followed by Unified Theory of Acceptance and use of Technology (UTAUT), and Diffusion of Innovations Theory (DIT).

Although this meta-analysis (Shaikh & Karjaluoto, 2014) provided useful insights about the latest developments on mobile banking adoption literature, it is not comprehensive for the whole literature. The author of this dissertation found several studies that were not covered in this meta-analysis and were published in the said coverage period. These studies were conducted in several countries in Africa and Asia (A. Y. S. Ali & Dhaha, 2014; Karma et al., 2014; Kazi & Mannan, 2013; Sayid, Echchabi, & Aziz, 2012; Shambare, 2013; Shanmugam, Savarimuthu, & Wen, 2014; Tobbin & Kuwornu, 2011). Therefore, this dissertation adds some further coverage on the development of the body of knowledge in this area.

As suggested by the discussed meta-analysis, there is an urgent call for studying certain issues highlighted by the meta-analysis article or it can be implied from it. First, there are few

studies examined the adoption and acceptance of mobile banking from African perspective (A. Y. S. Ali & Dhaha, 2014; Brown et al., 2003; Karma et al., 2014; Sayid et al., 2012; Shambare, 2013; Tobbin & Kuwornu, 2011) as well as from Arab countries' perspective (Aboelmaged & Gebba, 2013; A. Y. S. Ali & Dhaha, 2014; Al-Jabri & Sohail, 2012; Karma et al., 2014; Khraim, Shoubaki, & Khraim, 2011). As such, the current study contributes to this perspective because Sudan shares several social and cultural factors with the said countries.

Second, there is a little known about the early adoption factors for mobile phone adoption among Sudanese populations. Very few studies (Karma et al., 2014) examined these factors based on a modified TAM model. Perceived ease of use and perceived trust were found to be the determinants of behavioral intention to adopt the service. Consequently, this study includes in the proposed model as many variables as possible in order to a gauge a good predictive power for the intention of mobile banking adoption in Sudan. This is to better understand the phenomenon and provide relevant recommendations and suggestions to the respective authorities and policy makers.

Third, another meta-analysis conducted Nysveen and Pedersen (2011) a growing body of knowledge in the area of mobile banking adoption and usage. The meta-analysis included 31 articles published in ISI journals and available in IS web of science from 200 to May 2010. This meta-analysis was confined only to those with title or elements of SST. Although the coverage is limited, however, it provided the trend of the current literature and directions for future research. Several dependent variables were examined in these studies namely adoption, attitude, usage, intention, satisfaction and loyalty.

Nysveen and Pedersen's (2011) review paper revealed that the potential of subjective norms is widely ignored and contended that "given the increased usage of mobile devices as platform for self-services, more consumers will conduct self-services in a social context. The importance of social norm as an antecedent for adoption may therefore be more relevant in the years to come"

(p.17). As such, this study fills the gap in the literature by examining the impact of subjective norms in the conceptual model.

Fourth, Nysveen and Pedersen's (2011) meta-analysis also suggested that the potential of moderating effects such as situational factors has been ignored. They argued that these moderating factors have the potential to account for great variance in consumers' adoption of mobile banking. Therefore, the current study fills this gap in the literature by identifying the moderating effect of situational factors (such as waiting time and task interruption) between the mobile banking determinants and consumers' adoption.

Finally, previous studies were criticized for being concentrating on information systems theories and models (Shaikh & Karjaluoto, 2014), and neglecting the potential of management and business theories. Therefore, the current study integrates three main theories namely Technology Acceptance Model (TAM), and Theory of Reasoned Action (TRA) and Service quality theory (SERVQUAL) to provide better prediction on the endogenous variable in this study (adoption).The recent meta-analysis by Shaikh & Karjaluoto (2014) revealed no study adopting or incorporating the service quality theory. Thus, this study fills this gap in the literature by uncovering the potential of this theory in the context of mobile banking adoption. The reason of integrating TAM in this study is the model was considered a robust enough to gauge use behavior in information systems acceptance (Chen, Li, & Li, 2011; Chuttur, 2009)(Taylor & Todd, 1995b). However, TAM has some weakness particularly its simple structure and it can be overcome by incorporating other relevant construct (Chuttur, 2009). While TRA is another rigorous theory explaining a performing a behavior based on several elements (Taylor & Todd, 1995a).

Table 1:1Review on related studies to mobile banking adoption/intention

No.	Author/s	Year	Sample	Country	Model/theory	Influential factors
1.	Brown et al., 2003	2003*	162	South Africa	Extended DIT	Relative advantage, perceived risk, trialability, and banking needs
2.	Luarn & Lin, 2005	2005	180	Taiwan	Extended TAM	Perceived usefulness, perceived ease of use, perceived credibility, self-efficacy, and financial cost
3.	Amin, Baba, & Muhammad, 2007	2007	239	Malaysia	Extended TAM	Perceived usefulness, perceived ease of use, perceived self-efficacy, perceived credibility,
4.	Lee et al., 2007	2007*	306	South Korea	Modified TAM	Perceived usefulness and trust
5.	Sulaiman, Jaafar, & Mohezar, 2007	2007	279	Malaysia	DIT	Personal characteristics
6.	Gu, Lee, & Suh, 2009	2009	910	South Korea	Extended TAM	Perceived usefulness, perceived ease of use, and trust
7.	Liu, Min, & Ji, 2009	2009	438	China	Extended TAM	Perceived usefulness and trust
8.	Amin & Ramayah, 2010	2010	115	Malaysia	Extended TRA	Attitude, subjective norms, and privacy and security concerns
9.	Koenig-Lewis, Palmer, & Moll, 2010	2010	263	Germany	TAM & DIT	Perceived usefulness, compatibility and risk
10.	Luo, Li, Zhang, & Shim, 2010	2010	122	USA	Modified UTAUT	Performance expectancy and perceived risk
11.	Püschel, Mazzon, & Hernandez, 2010	2010	666	Brazil	Integrated model	Subjective norms, attitude, and perceived behavioral control
12.	Riquelme & Rios, 2010	2010	681	Singapore	Extended TAM	Perceived usefulness, perceived risk, and subjective norms
13.	Schierz, Schilke, & Wirtz, 2010	2010	1447	Germany	Extended TAM	Attitude, perceived compatibility, and individual mobility
14.	Wessels & Drennan, 2010	2010	314	Australia	Extended TAM	Perceived usefulness, perceived financial cost, and compatibility
15.	Bankole, Bankole, & Brown, 2011	2011	231	Nigeria	Extended UTAUT	Power distance, utility expectancy and effort expectancy
16.	Daud et al., 2011	2011	300	Malaysia	Extended TAM	Perceived usefulness, perceived credibility, customer awareness
17.	Khraim, Shoubaki, & Khraim, 2011	2011	301	Jordan	Extended DIT	Self-efficacy, trialability, compatibility, complexity, risk, and relative advantage
18.	Min, Lu, & Yinjun, 2011	2011	278	China	Extended TAM	Perceived usefulness, perceived ease of use, compatibility, trialability, and perceived risk
19.	Tobbin & Kuwornu, 2011	2011*	298	Ghana	TAM & DIT	Perceived usefulness, perceived ease of use, perceived trust, and trialability
20.	Zhou, 2011	2011	210	China	TAM & ISS	Perceived usefulness and initial trust
21.	Akturan & Tezcan, 2012	2012	435	Turkey	Extended TAM	Attitude

22.	Al-Jabri & Sohail, 2012	2012	330	Saudi Arabia	DIT	Relative advantage, compatibility, observability and perceived risk
23.	Amin, Supinah, Aris, & Baba, 2012	2012	152	Malaysia	Extended TAM	Perceived credibility, perceived enjoyment, and perceived self-efficacy
24.	Mashagba & Nassar, 2012	2012	162	Jordan	Extended UTAUT	Performance expectancy, social influence, security and reliability
25.	Safeena, Date, Kammani, & Hundewale, 2012	2012	53	India	Extended TAM	Perceived usefulness, perceived ease of use, perceived risk, and consumer awareness
26.	Sayid, Echchabi, & Aziz, 2012	2012*	100	Somalia	Extended TAM	Perceived usefulness, social influence, and attitude
27.	Yu, 2012	2012	441	Taiwan	UTAUT	Performance expectancy, social influence, perceived credibility, perceived financial cost, and facilitating conditions
28.	Zhou, 2012	2012	200	China	Extended TAM	Trust and follow experience
29.	Aboelmaged & Gebba, 2013	2013	119	UAE	TAM & TPB	Attitude, subjective norms,
30.	Ghalandari, Ghahremanpour, & Hasanluei, 2013	2013	385	Iran	Extended TAM	Considerable usefulness, social risk, performance risk, and considerable benefit
31.	Kazi & Mannan, 2013	2013*	372	Pakistan	Extended TAM	Perceived usefulness, perceived ease of use, perceived risk, and social influence
32.	Shambare, 2013	2013*	282	South Africa	Extended DIT	Relative advantage, complexity, and self-efficacy
33.	Ali & Dhaha, 2014	2014*	414	Somalia	Extended TAM	Perceived usefulness, perceived ease of use, and perceived trust
34.	Hanafizadeh, Behboudi, Abedini Koshksaray, & Jalilvand Shirkhani Tabar, 2014	2014	361	Iran	Extended TAM	Perceived usefulness, perceived ease of use, need for interaction, perceived risk, perceived cost, compatibility, trust, and credibility
35.	Karma, Ibrahim, & Ali, 2014	2014*	181	Sudan	Extended TAM	Perceived ease of use and perceived trust
36.	Oliveira, Faria, Thomas, & Popovič, 2014	2014	194	Portugal	Extended UTAUT	Performance expectancy and initial trust
37.	Shanmugam, Savarimuthu, & Wen, 2014	2014*	202	Malaysia	Expended TAM	Perceived usefulness and attitude

Note: * not covered in the meta-analysis by Shaikh & Karjaluoto (2014).

Table 1:2salient factors affecting behavioral intention of mobile banking

No.	Constructs used in the studies in Table 1	Frequency
1.	Perceived usefulness	20
2.	Perceived risk	11
3.	Perceived ease of use	9
4.	Perceived trust	9
5.	Subjective norms/social influence	8
6.	Perceived credibility	7
7.	Compatibility	7
8.	Attitude	7
9.	Compatibility	7
10.	Performance expectancy	5
11.	Self-efficacy	5
12.	Trialability	4
13.	Financial cost	4
14.	Customer awareness	2
15.	Complexity	2
16.	Security	2
17.	Reliability	1
18.	Facilitating conditions	1
19.	Considerable benefit	1
20.	Need for interaction	1
21.	Perceived enjoyment	1
22.	individual mobility	1
23.	Power distance	1
24.	Effort expectancy	1
25.	Follow experience	1
26.	Banking needs	1
27.	Personal characteristics	1
28.	Perceived behavioral control	1

1.4. Research Objectives

The main objective of this study is to examine the moderating effect of situational factors as well as the influential factors that affect the consumers' intention to adopt a self-service technology (SST) taking mobile banking as an example, drawing on the information systems use and acceptance literature. Specifically, this study addresses the following sub-objectives:

1. To explore the determinants of mobile banking adoption among Sudanese.
2. To examine the effect of service quality dimensions (reliability, responsiveness, efficiency, and convenience) on the Sudanese's intention to adopt mobile banking service.

3. To measure the effect of TAM constructs (perceived usefulness and perceived ease of use, perceived trust and perceived risk) on Sudanese's intention to adopt mobile banking services.
4. To explore the effect of subjective norms (descriptive norms and injunctive norms) on Sudanese's intention to adopt mobile banking services.
5. To test the moderating effect of situational factors (waiting time and task interruption) on the relationship between the main the exogenous variables (service quality dimensions, TPB constructs, and TAM-related constructs) and endogenous variable (behavioral intention).

1.5. Research Questions

In order to addresses the above-mentioned research objectives, several research questions related to the main objective of this study were developed:

1. What are the determinants of mobile banking adoption among Sudanese citizens?
2. Do service quality dimensions (reliability, responsiveness, efficiency, and convenience) have positive and direct influence on Sudanese's intention to adopt mobile banking?
3. Do TAM-related constructs (perceived usefulness and perceived ease of use) have positive and direct effect on Sudanese's intention to adopt mobile banking services?
4. Does perceived trust has a positive and direct effect on Sudanese's intention to adopt mobile banking services?
5. Does perceived risk has a positive and direct effect on Sudanese's intention to adopt mobile banking services?
6. Do subjective norms dimensions have a positive and direct effect on Sudanese's intention to adopt mobile banking services?
7. Do situational factors have moderating effect on the relationship between the main exogenous variables and endogenous variable?

8. Does the hypothesized model for mobile banking adoption among Sudanese is consistent with the empirical data?

1.6. Significance of the study

There is a growing interest from academic scholars and practitioners to understand the issues and factors driving consumers to adopt and accept mobile banking services to their daily and normal transactions. Several studies were conducted in many countries in Europe, Africa, America, and Asia, looking at the different perspectives of the adoption, acceptance, attitude, and satisfaction with the service.

Based on the findings of this study, it will provide several practical and theoretical contributions to the body of knowledge in the context of self-service technologies (SSTs) with special emphasis on mobile banking. First, this study, to the best of the researcher's knowledge, is the first study addressing the current status of mobile banking adoption in the country and drawing on several influential factors as suggested in the literature of information systems.

Second, this study will contribute to the growing literature on SSTs particularly mobile banking adoption factors. Specifically, this study extends the service quality theory to the context of mobile banking adoption. This theory had been paid little attention and it has the potential to contribute to this context. Therefore, this research will shed some light on the service dimensions and their contribution to adoption along with TAM and TRA constructs. In addition, this study tests, extends and validates the theoretical underpins and empirical relevance of several important constructs for understanding mobile banking adoption in Sudan.

Third, as the mobile banking service is new and only two banks are offering the service, this research will provide useful information about the stage of mobile banking adoption in Sudan and its major determinants particularly for current and future service providers. Understanding consumers' needs and meeting their expectations had become today a major organizational role. The information provided by this thesis can give useful insights to the

relevant authorities and policymakers to take the right and relevant decisions and strategies. Furthermore, knowledge on the factors that affect consumers' adoption of a technology or service is important for managers in the banking sector and telecommunication industry in order to introduce effective strategies and approaches to develop a mutual relationship between consumer and service provider as well crating loyalty to the service provider. As a result, the gained knowledge from this thesis contributes to key areas for future improvement in order to meet customer needs and expectations. Moreover, this study is important because it will give useful insights for other banks and telecommunication companies who have not yet implemented mobile banking services but have the intention to introduce in the near future.

1.7. Scope of the study

This study is aimed at investigating the factors that influence the adoption of mobile banking among Sudanese consumers by using an integrated model developed based on the technology acceptance model including itsrelevant constructs to the context of banking adoption namely perceived trust and perceived risk, theory of planned behavior, service quality theory. This study will only focus on consumers who already had experience in using the service and draw the sample only from the Khartoum State.

1.8. Overview of Theoretical framework

This study uses an integrated model based on three major models and theories in the information systems research. These are technology acceptance model (TAM), Theory of Reasoned Action (TRA), and service quality theory (SERVQUAL). TAM postulates that perceived ease of use and perceived usefulness are major determinants of adopting new technologies, whereas TRA posits that a behavior is mainly influenced by attitude of the people towards a behavior and subjective norms. SERQUAL concerns the major components of a highly quality services. Five dimensions were identified in the original model namely reliability, assurance, tangibility, empathy and responsiveness.

The rational for choosing TAM is because of its robustness and was widely supported by many empirical studies in different contexts and settings(Chuttur, 2009; Legris, Ingham, & Collerette, 2003; Shaikh & Karjaluoto, 2014). In addition, TRA was found to be a robust enough to predict a voluntarily setting (F. Davis, Bagozzi, & Warshaw, 1989). While SERQUAL is another robust theory which has been used to examine the quality of services provided by a certain organization or company (Aghdaie & Faghani, 2012). Although these theories are robust in its own sense, however, integrating with other models and theories can provide further predictive power about the adoption of the technology. Therefore, the current study integrates all these theories to investigate the adoption of mobile banking among Sudanese consumers. It is expected that this study will provide a quick insight about the current stage of mobile banking adoption in the country. It also hoped that this study will motivate other telecommunication and banks to initiate like this service, as the study provides useful information about the potential factors contributing towards consumers' adoption.

1.9. Definition of Key Terms

- **Self-service technology (SST):** SST is a service conducted independently by the customers without any help from the employees. Meuter, Ostrom, Roundtree, and Bitner (2000) first coincided the term SST and defined as "a classic example of marketspace transactions in which no interpersonal contact is required between buyer and seller" (p.51).
- **Mobile banking:** it defined as "a wireless service delivery channel providing increased value for customers' banking transactions" (Laukkanen, 2007, p.798). Simply put, it means offering banking services through standard mobile phones and smartphones.
- **Perceived Usefulness**: it is defined as "the degree to which a person believes that using a particular system would enhance his or her job performance" (Davis, 1989, p.320).

The concept means that the belief about the beneficiary that the user can gain from using the technology is more likely to shape his/her decision to adopt it.

- **Perceived Ease of Use:** it is defined as "the degree to which a person believes that using a particular system would be free of effort"(Davis, 1989, p.320). It means that if the consumers feel that the usage of the technology does not require a lot of mental efforts, they are more likely to adopt it.
- **Perceived Risk:** this concept is first introduced by Bauer in 1960 (as cited in Akturan & Tezcan, 2012). It refers to the "nature and amount of risk perceived by a consumer in contemplating a particular purchase decision. Presumably a consumer is motivated to make a purchase in order to attain some set of buying goals" (Akturan & Tezcan, 2012, p.447). It is also referred to "a consumer's belief about the potential uncertain negative outcomes from the mobile money transaction"(Tobbin, 2012, p.4).
- **Perceived Trust:** trust is important element in the context of seller and buyer. Gefen, Karahanna and Straub (2003) acknowledged that there is a confusion and disagreement among the scholars regarding the conceptualization and definition of trust. However, after extending discussion on diverse conceptualizations by different studies, they contended that the scholars looked at trust from several perspectives as follows: 1) a set of specific beliefs dealing primarily with the integrity, benevolence, and ability of another party; 2) a general belief that another party can be trusted; 3) affect reflected in "feelings of confidence and security in the caring response" of the other part; and 5) a combination of these elements (Gefen et al., 2003, p.55).
- **Reliability:** it is about the dependability and consistency of the service. It means that the firm performs the service right the first time (Parasuraman, Zeithaml, & Berry, 1985, p.47).

- **Responsiveness:** this dimension concerns the willingness or readiness of employees to provide service and it involves timeless of the service (Parasuraman et al., 1985).
- **Efficiency:** this concerns the simplicity, structure and speed of using the technology. More precisely, it is defined as " the ease and speed of accessing and using the [mobile banking]" (Parasuraman, Zeithaml, & Malhotra, 2005, p.9).
- **Subjective norms:** Fishbein and Ajzen (1975) defined as a person's perception that most people who are important to her or him should or should not perform the behavior in question (cited in Amin & Ramayah, 2010, p.3).
- **Situational factors:** are in the environment surrounding a person. External factors are beyond the control of a person and may affect the outcome of a decision.
- **Convergent Validity:** it is defined as "extent to which indicators of a specific construct converge or share a high proportion of variance in common" (Hair et al., 2010,p.661).
- **Discriminant Validity:** it is defined as "extent to which a construct is truly distinct from other constructs both in terms of how much it correlates with other constructs and how distinctly measured variables represent only this single construct" (Hair et al., 2010, p.661).

1.10. Structure of the Study

This study is organized according to chapters. The thesis will consist of five chapters, where the first chapter intends to provide an overview of the thesis; it provides a detailed discussion on the background of the study followed by the problem statement, research objectives, research questions as well as the significance of the study. In addition, the chapter will discuss the scope of the study, an overview of theoretical framework, definition of key terms and the structure of the study chapters.

The second chapter concerns with the literature review and will provide a comprehensive discussion on the relevant concepts, theories, models, and constructs. It starts with a brief

description on the banking industry in the country, and online banking development followed by another brief discussion on the mobile banking definition and development. Further, this chapter discusses concisely information system theories and models followed by discussion on the selected theories and model such technology acceptance model, theory of planned behavior, and service quality theory. Finally, the chapter will conclude with the conceptual framework and hypotheses development.

The third chapter will present the methodology of the study, beginning with the research design, sampling procedure, sample size, research instrument, study measures, data collection method, data analysis techniques and pilot study test. The fourth chapter will display the findings of the study while the last chapter will provide the discussion of the findings, conclusion, recommendations and future research scope.

Chapter Summary

The first chapter acted as an introductory component for the whole structure of the thesis. It provided guides and background how the study is going to be conducted. It first started with providing a background on the context of the study relating to growing interest of scholars towards examining self-service technologies particularly mobile banking technology. Further, the chapter discussed the problem of the statement, research objectives, research questions, significance of the study and scope of the study. Also, the chapter presented an overview on theoretical framework proposed for the study, key terms definition, and structure of the study.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter provides extensive review on the related literature, beginning with a brief discussion about the self-service technologies, specifically those which are available in the banking industry. The chapter will also briefly discuss the current and past developments in the Sudanese banking industry, then extending the discussion to the online and mobile banking in the country as well as other countries.

Furthermore, this chapter presents a detailed discussion on the selected theories and models to understand the current phenomenon of mobile banking adoption in the country. It starts with the Technology Acceptance Model (TAM), followed another discussion on Theory of Reasoned Action (TRA) as well as Service Quality Theory (SERVQUAL). Finally, the chapter will provide a comprehensive discussion on the conceptual framework chosen for the study, followed by hypotheses development.

2.2 Self-Service Technologies (SST)

With the improvements and advancement of technologies, customers nowadays can serve themselves without depending on the seller through utilizing the self-service technologies (SST). These SST are shaping todays' firm daily activities and changing the way they interact with their clients, gaining an increased level of satisfaction and repeat purchase intentions.

SSTs are defined as "technological interfaces that enable customers to produce a service independent of direct service employee involvement. Examples of SSTs include automated teller machines (ATMs), automated hotel checkout, banking by telephone, and services over the Internet, such as Federal Express package tracking and online brokerage services" (Meuter et al., 2000, p.50). Other examples of SSTs include airline ticket machines, , car rental machines, gambling machines, electronic blood pressure machines, pay-at-the-pump terminals and internet

based services(Nysveen& Pedersen, 2011). The concept of internet services is too broad and can accommodate hundreds of services available online. Therefore, all services over the internet can be considered as SSTs.

Moreover, Meuter et al. (2000)broadly categorized the firm's purposes for providing SSTs into three main categories, namely customer service, transactions, and self-help. They also divided types of technology interfaces into four main categories namely telephone/interactive voice response, online/internet, interactive kiosks as well as video/CD. They have also given some examples for each interface and its corresponding purpose. Table 2.1 provides a detailed description on these categories and examples.

Table 2.1: Categories and examples of SST in the use

Purposes	**Type of technology interfaces**			
	Telephone/interactive voice response	**Online/internet**	**Interactive kiosks**	**Video/CD****
Customer service	▪ Telephone banking ▪ Mobile banking* ▪ Flight information ▪ Order status	• Package tracking • Account information	▪ ATMs ▪ Hotel checkouts	
Transactions	• Telephone banking • Mobile banking* • Prescription refills	▪ Retail purchase ▪ Financial transactions	• Pay at the pump • Hotel checkout • Car rental	
Self-help	Information telephone line	• Internet information search • Distance learning	▪ Blood pressure machines ▪ Tourist information	▪ Tax preparation software ▪ Television/CD-based training

Source: adopted from Meuter et al. (2000). * added by the researcher.
** Video/CD is typically linked to other technologies to provide customer service and transactions (Meuter et al., 2000, p.52).

The new trend in today's firms strategies and policies is provide majority of the services through SST (Hsieh, 2005), which can dramatically reduce the costs and provide convenient services available at any time. The advantages of SSTs particularly for the customers include its easiness of use, convenience, saving time, reducing costs, greater control over the transaction, fun and enjoyment with the technology (Curran & Meuter, 2005; Dabholkar & Bagozzi, 2002; Meuter et al., 2000). It also has advantages to the firm or service provider such as cost reduction,

increasing level of customer satisfaction, customers' convenience, saving time for the customer and providing efficient and reliable services (Hsieh, 2005; Nysveen & Pedersen, 2011).

In the context of banking industry, several SSTs have been introduced in late 1980s and early 1990s, namely ATMs, bank by phone and later online banking in early 2000s (Curran & Meuter, 2005). However, the new and latest trend of SST in today's banking industry is providing financial services through mobile banking technology(Hanafizadeh et al., 2014; Shaikh & Karjaluoto, 2014). As such, the current study's main objective rests with mobile banking adoption as a form of Self-service technology among Sudanese consumers.

2.3 Banking industry in Sudan

The Sudanese banking industry has witnessed several developments during the past two decades. The industry is led and managed by the government controlled bank, which is the central bank of Sudan (CBS). CBS was established immediately after the independence, following the issuance of the Bank of Sudan Act of 1959and started full operation in February 22, 1960 (Central Bank of Sudan, 2014), serving wide range of society segments and industry sectors. Over the years, the banking industry had witnessed exponential growth as there were many banking in operation and the number of banks increased dramatically. There are currently 37licensed banks operating in the country and providing various financial services to the citizens (Central Bank of Sudan, 2014). Among these banks, 27 of them are commercial banks (one state-owned bank, three branches of foreign banks and 23 joint venture banks). The remaining five banks are considered as specialized banks, providing specific services to certain industries and sectors such as economy, agriculture, social development, industry and investment. Majority of the banks are mainly operating in the capital city of Khartoum, which some branches in other states.

With rapid growth and increasing demands and challenges in the banking industry, the central bank of Sudan had launched several policies for the development of the industry. One

of the major policies was launched in 1998 which was named “comprehensive banking policy” (Tingari & Mahmoud, 2014). The policy was in line with the new developments in the banking industry worldwide and its main aim was “to promote the banking sector to adapt to the contemporary international economic developments namely, the wide-range adoption of the economic liberalization policies, the enforcement of the stipulations of the Basle Committee accord and the trend of economic globalization” (p.3).

Part of the initiatives and recommendations of technical committees of the Union of Sudanese Banks, the central bank of Sudan established Electronic banking System Company which started its operation in middle of 2000 (Electronic Banking Services (EBS), 2014). EBS is the technical arm of the central bank of Sudan, which helps in the application and implementation of the banking technology projects. The company started the implementation of the projects in early 2001 and played “a positive role in the economic sector through its concern in the technical banking, hence the Sudan technical banking scheme became a national scheme officially supported from the government” (Electronic Banking Services, 2014).

EBS offers modern electronic payment methods for advanced banks; facilitates the needs of the customers and stakeholders, as well achieves the abundance funding for the economic revival. The company strive to achieve the following objectives (Electronic Banking Services, 2014):

1. Created infrastructure for electronic payment systems.
2. Connect banks to a unified banking network.
3. Offer electronic payment services in Sudan.
4. Bring banking technologies from abroad and indigenization in proportion to the local environment.
5. Contribute to publishing a culture of banking technology in Sudanese society.
6. Offering technical consultancy in the field of technology for banks and financial institutions.

The establishment of electronic banking systems company is considered the first attempt and benchmark for electronic banking development in the country (Tingari & Mahmoud, 2014). The highest share of the company is owned by the central bank of Sudan (49%) followed by Sudatel (30%) and banks (21%) (Electronic Banking Services, 2014). The company provides six main services to the banks as well as cardholders. The following paragraphs discuss in detail the services.

2.3.1 SWIFT network services

The company strives hard to facilitate world financial transaction from and to Sudan and the integration of the local commercial activities with the international trade. The following services are specifically offered by EBS to the banks (Electronic Banking Services, 2014):

- Manage and operating the main servers system, to link the Sudanese banks with SWIFT network.
- Offering the technical support for banks to enable them to communicate with terminals outside Sudan.
- Service of linking the banks with SWIFT network (messages).
- Service of communication through terminals.
- Reporting and archiving system.
- System of the prevent recurrence messages.
- Connect the SWIFT interface in the banking system.
- Local transfers.
- Settlements the account of senders.

2.3.2 National switch center

The company acts as national facilitator for enabling banks to efficiently do their transactions and provide electronic banking services and solutions. Specifically, these are services are provided to the banks:

- Manage and operating the main servers of the national switch for Automated Teller Machine (ATM), Point Of Sale (POS), and Short Message Service (SMS).
- Offering the technical support for the banks to enable them to manage their own ATM.
- Linking and testing the interface for banks / and switches.
- Serve of management for ATM and Card management System (CMS).
- Offering the necessary reports to Central Bank of Sudan (CBOS) for conduct clearance between banks, and offering reporting for banks to meet their needs.
- Customer Services for banks and cardholders.
- Offering a service for the resolution of disputes between banks.

The company is not only providing the services to the banks, but also to the cardholders. The following are provided to the cardholders and make at their convenience (Electronic Banking Services, 2014).

- Cash withdrawals
- Balance Inquiry.
- Mini statement
- Change Personal Identification Number (PIN).
- Account transfer.
- Card-less transfer.
- Value Added Services (VAS) (top-up, bill payment, and purchase electricity).

2.3.3 Electronic Cheque clearance service

The following services are provided with regard to electronic Cheque clearance(Electronic Banking Services, 2014):

- Offering the technical support that enables the banks to communicate terminal with branches.
- Collecting cheques from any bank window.

- Offering the necessary reports to Central Bank of Sudan (CBOS) and Banks.
- Archiving the data and copy of the cheques that have been exchanged via electronic clearing system.
- Service of the prompt collecting of cheques.
- Save and store the cheques that weren't the time to collection and send it automatically to collecting according to the maturity date.
- Contributing to develop the plans and implementation to deploy the electronic clearing system in all parts of Sudan.

2.3.4 Card personalization services

With regard to card personalization services, the company is providing to the banks the following services (Electronic Banking Services, 2014):

- Print the ore plastic cards for banks.
- Print the confidential numbers.
- Envelope for the personalized cards.
- Print the card numbers significantly at the diagnosis.
- Storage the cards that has been printed banks.
- Assist the banks to create and innovate new products based on the technology of cards.
- Diagnosis of the bank cards for banks' customer.
- Delivered the cards to banks.
- Electronic orders service, and directly through the bank branches.
- Cards management service, for the cards that have been captured from ATM.

2.3.5 Banking information network

The fifth major service provided the EBS is helping the banks with their information network (Electronic Banking Services, 2014). Specifically, the following aspects are addressed:

- Design and redesign for banking network.

- Issuance the standard setting to connecting the network sites with the wide network.
- Develop and auditing the insurance policy in collaboration with Central Bank Of Sudan (CBOS).
- Provide connectivity through banking network.
- Monitoring the sites that connected the network.
- The securing service for banking information network in accordance with international standards.
- Manage switches securing communications devices on banking network.
- Email system for the banking sector.
- Provide a secure and documented service for transactions that execute by banks via banking network
- Public Key Infrastructure projects.

2.3.6 Value added services

The company also provides several value added services short message services which enable the customer to follow the transactions made through bank card. Other services include POS service, ATM service as well as internet services mainly for electronic commerce (Electronic Banking Services, 2014).

2.3.7 Electronic banking

The banking industry is dramatically witnessing major changes in the delivery of financial services particularly through the internet, by reshaping the business environment and stimulating investments (Laukkanen, 2007). Electronic banking is a growing research area among disciplinary scholars. The term electronic has been used to encompass all types of banking channels and sometimes has been used to refer to online banking or internet banking as Karjaluoto, Mattila, and Pento (2002) argued, “the term electronic banking often refers to online

banking/Internet banking. However, electronic banking is an upper construct including also telephone banking, WAP-banking, as well as iNet-television banking" (p.261).

Internet banking and online banking has been interchangeably used to refer to the transactions performed by the consumers using computers and internet and it is one of the newest service delivery in the banking industry (Nasri, 2011) and the concept of internet banking has been described as a "modern innovative concept in the banking industry" (Ismail & Panni, 2009, p.42).

This kind of technology provides convenience to the consumers to perform their daily transactions and financial activities at their own convenience and without waiting long queues or waiting to hold for telephone banking service. They can do several activities using the internet and personal computers such as transferring funds, checking their account balance, bill payments, application for loans, information on accounts, trade stocks, and funds (Kesharwani & Bisht, 2012; Laukkanen, 2007; Nasri, 2011). It has been argued that banking industry is facing several challenges. Polatoglu and Ekin (2001) mentioned some of these challenges "facing from within the banking sector and especially from the non-banking financial services sector, banks are moving toward multi-channel banking services, providing innovative products, and offering wider choices with lower costs to customers (p.156).

There are several types of electronic banking, which has been in existence for almost three decades. As argued by Laukkanen (2007), early electronic banking services included Automated Teller Machines (ATMs), telephone banking as well as personal computers banking. More recently, scholars shifted their attention to the new information system and communication technologies particularly the internet, which provides the option for multiple service transaction, which can be easily conducted via the internet. Although mobile banking is the latest and newest technology in the banking industry, and it is in early infancy, the internet banking is predominantly shaping the industry in todays' daily transactions (Laukkanen, 2007).

Mobile banking, its history, developments and adoption by consumers will be discussed in detail in the next section under the heading of "mobile banking". However, here in this section, the researcher discusses mainly other types of electronic banking and their adoption in different contexts and settings.

Scholars and researchers have long time examined the adoption and acceptance of Internet banking or online banking(Aldás-Manzano, Lassala-Navarré, Ruiz-Mafé, & Sanz-Blas, 2009; Gerrard & Barton Cunningham, 2003; H. Bin Ismail & Panni, 2009; M. Ismail & Osman, 2012; Juwaheer, Pudaruth, & Ramdin, 2012; Karjaluoto et al., 2002; Kesharwani & Bisht, 2012; Laforet & Li, 2005; Lassar, Manolis, & Lassar, 2005; Laukkanen, 2007; Nasri, 2011; Polasik & Piotr Wisniewski, 2009; Polatoglu & Ekin, 2001; Sathye, 1999; Wan, Luk, & Chow, 2005), the acceptance and adoption of telephone banking(Al-Ashban& Burney, 2001; Moutinho & Smith, 2000; Peevers, Douglas, Marshall, & Jack, 2011; Wan et al., 2005), as well as scholars also investigated the consumers' adoption of ATMs (Olatokun & Igbinedion, 2009; Rugimbana & Iversen, 1994; Rugimbana, 1995). It is noteworthy, that these studies were conducted in different cultures and countries such as Turkey, Malaysia, China, Hong Kong, Singapore, Sudan, Tunisia, Mauritius, Saudi Arabia Australia, United Kingdom, United Statesof America, Spain, Finland, and Poland. Table 2.2 provides detailed information about these studies on electronic banking adoption.

Internet banking has been predicted to be widely accepted by banks and customers with higher level of technology acceptance attitude and can easily understand more complex products(Polatoglu& Ekin, 2001). Banks are providing multi-channel services, driven by the intense competition among the banks towards attracting more customers to their services and increase their profits by minimizing their costs as well.

Polatoglu and Ekin (2001) conducted an empirical study using survey method to investigate internet banking adoption among randomly selected Turkish respondents, and using

services provided by one Turkish bank. Their study suggested that early adopters of internet banking were more satisfied than the late adopters in terms of reliability, security and privacy dimensions of service quality. This is because “they had been using the service for the longest time without any reliability problem; they tended to report higher satisfaction”. The internet banking acceptance among Turkish consumers (Polatoglu & Ekin, 2001)has been found to be relative advantage, observability, trialability, complexity, compatibility, perceived risk, and marketing effort.

Using a convenient sampling and employing theory of diffusion of innovations as theoretical guidance, Ismail and Panni (2009) found that customer retention among Malaysian internet banking users were found to be influenced by innovation characteristics such as relative advantage, compatibility, trialability, observability, and complexity. The respondents of this study felt that internet banking is more complex which negatively influenced their intention to continue with the service.

Drawing on a qualitative in-depth interview with experienced internet users from Finland, Laukkanen (2007), conducted a study to compare internet banking and mobile banking services provided by Finish banks. The study suggested that convenience, efficiency, safety were the most import factors differentiating the customers’ perceptions regarding internet and mobile banking, with strong preference for mobile banking mainly for its efficiency, convenience, and accessibility.

In the context of China, it has been found (Laforet & Li, 2005) that Chinese internet banking consumers were predominantly influenced by several factors such as perceived usefulness, associated easiness, associated risk, convenience, accessibility, awareness, and personal computer experiences. Security and associated risk was the most important factor that motivated the Chinese internet banking consumers to accept the service. It means that if they

rerceive that there is low level of risk associated with the service they are more likely to adopt and accept it.

Further, Internet banking customers in Tunisia were found to be influenced by convenience, prior internet knowledge, perceived risk, and security perception (Nasri, 2011). It has been found that convenience factor was a major driving motivator for early adopters of internet banking among Tunisia respondents. In India, internet banking behavioral intention (Kesharwani & Bisht, 2012) was found to be positively influenced by perceived usefulness and social influence whereas perceived risk negatively influenced the consumers' internet banking adoption behavior. Perceived risk was negatively determined by social influence, trust, and web design, with higher influence from the peers, higher level of trust, and good design for the website had led to lower level of perceived risk (Kesharwani & Bisht, 2012).

In Mauritius, it has been found (Juwaheer et al., 2012) that internet banking adoption has been mainly influenced perceived ease of use, perceived usefulness, attitude towards the service, awareness, income level, and education level.

Table 2.2: Factors influencing internet banking adoption

No.	Authors (year)	Type	Country	Sample size	Theory	DV	Remarks
1.	Rugimbana & Iversen (1994)	ATM	Australia	698	TDI	Adoption	Convenience, reliability, compatibility perceived risk, social cost, complexity, trialability, and observability
2.	Rugimbana (1995)	ATM	Australia		TDI	Adoption	Relative advantage, compatibility and complexity
3.	Sathye (1999)	Internet banking	Australia	589	Mixed	Adoption	Lack of awareness, security concerns were major obstacles for adopting internet banking
4.	Moutinho & Smith (2000)	Telephone banking	UK	250	Mixed	Loyalty	Customer switching behavior and customer perceived satisfaction with human tellers and automated tellers.
5.	Al-Ashban & Burney (2001)	Telephone banking	Saudi Arabia	128	General	Adoption	Demographic factors such as education level, income level and age groups.
6.	Polatoglu & Ekin (2001)	Internet banking	Turkey	114	Extended TDI	Adoption	Relative advantage, observability, trialability, complexity, compatibility, perceived risk, and marketing effort
7.	Karjaluoto et al. (2002)	Internet banking	Finland	1,167	Mixed	Adoption	Prior computer experience, personal banking experience, reference group influence, and attitude towards internet banking
8.	Bradley & Stewart (2002)	Internet banking	Ireland & USA	71	Mixed	Adoption by banks	Competition, industry adoption, low risk, enhanced ability to deal with customers, availability of technology, and suitability of online facilities to banking.
9.	Gerrard & Barton Cunningham (2003)	Internet banking	Singapore	240	Extended TDI	Adoption	Accessibility, confidentiality, convenience, complexity, compatibility, competence, economic benefit, social desirability, and innovativeness
10.	(Akinci, Aksoy, & Atilgan, 2004)	Internet banking	Turkey	140	General	Adoption	Security of the website, reliability of the bank, privacy, transaction speed, user friendly, service variety, and innovativeness.

11.	Laforet & Li (2005)	Internet banking	China	128	Mixed	Adoption	perceived usefulness, associated easiness, associated risk, convenience, accessibility, awareness, and personal computer experiences
12.	Lassar et al. (2005)	Online banking	USA	349	Extended TAM	Adoption	Perceived usefulness, perceived ease of use, attitude, self-efficacy of web use intensity, utilitarian-web based use, and income.
13.	Wan et al. (2005)	Internet banking	Hong Kong	314	Mixed	Adoption	Convenience, informativeness, user-friendliness, and assurance
14.	Laukkanen (2007)	Internet banking	USA	Interview	Means-end	Adoption	Convenience, efficiency, and safety
15.	Aldás-Manzano et al. (2009)	Internet banking	Spain	511	Extended TAM	Adoption	Perceived usefulness, and perceived risk dimensions such as performance risk, social risk, privacy risk, and security risk
16.	H. Ismail & Panni, (2009)	Internet banking	Malaysia	300	TDI	Retention	Relative advantages, compatibility, trialability, observability, and complexity
17.	Olatokun & Igbinedion (2009)	ATM	Nigeria	428	TDI	Adoption	Relative advantages, compatibility, trialability, observability, and complexity
18.	Polasik & Wisniewski, (2009)	Internet banking	Poland	3,519	Mixed	Adoption	Perceived security, exposure to marketing campaigns, internet experience, experience with other banking products, place of living, education level, and age groups.
19.	Nasri (2011)	Internet banking	Tunisia	253	Mixed	Adoption	Perceived risk, perceived security, convenience, and prior internet knowledge
20.	M. Ismail & Osman, (2012)	E-banking	Sudan	269	Mixed	Adoption	Frequent breakdown of ATM, inconvenience locations of EPOS, inaccessible internet, inconvenience locations of ATMs, risk associated with e-banking, etc.
21.	Juwaheer et al. (2012)	Internet banking	Mauritius	384	Extended TAM	Adoption	Perceived usefulness, perceived ease of use, trust, security, income and education level
22.	Kesharwani & Bisht, (2012)	Internet banking	India	619	Extended TAM	Adoption	Perceived usefulness, trust and social influence.

2.4 Mobile banking

2.4.1 Definition, Benefits and History of Mobile Banking:

The banking industry is undergoing a dramatic transformations and changes in line with the new information and communication technologies. The new products, new services, new players, new mechanisms, new channels are the symptoms of these transformations, which impacting all sectors of the banking industry (Khraim et al., 2011). The todays' technology is considered as a major player in this transformation process, where the geographical, legal and industrial barriers can be overcome; it also shaping the business environment where multiple electronic channels has made it possible to provide new kinds of added value for customers (Anderson, 2010; Khraim et al., 2011; Laukkanen, 2007).One of the latest developments and advances technologies is providing the banking services through mobile or cell phones.

Mobile banking, or m-banking, refers to technologies and devices for providing financial transactions to consumers, and include transferring funds, bill payments, third party payments, checking account balances, SMS bundles, air ticket payments, accessing their other financial information, products, and services using their mobile phone anywhere at any time for their convenience(F. Bankole et al., 2011; Chitungo & Munongo, 2013; Harma & Dubey, 2009; ITU, 2014). Mobile banking innovation usage is increasing becoming today popular among various segments of world populations. It has huge positive impact on the lives of ordinary more than the other technologies involved in their daily lives(Agwu& Carter, 2014). According to Cruz et al. (2010), mobile banking or handled devices through cellphones can be found in several forms such as standard or normal mobile phones, smartphones, personal digital assistants (PDAs), pocket PCs, tablet PCs, or multimedia readers with wireless.

With the rapid technological advancements, mobile banking is considered the latest approaches which allows providing financial services and products, which is made available by information and communication technologies (ICTs) as well as made available by the

extensive and widespread usage of mobile phone devices among world populations, particularly in low income countries including Sudan, Kenya, Malaysia, The Philippines, South Africa, etc.This allows bringing together mobile handset users with other mobile users and commercial partners (Anderson, 2010; Daud et al., 2011). It has been argued that the infrastructure of mobile banking is the same with ATM solutions; however, mobile banking is tremendously easy and inexpensive to perform and implement it and it has low cost of operation as compared to the ATMs (Harma & Dubey, 2009).

The mobile banking technology is overwhelmingly becoming increasingly sophisticated, slimmer and multifunction; it allows making several functions such as communication, connecting to the internet and obtaining information related to services and products (Dineshwar & Steven, 2013). It has the potential to narrow the gap between rich and poor segments, by allowing the unbanked population to get basic financial transactions such as transferring balances and managing their own account (Anderson, 2010; Cruz et al., 2010; Tobbin, 2012). It is predicted a positive impact of mobile banking technology on the society's daily life activities and financial services; however, there are still some challenges from the perspective of consumers' perceptions, which need to be addressed and overcome (Laukkanen & Kiviniemi, 2010).

Mobile banking is defined as "a channel whereby the consumer interacts with a bank via a mobile device, such as a mobile phone or personal digital assistant. In that sense, it can be seen as a subset of electronic banking and an extension of internet banking with its own unique characteristics" (Laukkanen & Pasanen, 2008, p.87). It is also defined as"a mobile banking is defined as banking transactions using mobile devices such as cellphones, PDAs (Personal Digital Assistants), smart phones and other devices (except for laptops). It can be considered a type of Internet banking because it requires Internet access"(KC Lee & Chung, 2009).In another study it was defined as "an interaction in which a customer is connected to a

bank via a mobile device such as cell phone, smartphone or personal digital assistant (PDA) (Laukkanen & Kiviniemi, 2010, p.373). it is also an is an innovative method for accessing banking services via a channel whereby the customer interacts with a bank via a mobile device (e.g., mobile phone or personal digital assistant) (Luo et al., 2010).

It has been recently argued that there is difference between the adoption of mobile banking and electronic banking, which refers to non-mobile internet banking (H.-F. Lin, 2013). The author argues that the difference lies at least in two ways. First, electronic banking is Internet-based customer access to banking services, while m-banking is mobile phone based customer access to banking services. Second, the difference lies in the pace and speed of evolution, where mobile banking is evolving much faster than the electronic banking.

Mobile banking has been reported to provide several benefits and opportunities to both consumers and bank. For consumers, they can send and receive money through their mobile phone devices, request their account balance and latest updates, receive message about their financial accounts, instructions and access points(Aboelmaged& Gebba, 2013; Cheng, Jong, Chen, & Chen, 2013; Harma & Dubey, 2009; Laukkanen & Kiviniemi, 2010). This is facilitated by "the ease of use of mobile banking since the availability of the system whenever they need it will increase their intention to adopt the system and become their preference as compared to the traditional banking system" (Daud et al., 2011, p.252). moreover, it has also several other benefits for the consumers such as lower transaction cost, higher accessibility, faster transaction processing, high adoption, higher volume of transactions, and larger client base (Thulani & Kosmas, 2011).

Mobile banking allows customers to carry out other financial services such as balance enquiries, interest rate enquiries, payment of bills, internet shopping, transfer to other accounts and password change (Laukkanen, 2007).The amount of data processing and operational performance need in mobile banking technology is much easier for the customer

(Laukkanenand Lauronen, 2005, cited in Aboelmaged & Gebba, 2013). In general, mobile accounting, mobile brokerage and mobile financial information services are the three major classifications of mobile banking operations (Cruz et al., 2010).

Using mobile banking technology allows performing a range of financial activities through individual and business levels. These activities include "micropayments to merchants, bill-payments to utilities, person to person (P2P) transfers, business to business (B2B) transfers, business to person (B2P) transfers and long-distance remittances" (Chitungo & Munongo, 2013, p.52). Mobile banking is not only advantageous to the customers, but also to the service providers (banks) in several ways. First, the cost investment in the technology of mobile phone is lower than many technologies used in the banking industry(Mashagba& Nassar, 2012). This means that no major infrastructure is needed as mobile phone is already embedded in the customers' daily life activities. Second, it allows for the bank to reach a large segments of populations overcoming the limitation of the technologies (Laukkanen, 2007). Third, its operation and maintenance is cost is minimal as compared to other technologies adopted by the bank (Laukkanen, 2007; Mashagba & Nassar, 2012). Fourth, this technology (mobile banking) allows the bank to provide to the customers a service with high level of security as it is a major concern for the consumers (Laukkanen, 2007). Finally, the technology allows for the service provider to improve the quality of the service (Mashagba & Nassar, 2012).

2.4.2 Challenges and barriers of using Mobile Banking:

Mobile banking adoption particularly in developing nations is still in its infancy and initial stage (Al-Jabri & Sohail, 2012; O. Bankole & Cloete, 2011; Laukkanen, 2007). However, there are several challenges which have been reported to be the barrier for the adoption of the services among various populations.

Laforet and Li (2005) explained the barriers challenging Chinese consumers for adopting mobile banking technologies. They found several challenges namely lack of

awareness and knowledge of existence of such services, perceptions of security, associated risks with financial transactions, awareness, as well as computer technological skills. In another study (Agwu & Carter, 2014), it has been reported that the economic state and widespread unemployment rate are some reasons for not adopting mobile banking in Nigeria, where the authors argue that lack of employment, which mean no money to deposit or use, leads to non-usage of the services. Moreover, the authors argued that lack of telecommunication infrastructure and lack of required skills, widespread poverty are among majority of the Nigerian population.

Several studies (Brown et al., 2003; Dineshwar & Steven, 2013; Harma & Dubey, 2009; Laukkanen & Kiviniemi, 2010; H.-F. Lin, 2011; Luarn & Lin, 2005; Wonglimpiyarat, 2014)have reported that perceived security, associated risk, lack of reliability, and the high cost are barriers for adoption mobile banking technology among consumers in Nigeria, India, South Africa, Taiwan, China,Thailand,Portugaland Finland.Moreover,O. Bankole and Cloete (2011)suggested that mobile banking has not been fully utilized for its potential in Nigeria and South Africa. However, the latter country's consumers prefer to perform their financial transactions from their home computers, which they feel safer than performing on the mobile phone, although the technological platforms for using various mobile banking services is available in the country. In the context of Nigeria, the elderly consumers prefer to visit the bank branches when it comes to performing financial transaction, which the authors claim that this supports the social support theory (Agwu & Carter, 2014). In the context of Zimbabwe (Chitungo & Munongo, 2013), it has been reported that lack of awareness and knowledge is a major barrier among rural communities. They had no knowledge about existence of such mobile banking services.

KC Lee and Chung (2009) stated that lack of trust is a major barrier of not adopting mobile banking technology in the context of South Korea, and significantly affects the

consumers' satisfaction with the service. This is supported by the findings of Kim, Shin, and Lee (2009), who found that initial trust of the consumers significantly determine their usage and adoption of the technology. They developed the initial trust models, where the trust is determined by relative benefits of mobile banking, personal propensity to trust, structural assurance in mobile banking, and firm reputation. In turn, the initial trust will determine the usage intention of the consumers to adopt the mobile banking service.

Laukkanen and Kiviniemi (2010) suggested the existence of several barriers related to the banking approaches towards the consumers. The barriers are risk barrier, usage barrier, image barrier, tradition barrier, and value barrier, where all of these significantly and negatively impacted by the information and guidance offered by the bank. The more the information and guidance is offered or available to consumers, the lower these risks will be. It means that the level of information provided by the banks significantly decreases the usage, value, tradition, risk and image barriers associated with the consumers' perceptions.

2.4.3 Mobile banking in Asia/Australia

Several researchers from various countries in Asian and Australian continents had been conducting empirical studies about the current status of adoption or the possibility of adoption among various segments of the society. Mobile phone adoption and acceptance has been examined in various countries such as China, Taiwan, South Korea, Malaysia, Singapore, India, Pakistan, Iran, Australia, Saudi Arabia, Jordan, and United Arab Emirates.

Several researchers investigated the adoption and acceptance of mobile banking technology among Chinese consumers, using various constructs derived from different information system theories and models(Laforet& Li, 2005; Liu et al., 2009; Min et al., 2011; Zhou, Lu, & Wang, 2010; Zhou, 2011, 2012). Drawing on a sample size of 128 respondents selected from six major cities in China, Laforet and Li (2005)found that the most prevalent barriers towards adopting mobile banking among Chinese consumers are lack of awareness and

lack of understanding the potential benefits for adopting this technology, as well as prior experience with computers and new technology significantly determined their adoption of mobile banking. Complementary to this, Liu et al. (2009) found that intention to adopt mobile banking is major impacted directly by perceived usefulness and trust, while trust dimension such as trust in technology, trust in vendors and structural assurance significantly and indirectly affect the Chinese consumers' behavioral intention.

By integrating elements from TAM model and diffusion of innovation theory (DIT), Min et al. (2011) examined the influential factors for adopting mobile banking in China and found that perceived usefulness, perceived ease of use, compatibility and perceived risk were major determinants of behavioral intention of mobile banking acceptance. Similarly, (Zhou et al., 2010) integrated the Unified theory of acceptance and use of technology (UTAUT) and Task Technology Fit (TTF) model to investigate the mobile banking adoption in China. Their study suggested that task technology fit, social influence, performance expectancy, and facilitating conditions had positive impact on users' adoption of the service.

Based on initial trust model and information success model, Zhou (2011)concluded that usage intention is mainly determined by initial trust and perceived usefulness, and indirectly affected by information quality, system quality, structural assurance and trust propensity among Chinese customers. In other study in the context of China conducted byZhou (2012) asserted that trust and follow experience had significant impact on users' intention to adopt mobile banking technology. Overall, it can be concluded from the above-mentioned studies that Chinese consumers are mainly driven by trust element for adopting this technology.

In the context of Taiwan, Luarn and Lin (2005)assessed the customers' behavioral intention to use mobile banking service in the country, based on extended TAM. The authors found that the intention is positively related to perceived usefulness, perceived ease of use, perceived credibility, and perceived self-efficacy, while it is negatively related to perceived

financial cost. Recently, Lin (2011) conducted an empirical study to assess the direct and indirect determinants of mobile banking adoption among various segments in the society, based on the innovation diffusion theory and knowledge-based trust perspectives. Obtaining 368 respondents,Lin (2011)found that behavioral intention to adopt mobile banking technology among Taiwanese consumers is directly determined by the consumers' attitude towards the technology and indirectly by knowledge-based trust elements such as perceived competence, perceived benevolence, and perceived integrity as well as innovation attributes such as perceived relative advantage, perceived ease of use and perceived compatibility. As demonstrated by the above studies, trust again is a prevent factor driving the consumers in Taiwan.

Building on extended TAM model, KS Lee et al. (2007)identified several factors impacting the usage and adoption level of mobile banking among Korean customers. Their study revealed that the adoption is significantly and positively predicted by two factors namely perceived usefulness and trust elements such trust in the bank, telecom, and wireless service, whereas perceived risk was related to the adoption, which indicates that the Korean consumers had no risk perception in their adoption of the technology. However, it had indirect effect on the adoption through trust. Similarly, in a later study, it has been found that initial trust and relative benefits were major factors influencing usage intentions of mobile banking among Korean consumers. It is also suggested in this study that firm reputation has nothing to do with the consumers'' usage intentions(G. Kim et al., 2009).

Gu et al.'s (2009) study was based on several theories and models in information systems literature to assess the users' behavioral intention to adopt mobile banking technology in South Korea. They found three major factors influencing the usage intention for adopting the technology namely perceived ease of use, perceived usefulness and perceived trust. However, each of these factors was determined by several other factors, which also carry an effect on the

usage intention. For example, perceived usefulness is negatively affected by social influence and positively by system quality and perceives ease of use. Trust factor was positively impacted by calculative-based trust, structural assurance, and situational normality, but not perceive ease of use and familiarity with the bank. While perceived ease of use was determined by self-efficacy, facilitating conditions, and situational normality; however, familiarity with the bank has nothing to do with this factor. In the area of customer satisfaction with mobile banking services, it has been reported the satisfaction is determined by information quality, system quality and trust, and indirectly through trust factor (KC Lee & Chung, 2009).

The key aspects discussed in the context of Southeast nations such as Malaysia and Singapore includesthe ways consumers adopt mobile banking technologies and the factors motivating them to do so. As it shown in Sulaiman et al.'s (2007) study, the demographics factors such as age, gender, personal income, and educational background, as well as personal innovativeness were found to be driving factors for adopting mobile banking among Malaysian consumers. Moreover, numerous studies conducted by Amin and colleagues in the context of Malaysia had reported perceived usefulness, perceived ease of use, perceived credibility, perceived enjoyment, perceived self-efficacy, subjective norms, attitude, security and privacy concern to be determinants of behavioral intention to adopt mobile banking among Malaysians (Amin et al., 2007, 2012; Amin & Ramayah, 2010).

Based on extend TAM, Daud et al. (2011) claimed that mobile banking adoption in Malaysia significantly and positively predicted by perceived usefulness, perceived credibility, and perceived awareness. However, it is reported in this study that perceived ease of use and perceived risk were not predicting the consumers' adoption of the technology. In a more recently study, which is also based on extended TAM(Shanmugam et al., 2014), it has been suggested that perceived usefulness and attitude towards mobile banking significantly determined the adoption of the service among Malaysian consumers. However, there were

other indirect determinants of mobile banking adoption through the attitude factor;these included perceived ease of use, perceived usefulness, perceived benefit, perceived financial cost, and perceived credibility. Conversely, in the context of Singapore, it has been demonstrated by the users of mobile banking that their adoption is not only determined by usefulness, but also the subjective norms (similar with social influence) and perceived risk, which resulted a negative impact on the users' adoption level(Riquelme& Rios, 2010).

Likewise, perceived usefulness, perceived ease of use, perceived risk, and consumer awareness were reported to be major determinants of mobile banking adoption in a developing country in South Asia (India) (Safeena et al., 2012). They concluded that security and risk (two dimensions of perceived risk) are main reasons that inhibit the adoption of the technology. Consumers do not adopt the technology until they assured there is no risk associated with its usage. In a conceptual paper, Nayak, Nath,and Goel (2014)suggested for the policy makers and service providers in India to consider several factors when it comes to mobile banking adoption among the consumers. Among these factors are awareness, perceived ease of use, perceived usefulness, trust and perceived cost.This is in line with the suggestions and findings byMishra and Bisht (2013). They suggested for service providers to follow "a joint bank–telecom led mobile banking model" (p.503), which they see as suitable for the context of Indian consumers.

Extending TAM with elements of risk, trust and group reference influence, Kazi and Mannan (2013) examined influential factors for adopting mobile banking from the perspective of Pakistani consumers. Their study demonstrated that perceived ease of use, perceived usefulness, and social influence had positively contributed towards mobile banking intention to adopt among the consumers, while perceived risk negatively contributed to it, indicating that the lower their perception of the risk, the higher the level of adoption. On the other hand, drawing on 520 samples from major cities in Pakistan and building on service quality theory, F. Ali and Zhou (2013)found that the customers had higher perception about the quality of the

service provided by mobile banking providers, as well as they noticed a difference between users of Islamic banks and conventional banks, where users of Islamic banks perceived higher perception about assurance dimension more than their counterparts. Notwithstanding, another study (Saleem & Rashid, 2011), focusing on the customer satisfaction among Pakistani mobile banking users, asserted that organizational mobile banking factors such as organizational factors, technological factors, strategic factors, functional factors, and economic factors significantly influenced the users' satisfaction with the service. It is noticed in this study that economic factors are negatively contributed to satisfaction among the users.

In the context of middle east nations, several researchers (Aboelmaged & Gebba, 2013; Al-Jabri & Sohail, 2012; Ghalandari et al., 2013; Hanafizadeh et al., 2014; Khraim et al., 2011; Mashagba & Nassar, 2012) had reported several influential factors which are driving the consumers in these countries to adopt and integrate mobile banking technology in their daily life activities. Integrating TAM with Theory of Reasoned Action (TRA), Aboelmaged and Gebba (2013) found that attitude and subjective norms significantly contributed to the perceptions of Emirati consumers towards mobile banking adoption. Surprisingly, perceived usefulness and behavioral control did not contribute to the adoption. However, this variable only contributed to the attitude towards the technology. In contrast, considerable usefulness (similar with perceived usefulness) were reported to be significant predictor of mobile banking adoption among Iranian consumers, along with social risk, performance risk, and considerable benefits (Ghalandari et al., 2013).

Furthermore, building on extended TAM, Hanafizadeh et al. (2014)suggested that mobile banking adoption among Iranian customers is not only determined by perception of usefulness and ease of use, but there are other important factors influencing them. Among these factors need for interaction, perceived risk, and perceived cost, which are negatively contributed, while trust, credibility and compatibility with lifestyle and needswere found to be

positive predictors towards the adoption of the technology. Other studies in the context of Saudi Arabia and Jordan (Al-Jabri & Sohail, 2012; Khraim et al., 2011), it has been found that mobile adoption in these countries is determined by several factors. In Saudi Arabia (Al-Jabri & Sohail, 2012), it was reported that mobile banking adoption is influenced by relative advantage, compatibility, observability and perceived risk, while complexity and trialability did not contribute to the adoption. This is in contrast to findings by Khraim et al. (2011)in Jordan context, who found similar factors in the context of Saudi Arabia (such as relative advantage, perceived risk, compatibility), but also reported that compatibility and trialability are predictors of mobile banking adoption in Jordan along with self-efficacy factor.

From different theoretical underpins, Mashagba and Nassar (2012)reported numerous factors affecting mobile banking adoption in Jordan based on an extended UTAUT model. The study claimed that performance expectancy, effort expectancy, social influence, facilitating conditions, security issues, design issues, and reliability were determinants of behavioral intention to adopt mobile banking service among the consumers. Moreover, the study also reported that the impact of performance expectancy was moderated by education and experience factors.

Finally, a recent study from the perspective of Australia is conducted by Wessels and Drennan (2010), based on an extended TAM with additional elements from other literatures. Their study described that mobile banking adoption and acceptance among Australian consumers was predominantly determined by perceived usefulness, perceived cost, and compatibility factors, whereas attitude towards mobile banking was influenced by perceived usefulness, perceived risk, perceived cost and compatibility factors.

In a summary, the review of available studies conducted in the continents of Asia and Australia suggested that China has the highest number of studies examining the state of mobile banking adoption and its determinants, followed by South Korea. There were few studies

conducted particularly in the context of Australia and Middle East countries. Several theories and model had been applied to examine the adoption of mobile banking in these countries. The prominent models included TAM, IDT, and UTAUT.

2.4.4 Mobile banking in Europe/America

Numerous studies had been conducted to investigate the motivating factors for the adoption of mobile banking technology in a number of countries in the European and American continents. These countries include Turkey, Portugal, Finland, Germany, Brazil, and United States of America. The author of this thesis will conduct a quick review on influential factors in each country, and highlighting similarities and differences.

Based on the responses obtained from 435 university students from Turkey, Akturan and Tezcan (2012)developed an extended TAM model to empirically test it among prospect users of mobile phone banking by predicting their likelihood of intention to use the technology in the near future. Their study suggested that intention to adopt mobile banking is only determined by attitude towards the technology, whereas perceived usefulness has no direct effect on behavioral intention. Further, the study reported that attitude towards the technology was significant and positively related to perceived usefulness, perceived social risk, perceived benefit and perceived performance risk. The authors did not report whether these variables had indirect or mediating effect on intention through the mediator of attitude.

Cruz et al. (2010)analyzed the reasons for not adopting mobile banking among Brazilian internet banking users. With a large sample size of 3,585 respondents, concluded that the major reasons for not using mobile banking were perceptions of cost, associated risk, low perceived relative advantage, and complexity. These factors had led to the rejection of the technology usage by the consumers. In contrast to this, Püschel et al. (2010) reported that perceived behavioral control, attitude and subjective norms significantly and positively predicted intention to adopt mobile banking among Brazilian consumers. However, attitude is

explained by several factors including perceived ease of use, relative advantages, visibility, compatibility, image, trialability, and results demonstrability.

In the context of Germany, Koenig-Lewis et al. (2010) investigated the predicting variables on behavioral intention to adopt mobile banking in Germany, and built their model on several elements from existing information system theories and models. Based on their findings, the authors concluded that the major predictors of mobile banking intention to adopt among the consumers are perceived usefulness, compatibility and perceived risk. It is notable in this study that credibility, trust, perceived cost, and perceived ease of use did not predict at all the behavioral intention. In the same context, another study (Schierz et al., 2010) suggested that behavioral intention is significantly predicted by three main factors namely perceived compatibility, individual mobility, and attitude towards mobile banking. The latter factor (attitude), which acted as a mediator variable in the model was found to be predicted by perceived compatibility, perceived security, perceived usefulness, perceived ease of use, and individual mobility.

Integrating Unified Theory of Acceptance and usage of technology, initial trust model and Task Technology Fit, Oliveira et al. (2014)tested an empirical model based on responses obtained from 194 sample selected from bank customers in Portugal. The study suggested that behavioral intention to adopt mobile banking is mainly determined by only two variables namely performance expectancy and initial trust. However, actual usage was significantly influenced by behavioral intention and facilitation conditions. Task technology fit and firm reputation were not contributors at all in the model. In a cross-cultural study based on the culture dimensions, Laukkanen and Cruz (2012) collected responses from 3,582 respondents from bank customers in Portugal and Finland and found that national culture in mobile bank adoption was significantly determined by individualism, long term orientation, and masculinity, along with demographic factors such as gender, previous mobile service

experience, and type of mobile devise. In another study in the context of Finland examined demographic factors' influence on mobile banking adoption and found that only gender and age were predictors of mobile banking technology adoption, indicating that males and older people are using the service more than the females and younger ones(Laukkanen & Pasanen, 2008).

Lastly, establishing on information system theories, Luo et al. (2010)investigated the influential factors on behavioral intention to adopt mobile banking technology among undergraduate student volunteers from USA, resulting a sample size of 122 respondents. Luo et al.'s (2010) study demonstrated that behavioral intention was significantly affected by performance expectancy, disposition to trust, perceived risk, and self-efficacy.

In a brief, few studies has been conducted from the perspective of developed countries when it comes to mobile banking adoption and numerous factors have been highlighted by the studies from various countries in Europe and American continents.

2.4.5 Mobile banking in Africa

A quite good number of studies have been conducted looking at the mobile banking adoption and acceptance from the perspective of various countries in African continent. Among the countries, whose studies are available to the author of this thesis, are Ghana, Nigeria, South Africa, Zimbabwe, Mauritius, Somalia, and Sudan.

from the perspective of Ghana, using a convenient sampling with student population in Ghana with a total of 189 respondents, Iddris (2013) identified several barriers and challenges facing the consumers towards adopting mobile banking in the country. The study demonstrated that lack of information, lack of awareness, additional banking charges, complexity, having no bank account, poor telecommunication network, consumer preference for traditional means of banking instead of mobile enabled banking services lack of required knowledge and skills are among numerous barriers perceived by the respondents of Iddris's (2013) study. The results of

the study also demonstrated that majority of the respondents were not subscribing to any mobile banking service.

In their study about the adoption factors motivating Ghanaian respondents, Crabbe, Standing, Standing, and Karjaluoto (2009)acknowledged that social and cultural factors had significant impact on the adoption of mobile banking technology. Drawing on a sample of 271 consumers in Ghana, Crabbe et al.'s (2009) study revealed that demographic factors (gender and education), facilitating conditions, perceived credibility, and perceived elitisation had significant positive impact on the consumers' adoption of mobile banking. Interestingly, the study reports different factors for users and non-users. The latter group were negatively impacted by elitisation of technology and services, while it asserted a positive impact on the users' group.

Tobbin and Kuwornu (2011)investigated the factors that influence the consumers of mobile banking in Ghana from the perspective of diffusion of innovation theory and technology acceptance model. Obtaining a sample size of 288 users, their study found that the behavioral intention to adopt mobile banking is positively influenced by perceived usefulness, perceived ease of use, trialability, and perceived trust, while perceived risk was not a predictor of adoption among the respondents. Moreover, the study suggested that relative advantage and perceived ease of use acted as antecedents for perceived usefulness.

Using a qualitative approach with a focus group discussion, Tobbin (2012)investigated the rural unbanked consumers' intention to adopt mobile banking technology in Ghana. The study exhibited that consumers' intention is predominantly influenced by several factors including perceived usefulness, perceived ease of use, economic factors and perceived trust. The author argued that the discovered constructs in the model has some limitations as the qualitative approach could not provide a way to statistically test the construct.

Drawing on the cultural dimensions and the unified theory of acceptance and use of technology perspectives, F. Bankole et al. (2011)demonstrated that mobile banking adoption among Nigerian consumers were mainly determined by three main variables namely utility expectancy, effort expectancy, and power distance. However, trust and privacy, and social factors did not contribute to the consumers' intention to adopt the technology. In addition, there were several antecedents for the predictors of behavioral intention. These are cultural dimensions such individualism uncertainty avoidance, masculinity/femininity as well as users' satisfaction with the technology.

In contrast, a recent study (Agwu & Carter, 2014) using unstructured interviews with bank staff, customers, and students, revealed that the major factors contributing to the consumers' intention to adopt mobile banking in Nigeria were found to be awareness, convenience, portability and maintenance, security, reduced cost, and availability option or possibility of converting air time to cash. The study also highlighted several challenges exist when it comes to mobile banking adoption namely economic and technological factors, skills and knowledge, age, education, occupation, and poverty.

In a cross-cultural setting, O. Bankole and Cloete (2011)conducted a cross-cultural study to compare the influential factors driving the Nigerian and South African consumers' intention to adopt mobile banking. Collecting 220 south African and 231 Nigerian samples, the study revealed that the consumers' intention to adopt the technology was influenced by perceived security risk, speed of the transactions, and trust among Nigerian consumers, whereas trust, utility services, usefulness, social factors, and user's satisfaction were predictors of south African consumers' intention.

In South Africa, Brown and colleagues (Brown et al., 2003) investigated the underlying factors for the consumers' intention to adopt mobile banking technology, based on the diffusion of innovation theory. Using a total of 162 respondents who were selected from mall and

shopping centers, their study has revealed that relative advantage, consumer's needs for operating from a mobile phone, and trialability exerted significant influence on the users' intentions towards adopting the technology. On the other hand, the study suggested that self-efficacy, compatibility, complexity, prior experience, and facilitating conditions had no influence on the users' intention. Brown et al. (2003, p.391) justified these non-significant factors due "to the fact that very few have actually used the service, and thus may not be able to unambiguously develop perceptions of whether this technology would be compatible with their lifestyle, whether facilitated support for its use would be necessary, whether they would have the confidence to use it, and whether it would be difficult to use".

Recent studies in the context of South Africa also asserted a low level of mobile banking adoption (Raleting & Nel, 2011; Shambare, 2013). Drawing on 465 samples of low-income non-users, Raleting and Nel (2011) found that perceived usefulness and perceived ease of use were predictors of the non-users' attitudes towards the mobile banking technology, while facilitating conditions, self-efficacy, and perceived cost were major antecedents of these two factors. Moreover, Shambare's (2013) study, which was to investigate the influential factors of adopting mobile banking among university students, suggested that complexity, relative advantage, self-efficacy as being the most influential factors determining the students' intention to adopt the technology.

In the context of Zimbabwe, Marumbwa and Mutsikiwa (2013) investigated mobile money transfer adoption and acceptance among consumers establishing on the rigorous models in the information system field namely technology acceptance model and diffusion of innovation theory. The study revealed that perceived ease of use, perceived usefulness, perceived trust, and perceived relative advantage were positive predictors of the consumers' intention towards adopting mobile money transfer. In contrast, Thulani and Kosmas (2011) found two major factors determining the adoption of mobile banking technology among users

in Zimbabwe, namely accessibility and affordability, which are similar to perceived cost and perceived ease of use. Further, their study also suggested that the consumers reported several benefits for the SMS banking or mobile banking. These include lower transaction cost, higher accessibility, faster transaction processing, high adoption, higher volume of transactions, and larger client base. Finally, the authors concluded that the mobile banking adoption is its early stage, though it has been launched almost 10 years ago, arguing also that "Lack of regulation for electronic banking in Zimbabwe remains a setback for mobile banking, it needs to be addressed to ensure customer trust and to make it more effective" (p.13).

A study conducted by Dineshwar and Steven (2013)examined the factors motivating mobile banking adoption and acceptance among Mauritius consumers, establishing on TAM model and IDT theory. Drawing on a total of 169 who were selected through online survey, the authors identified that privacy, conveniences, time and effort savings, compatibility with lifestyle and banking needs, and ubiquitous access to banking services as major driving factors for the adoption of mobile banking technology among the consumers. Dineshwar and Steven's (2013) study also suggested that reliability and perceived security risk as two main barriers for the adoption.

In Somalia, few studies conducted to examine the underlying factors of the newly launched mobile money transfer technologies in the country, based on the perspectives of extended TAM model (A. Y. S. Ali & Dhaha, 2014; Sayid et al., 2012). Drawing on a sample size of 100 customers and establishing on extended TAM, Sayid et al. (2012)found that Somali consumers' intention was positively influenced by perceived usefulness and social influence, while the consumers' attitude was determined by perceived usefulness and security. In a more recent study (A. Y. S. Ali & Dhaha, 2014) concluded that Somali students' behavioral intention to adopt mobile money was significantly determined by three main perceptions, namely

perceived usefulness, perceived ease of use, and perceived trust, while perceived risk was not a contributor towards students' intention.

Finally, few studies have been conducted about the influential factors behind the consumers' intention to adopt mobile banking in Sudan (M. Ismail & Osman, 2012; Karma et al., 2014; Tingari & Mahmoud, 2014). Based on an extended TAM, Karma et al. (2014)found that driving factors for the adoption of mobile banking in the country are perceived ease of use and perceived trust. In addition, this study suggested no significant influence of perceived usefulness, which in line with some previous studies in Malaysia, Turkey, and United Arab Emirates(Aboelmaged& Gebba, 2013; Akturan & Tezcan, 2012; Amin et al., 2012), as well as perceived risk was not predictor, which supports the findings of previous studies in Malaysia, Korea, and Ghana(Daud et al., 2011; KS Lee et al., 2007; Tobbin & Kuwornu, 2011).

Based on descriptive questions, Tingari and Mahmoud (2014) identified several benefiting factors for both the consumers and service providers including interactive browsing, improvement on customer service, customer retention and attracting new users. The study also reported that the risk associated with using the technology, lack of awareness, poor network, and lack of managerial strategies were perceived to be some challenges facing the adoption of mobile banking.

In contrast, a recent study by (M. Ismail & Osman, 2012), which investigated various electronic banking technologies, revealed that the most popular electronic banking channel was ATMs, followed by phone banking. Mobile banking was ranked the third most popular channel for financial transactions among the consumers. Confusion about the usage of the term "e-banking" was noticed in this study as the authors failed to define clearly what constitutes the term what is not. An example, the authors are considering ATMs are part of electronic banking or e-banking; however, one of the factors affecting e-banking is "Frequent breakdown of ATMs" (p.12), which is not in agreement with the above consideration.

To summarize, it is clear from the above-mentioned review on related studies in the continent that there is scarcity and necessity for conducting further studies to empirically predict the mobile banking adoption factors. It is also evidenced here that there were few studies conducted in the context of Sudan; some of the studies were descriptive in nature and did not base their arguments on a conceptual or theoretical framework.

There is an urgent need from the policy and academic perspective to explore the driving factors for the consumers' intention to adopt mobile banking in the country. The adoption rate is low as there are currently two banks which provide the mobile banking service. It is expected more banks to offer the service if they can get more insights about the consumers' perceptions and factors affecting their perception. Therefore, this study, based on rigorous theories and models in the field of information systems, will provide further understanding about the underlying factors of adoption to the policy and decision makers.

2.5 Technology Acceptance Model (TAM)

The Technology Acceptance Model (TAM) has been developed by Fred Davis in middle of 1980s (F. D. Davis, 1986) and the model is an extension of the Theory of Reasoned Action (TRA) in order to provide a theoretical understanding for the acceptance of emerging and new information technologies (F. Davis et al., 1989; F. D. Davis, 1989).

Davis (1985)stated that the objective of TAM is to provide theoretical explanation and empirical prediction on the determinants of user acceptance and adoption of information technologies (IT). In addition, he theorized that adoption of IT services are mainly predicted mainly by two major belief factors namely perceived usefulness and perceived ease of use of the IT service.

The original model for TAM (F. D. Davis, 1986)is presented in figure 2.1 below. As it can be seen from the figure, TAM postulates that acceptance and usage of IT is mainly determined by attitude towards the use, which in turn, is influenced by perceived usefulness and perceived ease of use. Further, perceived usefulness is jointly predicted by system

characteristics as well perceived ease of use. Finally, the model posits that system characteristics determine perceptual variables: perceived usefulness and perceived ease of use.

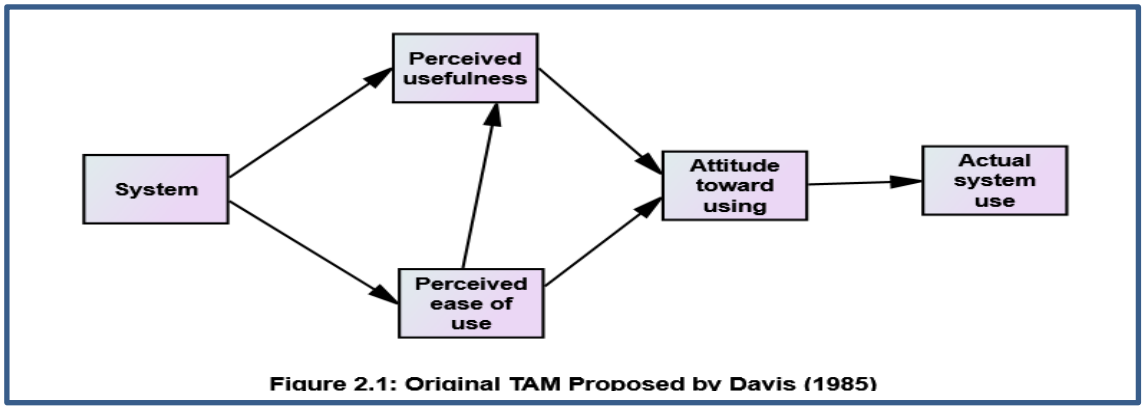


Figure 2.1: Original TAM Proposed by Davis (1985)

As shown in figure 2.2 below, the original model has revised by the Davis and colleagues (F. Davis et al., 1989) and conducted a longitudinal study to measure the intention to use the system as well as actual usage. They found empirical support for the model, indicating a good relationship of intention and system usage with attitude, perceived usefulness and perceived ease of use.

Further, when determining the acceptance and adoption of information technology, TAM provides the following constructs as major determinants of adoption: perceived usefulness, perceived ease of use, external variable, attitude towards the usage, and behavioral intention and finally actual usage of the information technology.

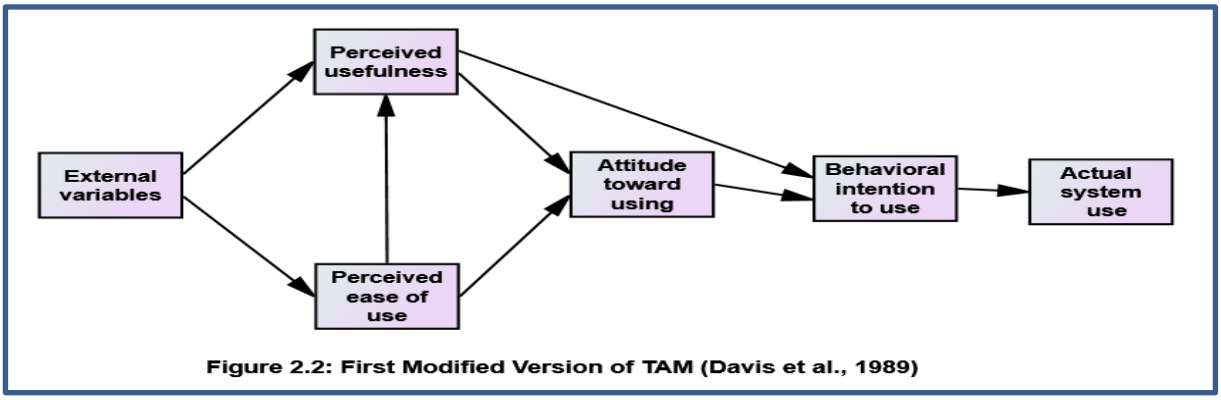


Figure 2.2: First Modified Version of TAM (Davis et al., 1989)

In a later study as shown in 2.3 below, the attitude variable has been dropped from the model (Venkatesh & Davis, 1996). The elimination of attitude brought some increase in the variance explained by the model. In addition, there were additional external variables such as use

training, user participation in design, and the nature of implementation design. It is notable that in all models that belief factors were relevant and contributed to the overall model variance in general and behavioral intention in particular.

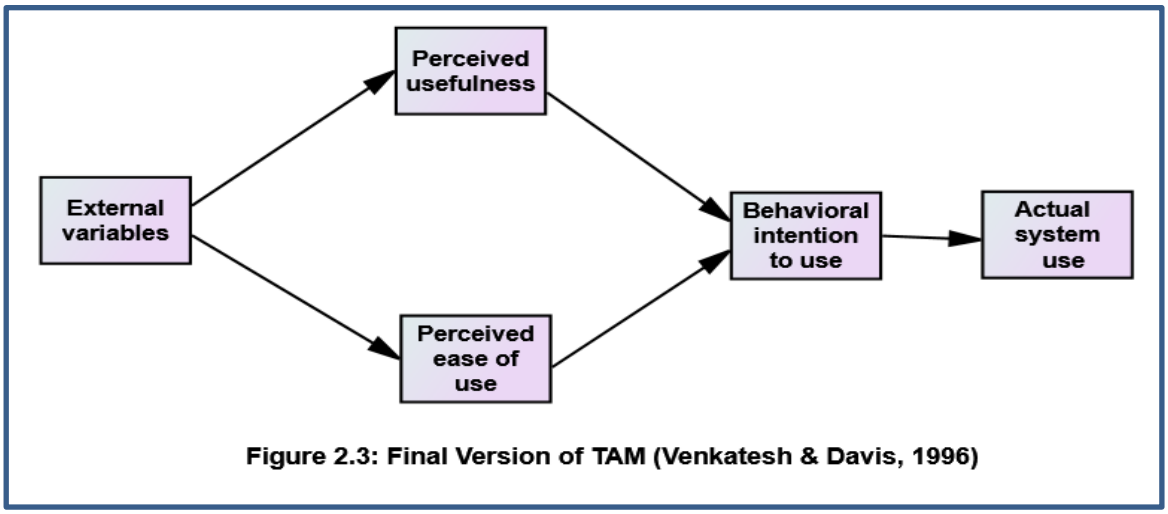


Figure 2.3: Final Version of TAM (Venkatesh & Davis, 1996)

TAM along with other theories and models such as extended technology acceptance model (TAM2), the unified theory of use and acceptance of technology (UTAUT), theory of planned behavior, and theory of reasoned action (TRA) in the information technologies literature to predict the users' intention and actual adoption of several IT related services and technologies (Venkatesh, Morris, Davis, & Davis, 2003).

TAM is one of the most popular and widely acceptable and used models in information systems. This model explains the nature of belief-attitude-intention-behavior and their relationship with the level of adoption of information technologies(Hanafizadeh et al., 2014; Luarn & Lin, 2005; Masrek, Mohamed, Daud, & Omar, 2014).

Since the influential work ofDavis (1985), resulting the development of TAM, the model has been validated in numerous studies in different contexts, examining a variety of information technologies(Adams, Nelson, & Todd, 1992; F. Davis et al., 1989; F. D. Davis, Bagozzi, & Warshaw, 1992; F. D. Davis, 1989; Gefen et al., 2003; Straub, Keil, & Brenner, 1997; Taylor & Todd, 1995b; Venkatesh & Davis, 1996).

Adams et al. (1992)conducted two replication studies to test the rigorousness of the TAM model using messaging technology as an example. The studies aimed at establishing psychometric properties (validity and reliability) measures for the perceived usefulness, perceived ease of use, and system usage. The first study was designed to investigate the perceptions of the users of Electronic Mail and Voice Mail technologies. The study demonstrated a good psychometric properties and showed good reliability and validity issues. The relationship found in this study was consistent with the assumptions of the original model. In addition, the second study examined the usage of WordPerfect, Lotus 1-2-3, and Harvard Graphics software technologies, which were new at the time of the studies. It is reported some discrepancies regarding the two belief factors; perceived ease of use was more important than usefulness in the second study.

Igbaria, Guimaraes, and Davis (1995)extended TAM with several external variables such as individual, organizational and system characteristics to examine the determinants of microcomputer usage. Their study suggested the existence of three main support: management support, organizational support and end-user computing support. In addition, individual, organizational and system characteristics were found to act as antecedents for perceived usefulness and perceived ease of use, which in turn, influence perceived usage of microcomputer. This provided empirical support for the TAM Model.

Venkatesh and Davis (1996) conducted three phases of experimental study with 108 students who are possible users of computer technology. The study established reliability and validity of the models and extended to include predictors of perceived ease of use (computer self-efficacy and usability). As such, it has provided a theoretical support for the original model.

In the context of online shopping, Gefen et al. (2003) examined the intention of experienced to do online purchase using extended TAM with trust element. The study

found that the intended behavior was significantly explained by trust, perceived usefulness and perceived ease of use. Therefore, this study provided a theoretical relevance of TAM in the context of online shopping.

In a recent study about E-banking adoption, (Kallanmarthodi & Vaithiyanathan, 2012) investigated influential factors driving Indian consumers to adopt E-banking from the perspective of TAM. Selecting 200 bank customers in a large city in India, they found that two basic factors in TAM (perceived ease of use and perceived usefulness) along with perceived risk to be determinants of users' intention to adopt E-banking. The study provided empirical support for the original model.

The popularity and rigorousness of Davis' TAM model was evidenced in a number of meta-analysis papers. An earlier of the rigorousness of the model was presented by meta-analysis conducted by Legris et al. (2003) which was examining the information technology adoption within 20 years (1980-2001). Articles included in the review were selected from six leading journals in the area of information systems including *MIS Quarterly, Decision Sciences, Management Science, Journal of Management Information Systems, Information Systems Research and Information and Management*. The meta-analysis found that TAM was applied into diverse information system technologies from text-editor to data and information retrieval software.

Furthermore, the meta-analysis revealed that TAM was compared to "four times to either the TRA or the theory of planned behavior (TPB). Five times subjective norm was added to the model" (Legris et al., 2003, p.193). In this meta-analysis, TAM was proved "to be a useful theoretical model in helping to understand and explain use behavior in IS implementation. It has been tested in many empirical researches and the tools used with the model have proven to be of quality and to yield statistically reliable results" (p.202).

Another review on TAM conducted by Chuttur (2009) and discussed the evolution, development, history and revisions made to the model. He asserted that although there were many models and theories in the field of information systems, TAM captured the most attention of the researchers for its predictive power and applicability in different setting including compulsory and voluntary settings. Chuttur (2009)explained that everyone needs to study information technologies adoption must has an understanding on TAM and its assumptions.

A recent review conducted Chen et al. (2011)suggested that TAM had been rigorous model for predicting and examining consumers' intention and usage of a variety of information systems and technologies. The model was widely adopted and extensively extended to include other predictive variable to increase the percentage of variance explained and to obtain a better understanding of the phenomenon under investigation. Chen et al.'s (2011) review demonstrated that TAM as "a useful theoretical model in helping to understand and explain use behavior in the information system implementation. It has been tested in many empirical researches and the tools used with the model have proven to be of quality and to yield statistically reliable results" (p.126). Furthermore, TAM is summarized to be insufficient as it cannot explain all kinds of technology aspects (Venkatesh & Davis, 2000).

Nevertheless, despite the rigorousness of TAM and its widely acceptance and adopted by different researchers, TAM faced numerous criticisms from a number of scholars by pointing out its weakness (Chen et al., 2011; Chuttur, 2009; Legris et al., 2003). However, it is also clear that the developer of the model (Davis) immediately responded to the criticisms and has made some modifications to the model by incorporating additional elements (F. D. Davis et al., 1992; Venkatesh & Davis, 1996, 2000). The developer of the

model included several variables and made some modifications to respond to critics faced by his model.

All those efforts made by Davis and colleagues, however, TAM still faces some challenges and limitations, particularly when it comes to new information systems and technologies in e-commerce and mobile banking adoptions, where additional variables are of great important such as trust and risk perceptions as the TAM did not capture these elements (Cruz et al., 2010; Daud et al., 2011; Gu et al., 2009). In addition, it is also argued that there are unexplored dimensions which are important to understand mobile banking adoption patterns (Nysveen & Pedersen, 2011).

2.6 Theory of Reasoned Action

Theory of Reasoned Action (TRA) is one of the most popular information systems and information technology-related field. Theory was developed in the last of last century by Fishbein and Ajzen (1975).

As shown in figure 2.4, the theory of TRA postulates that people's behavior in mainly determined directly by behavioral intention to perform the behavior. The behavioral intention is also determined by two factors namely attitude towards the behavior and subjective norms. It has been found that attitude has more variance explained than subjective norms, because "attitudes focus directly on the consequences of action (attitude toward the action) whereas the subjective norms deal with a more remote element, namely perceptions of what significant others think one should do" (Vallerand, Deshaies, Cuerier, Pelletier, & Mongeau, 1992, p.106). The authors established the construct validity of the model by replicating and extending it to the context of moral behavior among large sample of athletes.Vallerand et al. (1992)extended the theory by incorporating an additional causal link. Causal path has been added to predict impact of normative beliefs on attitude towards the behavior. They concluded that the "basic

structure underlying the theory of reasoned action in undoubtedly more complex than generally presumed, especially with respect to the role and functions of normative beliefs" (p.108).

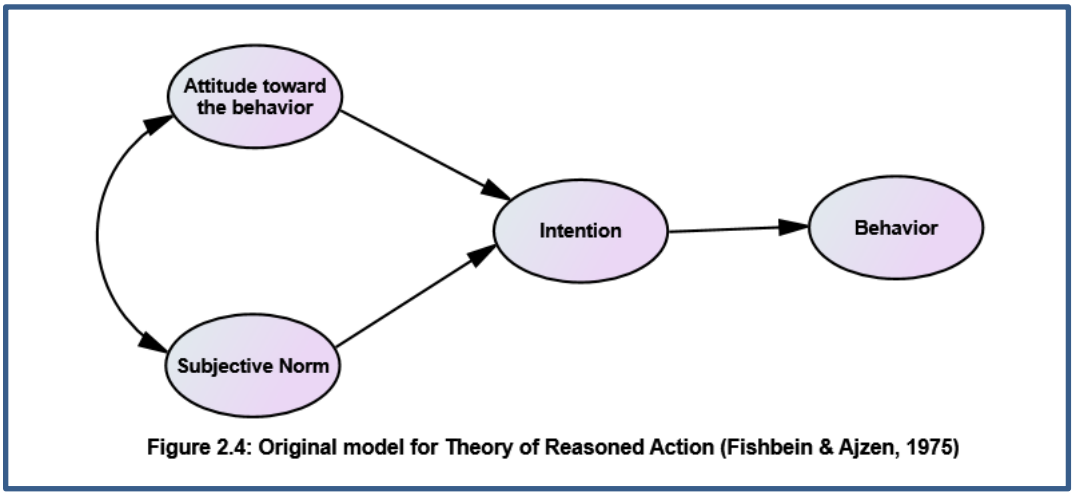


Figure 2.4: Original model for Theory of Reasoned Action (Fishbein & Ajzen, 1975)

In a later study, Ajzen (1991) extended the theory by additional one additional element and proposed a new theory called "Theory of Planned Behavior, TPB" . The difference between TRA and TPB is that the TPB adds one additional construct to the original theory (TRA). This construct has been labeled as "perceived behavioral control", which was postulated to have direct impact on behavioral intention and the actual behavior. In addition, it has indirect impact on actual behavior through behavioral intention.

The development of the TPB had led researchers to overemphasize this theory over TRA and subsequence studies mostly depend on Theory of planned Behavior (Siragusa & Dixon, 2009).

Due to the robustness of the theory of planned behavior for predicting intention and actual behavior from the perspective of attitude, subjective norms, as well as perceived behavioral control, numerous researchers had applied the theory into diverse context and settings such as internet purchasing, food purchasing, e-commerce, moral behavior of athletes, ICT use, green marketing and internet banking (Alam & Sayuti, 2012; George, 2004; Kalafatis, Pollard, East, & Tsogas, 1999; Sentosa & Mat, 2012; Siragusa & Dixon, 2009; Vallerand et al., 1992).

In a Halal food purchasing context, Alam and Sayuti (2012) found that *Halal*food purchasing behavioral intention was significantly and positively predicted by attitude towards *Halal* food, subjective norms, and perceived behavioral control among consumers in Malaysia. Using a college students as a sample, George (2004) reported that internet purchasing among students were predominantly determined by attitude, subjective norms, and perceived behavioral control. As well, he reported that attitude towards Internet purchasing was positively related to Internet trustworthiness belief and unauthorized use beliefs. Also, normative structure was positively correlated with subjective norms whereas efficacy beliefs were positively related to perceived behavioral control.

Using TPB as theoretical framework, Kalafatis et al. (1999)conducted a comparative study between United Kingdom and Greece regarding the determinants of behavioral intention of green marketing technologies. They found that intention is positively predicted by attitude, perceived behavioral control and subjective norms. However, their study suggested that the "theory is more appropriate in well established markets that are characterized by clearly formulated behavioral patterns (i.e. the model fitting elements of the UK sample are superior to the corresponding ones obtained from the Greek sample)" (Kalafatis et al., 1999, p.441).Li-Ming and Wai's (2013) study revealed that online green advertisement was found to have positive correlation with usability, trust, information, attitude towards online green advertisement and consumers' green purchase behavior among internet users in Malaysia. Further, they asserted that the theory is well established to predict behavioral intention in the context of online green advertisement. Several studies also reported the robustness and applicability of the theory in numerous context and found that behavioral intention is positively correlated with attitude towards the behavior, perceived behavioral control, and subjective norms (Sentosa & Mat, 2012; Siragusa & Dixon, 2009; Vallerand et al., 1992).

The above discussion shows that both TRA and TPB are robust and parsimonious theories for predicting behavioral intention and actual behavior related to various contexts. As such, this study will built on the basic assumptions of TRA and adopts subjective norms from the theory to examine its impact on mobile banking adoption along several elements adopted from TAM model and SERQUL theory. Therefore, the current will provide further understanding on underlying factors for adoption of mobile banking from the perspective of integrated model.

2.7 Service quality theory

Scholars and scientist have long been studied service quality and its measurements. During the last three decades, several models and theories have proposed to investigate the service quality as perceived by the customers and consumers.

The concept of quality has generated a lot debates and discussions among the scholars and is defined in numerous ways by different scholars. However, all scholars agreed that quality is a multi-dimensional concept consisting of several indicators. Earlier studies referred the concept of quality into three categories: technical quality, service performance quality and organization's mental picture (Gronroos, 1982 as cited in Mosahab, Mahamad, & Ramayah, 2010). In addition, Lehtinen & Lehtinen (1982) defined quality as three-fold dimensions namely physical quality, interactive quality, and organizational quality as three dimensions of service quality. Juran (1974) suggested five dimensions including psychological quality, time quality, software quality, and internal quality as cited in Cheng et al. (2013).

Groonroos (1984) argued that service quality is best captured by two major dimensions namely technical quality and functional quality dimensions. He proposed Nordic model of perceived service quality, which at was based on disconfirmation paradigm, and looking at the comparison of perceived performance and expected service. However, this model was only conceptual and no empirical testing was reported(Cheng et al., 2013). In a later study, Rust

and Oliver (1994) extended the Nordic model and proposed three distinct dimensions of service quality namely service environment, service product, and service delivery.

To overcome the limitation of Groonroos' Nordic model as well as previous studies only examined tangible products (Cheng et al., 2013), Parasuraman et al. (1985)introduced a SERVQUAL model after an extensive in-depth interviews, focus groups and empirical testing using samples driven from retail banking, credit card, securities brokerage, and production repair and maintenance.

The initial model consisted of ten dimension including reliability, responsiveness, access, communication, competence, courtesy, credibility, security, tangibles, and understanding. In a more detail, the following paragraph provides description on each dimension as defined by the authors(Parasuraman et al., 1985, p.47)

1) ***Communication:*** means keeping customers informed in language they can understand and listening to them. It may mean that the company has to adjust its language for different consumers—increasing the level of sophistication with a well-educated customer and speaking simply and plainly with a novice.
2) ***Access:*** involves approachability and ease of contact.
3) **Courtesy**: involves politeness, respect, consideration, and friendliness of contact personnel (including receptionists, telephone operators, etc.).
4) **Competence**: means possession of the required skills and knowledge to perform the service.
5) **Credibility**: involves trustworthiness, believability, honesty. It involves having the customer's best interests at heart.
6) ***Responsiveness:*** concerns the willingness or readiness of employees to provide service.
7) ***Understanding/knowing the customer***: involves making the effort to understand the customer's needs.

8) ***Reliability:*** involves consistency of performance and dependability.

9) ***Security***: is the freedom from danger, risk, or doubt.

10)Tangibles: include the physical evidence of the service.

In a later study, the SERQUAL has been rigorously tested and was reduced into five dimensions with 22-item scale (Parasuraman, Zeithaml, & Berry, 1988). The five dimensions were reliability, responsiveness, assurance, tangibility and empathy. These dimensions were used and tested in subsequent studies and were found to represent the overall assessment of the customers on the bank's perceived service quality (Cheng et al., 2013).

Parasuraman et al. (1988) provided definition and description for every dimension of the modified SERQUAL model. These are as follows:

1) ***Reliability:*** Ability to perform the promised service dependably and accurately.
2) ***Assurance:*** Knowledge and courtesy of employees and their ability to inspire trust and confidence
3) ***Responsiveness:*** Willingness to help customers and provide prompt service.
4) ***Empathy:*** Caring, individualized attention the firm provides its customers.
5) ***Tangibles:*** Appearance of physical facilities, equipment, personnel, and communication materials.

Service quality is defined as "the degree and direction of discrepancy between customer service perceptions and expectations" (Parasuraman et al., 1985). They argued that it not easy to define service quality and proposed three elements to consider when defining the concept namely "intangibility, heterogeneity and inseparability of production and consumption".

However, SERQUAL has faced some limitations and challenges from the scholars to what extent service is referred in the original model. It has been suggested that the model emphasizes only process quality rather than total service quality (Buttle, 1996; Richard & Allaway, 1993; Woo & Ennew, 2005). Woo and Ennew (2005) contended that what is referred

in the modelis not included technical quality, which is more important. As well, Richard and Allaway (1993)contended that the dimensions of the model clearly neglect the technical quality aspect and arguing that measuring only process quality makes the model less reliable and inadequate to comply with many settings and cultures.

In his review on research related to SERVQUAL, Buttle (1996) identified that the model has faced theoretical and operational criticisms. In terms of theoretical aspect, the review contends that "SERVQUAL is based on a disconfirmation paradigm rather than an attitudinal paradigm; and SERVQUAL fails to draw on established economic, statistical and psychological theory" (Buttle, 1996, p.10). According the review by Buttle, the models was criticized as the dimensions are not universals, which indicates they dependent of the context they are measuring, as well they are not stable whether they load on different factor which is not contrary to the a priori expectations for the factors. In addition, the model was criticized for being focusing on process of service delivery not the outcomes of the service.

In terms of operational aspects, Buttle's (1996) review suggested that the model fails to measure absolute service quality expectation, since use standards to evaluate the quality not the expectation. Few items for each dimension (between four to five) were also criticized as they cannot capture the whole meaning of the dimension. Two long scaling, small variance explained and administering the items in two times were also among the critics reported (Buttle, 1996)

Despite these limitations, several studies have adopted and applied SERQUAL model into different contexts and settings particularly conventional, Islamic, and private banks (Ahmad, Ur-Rehman, Saif, & Safwan, 2010; F. Ali & Zhou, 2013; Butt & Aftab, 2013; Horn & Rudolf, 2011; Katwalo & Muhanji, 2014; Kumar, Kee, & Charles, 2010; Lau, Cheung, Lam, & Chu, 2013; Newman, 2001; Parasuraman et al., 2005; Zeithaml, Berry, & Parasuraman, 1996). In the area of mobile banking adoption, the model was rarely applied to measure how

consumers' evaluate perceived service quality of mobile banking technology as there were very few studies conducted(Aghdaie& Faghani, 2012; Cheng et al., 2013; C. Lin & Shih, 2013).

Using SERQUAL model, Aghdaie and Faghani (2012) examined the impact of mobile banking perceived quality among Iranian consumers on the customer satisfaction. Their results suggested a significant impact of service quality on consumers' satisfaction with the service. Among the dimensions, assurance was the most satisfying according to the consumers followed by tangibility, responsiveness, and empathy, while reliability was least satisfied. Cheng et al. (2013) investigated the impact of five-dimensions of service quality measure on both consumers' satisfaction and behavioral intention to adopt mobile banking services among Taiwanese consumers. They found that all the five dimensions (assurance, tangibility, reliability, responsiveness, and empathy) contributed towards customer satisfaction which in turn contributed towards behavioral intention of adopting mobile banking service. Further, the dimensions were found to have indirect impact on behavioral intention of mobile banking through customer satisfaction.

The above discussion exhibits a scarcity of findings related to mobile banking service using the service quality model. As such, this study will contribute to the literature and extend the model to the context of mobile banking. It will the gap and address some of the limitations and critics of the model. Previous research (Buttle, 1996, Carman, 1990) contended that the model was not built on the assumptions in the established areas of social sciences such as economics, psychology and statistics as these fields address attitudinal and perceptual factors. Therefore, this study will incorporate SERQUAL with TAM and TRA which have elements of attitudinal and perceptual factors. In addition, this study will contribute to the literature by exploring the direct relationship between service quality factor or its dimensions and behavioral intention as there were very few which addressed this direction (Cheng et al., 2013; Woo & Ennew, 2005; Zeithaml et al., 1996).

2.8 Model Justification

2.8.1 Integrating TAM, TRA and SERVQUAL

Technology acceptance model (TAM) has been considered a parsimonious model for predicting users' intention to adopt and IT or information system. TAM has been used in many studies examining a range of technologies and provided empirical evidence that perception factors (perceived usefulness and perceived ease of use) were major determinants of consumers' intention to adopt a technology(i.e., Amin et al., 2007; Hanafizadeh et al., 2014; Marumbwa & Mutsikiwa, 2013; Min et al., 2011; Riquelme & Rios, 2010; Safeena et al., 2012). It has been found that TAM to be powerful in terms of predicting consumers' intention to use a technology. However, it was criticized being not enough to capture large variance in the intention factor and therefore, researchers extended the model with additional elements in order to overcome its limitations. Variables which were incorporated with TAM include perceived trust, perceived risk, social influence, interaction, system quality, satisfaction, and many others.

It has been suggested that using models individually and separately will be incapable to fully predict the behavioral intention, but integrating two or three models will give strong predictive power (Püschel et al., 2010). Therefore, the rationale of this study for adopting the basic TAM model variables (perceived usefulness and perceived ease of us) is based on their rigorousness and predictive power. The study will incorporate TAM with theory of reasoned action (TRA) and service quality to capture additional variance in the prediction of consumers' intention. In addition, the other two theories (TRA and service quality) are rigorous in their own stand, however, incorporating with other theories will give more emphasis and power for the prediction as it has been found in the incorporation of TRA with TAM (Taylor & Todd, 1995b).

To the best knowledge of the researcher, there is no single study incorporating elements from TAM, TRA and service quality to predict consumers' intention to adopt mobile banking technology. In addition, incorporating situational factors with the elements of the above models is also widely ignored in the literature. Hence, these situational factors will contribute towards our understanding on underlying factors influencing mobile banking service.

2.8.2 Moderating effect

Grounded in the theory of reasoned action, actual use is not only determined by intention but there are other factors and depend on the situation under investigation, indicating that there are moderating effects (Wang, Harris, & Patterson, 2012). This is particularly relevant in the context of Self-service technologies "where multiple service delivery options are offered. For example, a passenger who is not keen to use the self-check-in kiosk at the airport might actually use it if he or she was in a hurry to catch a flight and there was a long queue at the check-in counter" (Wang et al., 2012, p.58).

It has been suggested that moderating effect of situational factors are not addressed in the literature and there were few researches conducted about it (Dabholkar & Bagozzi, 2002)(Wang et al., 2012)(Nysveen, Pedersen, & Thorbjornsen, 2005). As such, the current study attempts to fill that gap in the literature by examining the moderating effect of situational factors such as perceived waiting time and task interruption on the relationship between adoption and major variables derived from TAM, TRA and Service quality theories.

2.9 CONCEPTUAL MODEL AND HYPOTHESES DEVELOPMENT

2.9.1 Overview

The conceptual framework for the current study is presented in figure 2.4 below and visualizes the hypothesized relationships among the independent, dependent and moderating variables. The conceptual model consists of three main components: independent variables, dependent variable, and moderating variables. As for the independent variables, the researcher draws them

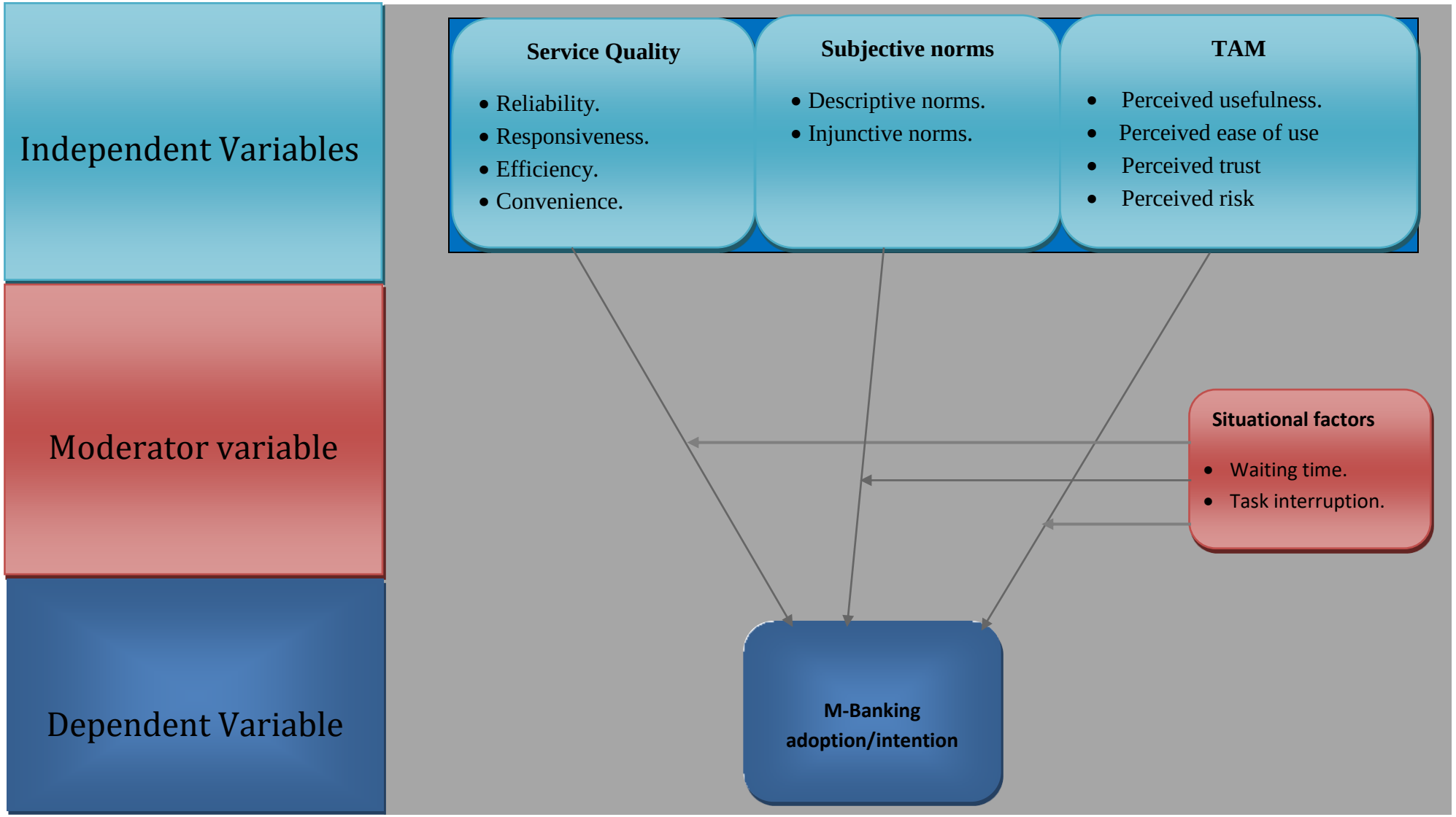
from different information systems models and management theories. Among them are TAMconcepts such as perceived ease of use, perceived usefulness; risk and trust related concepts such as perceived risk and perceived trust; subjective norms such as descriptive norms and injunctive norms; and finally service quality dimensions such as reliability, responsiveness, efficiency, and convenience. The following sections will provide detailed descriptions on each of the dimensions, looking at the different perspectives and settings.

2.9.2 Perceived Usefulness and Intention to Adopt

Perceived usefulness is defined by (F. Davis, 1986, p.82) as "the degree to which an individual believes subjectively that using a particular ITwould enhance his or her job performance". It means that the way users perceive the technology or the system to be useful; they are more likely to adopt the system for their transactions and activities.

Many researchers including the developer of the model extensively investigated the impact of perceived usefulness on behavioral intention to adopt different technologies (Adams et al., 1992; F. D. Davis et al., 1992; F. D. Davis, 1986; Gefen et al., 2003; Gu et al., 2009; Igbaria et al., 1995; Venkatesh & Davis, 1996, 2000). These studies reported a strong positive relationship between perceived usefulness and behavioral intention to adopt a variety of technologies including Email, electronic Mail, voice mail, Microcomputers, software applications, among others.

Figure 2.5: Conceptual Framework of the Study



It has been suggested that information systems or technologies is likely to be adopted by potential consumers based on their perception that adopting this system or technology will help them perform their tasks quickly and efficiently and with little cost (Nysveen et al., 2005; Nysveen & Pedersen, 2011). Perceived usefulness is similar with performance expectancy in the Unified Theory of Acceptance and Use of technology and they capture the same meaning (Venkatesh et al., 2003) as well the relative advantage from the diffusion of innovation theory (Dineshwar & Steven, 2013).

In the context of mobile banking, perceived usefulness has been found to be a good predictor of the behavioral intention and adoption of the technology among diverse consumers. Perceived usefulness was reported to be driving motive for the adoption of mobile banking in the context of several countries such as Chinese consumers(Liu et al., 2009; Min et al., 2011; Zhou et al., 2010; Zhou, 2011), Malaysian consumers (Amin et al., 2007; Daud et al., 2011; Shanmugam et al., 2014),Singaporean consumers (Riquelme & Rios, 2010), South Korean consumers (Chung & Kwon, 2009a; Gu et al., 2009; KS Lee et al., 2007), Taiwanese consumers(Luarn& Lin, 2005; Yu, 2012), Indian consumers(Nayak et al., 2014; Safeena et al., 2012), Pakistani consumers (Kazi & Mannan, 2013), Iranian consumers (Ghalandari et al., 2013; Hanafizadeh et al., 2014), Jordanian consumers(Khraim et al., 2011; Mashagba & Nassar, 2012), Saudi Arabian consumers (Al-Jabri & Sohail, 2012), Australian consumers (Wessels & Drennan, 2010), Ghanaian consumers(Crabbe et al., 2009; Tobbin & Kuwornu, 2011; Tobbin, 2012), Germany consumers (Koenig-Lewis et al., 2010), Zimbabwean consumers (Marumbwa & Mutsikiwa, 2013), Portuguese consumers (Oliveira et al., 2014), Somali consumers (A. Y. S. Ali & Dhaha, 2014; Sayid et al., 2012), and South African consumers (Shambare, 2013).

Although, perceived usefulness was reported to have significant impact on the intention of the consumers to adopt mobile banking technology, some recent studies reported that this variable (usefulness) is not determining the intention of the consumers towards the technology

in various countries such as Sudan, Malaysia, Turkey, and United Arab Emirates (Aboelmaged & Gebba, 2013; Akturan & Tezcan, 2012; Amin et al., 2012; Karma et al., 2014). This is a clear contradiction with the previous studies' findings regarding the usefulness of the technology. This means that consumers are no longer considering the usefulness of the service or the technology but along it they are considering many others. Therefore, the current study will explore the contradiction of the findings and will introduce a moderating effect on the relationship between usefulness and consumers' intention and adoption. The new moderating effect is also consistent with the recent recommendation by Nysveen and Pedersen(2011)who suggested to incorporate the moderating effect of situational factors in order to get a better understanding on the hypothesized relationships. Few studies addressed the moderating effect of situational factors (Dabholkar & Bagozzi, 2002; Wang et al., 2012). As such, the current study enriches and fills the gap in the literature. Based on that, the following two hypotheses were developed:

H1.1: Perceived usefulness will have significant influence on the Sudanese consumers' adoption of mobile banking technology.

H1.2: Waiting time will have significant moderating effect on the relationship between perceived usefulness and intention to adopt.

H1.3: Task Interruptionwill have significant moderating effect on the relationship between perceived usefulness and intention to adopt.

2.9.3 Perceived Ease of Use and Intention to Adopt

The construct of perceived ease of use was first coincided by the work of Fred Davis (F. D. Davis, 1986) and provided the first conceptual and operational definition of the construct. He defined perceived ease of use as "the degree to which an individual believes that using a particular IT would be free of effort, both physical and mental" (F. D. Davis, 1986). It means that the more the user perceived the technology or systems is easy and does not require a lot mental efforts, the more the user will adopt it.

Initially, perceived ease of use was found to be significant predictor of intention to use the technology particularly in the original model and subsequent works from the developer of the model (F. Davis et al., 1989; F. D. Davis, 1986, 1989). Davis argued that all other things being equal, an IT perceived to be easier to use than another is more likely to be accepted by the individual.

Numerous researchers had examined the impact of perceived ease of use on the adoption and intention of mobile banking from the perspective of several countries. It has been that this construct had significant positive impact on the consumers behavioral intention to adopt mobile banking technology in Malaysia (Amin et al., 2007; Daud et al., 2011), China (Min et al., 2011), South Korea (Chung & Kwon, 2009a; Gu et al., 2009), Iran (Hanafizadeh et al., 2014), Pakistan (Kazi & Mannan, 2013), Taiwan (Luarn & Lin, 2005), Somalia (A. Y. S. Ali & Dhaha, 2014), Zimbabwe (Marumbwa & Mutsikiwa, 2013), India (Safeena et al., 2012), Ghana (Tobbin & Kuwornu, 2011; Tobbin, 2012),

In contrast, perceived ease of use were found to have no significant impact on the consumers' intention to adopt mobile banking service in Malaysia (Amin et al., 2012), China (Liu et al., 2009) and Germany (Koenig-Lewis et al., 2010).

Previous study also examined the effect of perceived ease of use on attitude which in turn has an influence on behavioral intention to adopt a technology. Contradicting results has been reported regarding the relationship between perceived ease of use and attitude towards the technology or system, where some of the studies supported this relationship particularly in countries such as Zimbabwe, Taiwan, , South Africa and Germany respectively (Chitungo & Munongo, 2013; H.-F. Lin, 2011; Raleting & Nel, 2011; Schierz et al., 2010). Nevertheless, other studies revealed that perceived ease of use had no effect on attitude in several countries includingUnited Arab Emirates, Turkey, Brazil, Somalia,Malaysia and Australia respectively(Aboelmaged& Gebba, 2013; Akturan & Tezcan, 2012; Püschel et al., 2010; Sayid et al., 2012; Shanmugam et al., 2014; Wessels & Drennan, 2010).

There are other constructs from other models and theories that are in same meaning with perceived ease of use such as complexity from diffusion of innovation theory, effort expectancy from Unified Theory of Acceptance and Use of Technology (Venkatesh et al., 2003). For example, effort expectancy has been found to have significant positive impact on behavioral intention to adopt mobile banking in Nigeria and Jordan respectively (F. Bankole et al., 2011; Mashagba & Nassar, 2012). Contrary to this, the construct had no influence on intention in the context of Portugal, Taiwan and China respectively (Oliveira et al., 2014; Yu, 2012; Zhou et al., 2010). On the other hand, complexity is a similar in meaning with perceived ease of use and has been reported to have significant influence on behavioral intention to adopt mobile banking in Brazil and Jordan (Cruz et al., 2010; Khraim et al., 2011), whereas it has no influence on the consumers' intention in the context of Saudi Arabia and South Africa (Al-Jabri & Sohail, 2012; Brown et al., 2003).

It is clear from the above discussion on the influence of perceived ease of use and its derivatives (effort expectancy and complexity) that there are contradicting findings regarding the effect of these constructs on the consumers' intention to adopt mobile banking. The author of this thesis argues that there are other influential factors that moderate the effect of this construct (perceived ease of use) on intention. Moreover, the author agrees with Nysveen and colleagues (Nysveen et al., 2005) who suggested to examine the influential moderating effect of situational factors on the relationship between adoption factors and intention regarding mobile banking acceptance. Situational factors such as perceived waiting time and task complexity, social anxiety had been reported to moderate the relationship between attitude and actual use of behavioral intention (Dabholkar & Bagozzi, 2002; Wang et al., 2012). As such, the following hypotheses were suggested:

H2.1: Perceived ease of use will have significant influence on the consumers' adoption of mobile banking technology.

H2.2: Waiting time will have significant moderating effect on the relationship between perceived ease of use and intention to adopt.

H2.3: Task interruption will have significant moderating effect on the relationship between perceived ease of use and intention to adopt.

2.9.4 Perceived Trust and Intention to Adopt

The trust element is important in business environment whether the transaction, relationship and intention to come again or purchase again are based on mutual trust between the company or organization and the consumers. Trust has been identified as very important element in mobile banking environment and the customers' trust is imperative to be retained in the long term(Chung & Kwon, 2009b; Hanafizadeh et al., 2014).

Trust has been differently conceptualized in previous studies as contended by Gefen et al., (2003), indicating that there is a confusion among the researchers in terms of theoretical and operational aspects. After an extensive review, Gefen et al., (2003, p.55) explained that trust is defined as one of several ways: "1) a set of specific beliefs dealing primarily with the integrity, benevolence, and ability of another party; 2) a general belief that another party can be trusted; sometimes also called trusting intentions or "the 'willingness' of a party to be vulnerable to the actions of another"; 3) affect reflected in "'feelings' of confidence and security in the caring response" of the other party; 4) a combination of these elements". Moreover, trust has been found to have three types namely initial trust, trust disposition, and trust belief(Luo et al., 2010). As well, trust can be established through "1) a belief that the vendor has nothing to gain by cheating, (2) a belief that there are safety mechanisms built into the Web site, and (3) by having a typical interface, (4) one that is, moreover, easy to use"(Gefen et al., 2003, p.51).

Trust or perceived trust has been found to be a good determinant of mobile banking adoption among various consumers. The construct was a significant predictor in the context of South Korea along with several factors(Gu et al., 2009; G. Kim et al., 2009; KS Lee et al.,

2007)suggesting that trust is crucial in increasing behavioral intention of mobile, and service providers need to give priority and attention to it particularly how to increase it. In addition, Hanafizadeh et al. (2014) identified trust an influential factor determining mobile banking adoption among consumers in Iran. In addition, trust was reported to have significant positive and direct impact on the consumers' intention for adopting mobile banking in China and indirectly through follow experience (Zhou, 2012). Even though trust was deemed a predictor of behavioral intention to adopt mobile banking in china, perceived usefulness had played a greater role than trust in determining the intention of the consumers' to adopt mobile banking (Liu et al., 2009). In addition, trust was suggested to be a good determinant of adoption of mobile banking technology in the context of Sudan (Karma et al., 2014).

Previous studies also investigated the impact of trust dimensions on the behavioral intention adopt mobile banking. In a U.S based findings, Luo et al. (2010)reported that structural assurance, which a dimension of trust, was found to have significant positive impact on behavioral intention to adopt mobile banking among American consumers. Furthermore, Oliveira et al. (2014) reported another dimension (initial trust) to have significant impact on behavioral intention to adopt mobile banking among Portuguese consumers. In another study, initial trust was also reported to determine the consumers' intention for adopting mobile banking in China.

In the context of mobile money transfer, numerous studies have investigated the impact of perceived trust on mobile banking adoption among consumers in Somalia, Ghana and Zimbabwe. These studies have found a positive relationship between perceived trust and behavioral intention of adopting mobile money transfer (A. Y. S. Ali & Dhaha, 2014; Marumbwa & Mutsikiwa, 2013; Tobbin & Kuwornu, 2011; Tobbin, 2012).

Contrary to the above discussion which reported significant positive relationship between trust and intention, there are numerous studies who find that trust has no impact or

direct impact on the consumers' intention towards adopting mobile banking technology(F. Bankole et al., 2011; Koenig-Lewis et al., 2010; KS Lee et al., 2007; Shambare, 2013).

As shown in above discussions, related studies suggested that trust element is a crucial in determining mobile banking adoption among the consumers. However, some of the studies also reported contradicting findings where perceived trust had no significant impact on consumers' intention. To see whether there are external factors contributing towards trust and intention, the researcher would introduce a moderation effect on the relationship between perceived trust and adoption of mobile banking as there were few studies addressed the moderating effect of situational factors (Dabholkar & Bagozzi, 2002; Wang et al., 2012). In addition, this is also based on a recent suggestion to incorporate the moderating effect of situational factors (Nysveen et al., 2005). Therefore, we hypothesize as follows:

H3.1: Perceived trust will have significant influence on the Sudanese consumers' adoption of mobile banking technology.

H3.2: Waiting time will have significant moderating effect on the relationship between perceived trust and intention to adopt.

H3.3: Task Interruption will have significant moderating effect on the relationship between perceived trust and intention to adopt.

2.9.5 Previewed Risk and Intention to Adopt

In the age of information system and technologies, perceived risk is considered of relevant and great importance to both consumers and service provides. It refers to the degree of discrepancies between the perception and judgment of the consumer and the actual behavior associated with the service (Al-Jabri & Sohail, 2012; Koenig-Lewis et al., 2010; KS Lee et al., 2007). It also refers to "people's perceptions about their susceptibility to various threats, is often theorized as a cause of self-protective behavior"(Luo et al., 2010, p.225).

In the context of a technology, perceived risk is of great important. However, in mobile banking adoption is even more important since security threat and privacy invasion is mainly

associated with technologies (Luarn & Lin, 2005). Customers are concerned with their information during mobile banking transactions, and this decreases their confidence in using the technology (Laforet & Li, 2005; Luarn & Lin, 2005). In order to increase the confidence of the consumers, the definition of perceived risk has been changed in recent years to incorporate physical, financial, psychological, and social risk associated with online transactions (Hanafizadeh et al., 2014). It has been reported that perceived risk is a multi-dimensional construct consisting of several sub dimension including financial, performance, privacy, time, psychological, time, protection, and overall risks (Ghalandari et al., 2013; Luo et al., 2010). However, they reported two dimensions (social and physical risks) to be insignificant in the context of mobile banking adoption from American perspective (Luo et al., 2010), while time risk, protection risk and privacy risk were also reported to have no significant impact among Iranian consumers (Ghalandari et al., 2013).

Numerous studies examined the impact of perceived risk on the consumers' intention to adopt mobile banking technology in a variety of contexts. For example,Al-Jabri and Sohail's (2012)study revealed a significant negative impact of perceived risk on the Saudi Arabia consumers' intention to adopt mobile banking. It means that the lower the risk associated with the technology as perceived by the consumers, the higher the adoption likelihood. In addition, Brown et al. (2003), Chitungo and Munongo (2013) and Kazi and Mannan(2013) had reported that perceived risk has also significant negative impact on behavioral intentionto adopt mobile banking in South Africa, Zimbabwe and Pakistan respectively.

Furthermore, other studies also reported the importance of perceived risk according to the consumers, indicating that the construct had significant impact on the consumers' intention to adopt mobile banking in several countries such asBrazil,South Korea, Iran, Sudan, Jordan, Germany, United States of America, China, Singapore, India, and Australia respectively (Cruz et al., 2010; Gu et al., 2009; Hanafizadeh et al., 2014; Karma et al., 2014; Khraim et al., 2011;

Koenig-Lewis et al., 2010; KS Lee et al., 2007; Luo et al., 2010; Min et al., 2011; Riquelme & Rios, 2010; Safeena et al., 2012; Wessels & Drennan, 2010)

On the other hand, few studies, which examined influential factors for adopting mobile banking, found that perceived risk had no significant impact on the consumers' intention towards the technology adoption. Daud et al. (2011) contended that perceived risk had no significant impact on the consumers' intention among Malaysians. Kim et al. (2009)reported an indirect significant impact of this variable on consumers' intention among South Koreans but no direct impact was observed. Further, A. Y. S. Ali and Dhaha (2014), Shambare (2013) and Tobbin and Kuwornu (2011) also reported no direct and indirect significant impact of perceived risk on consumers' intention to adopt mobile banking among Somali, South African as well as Ghanaian consumers respectively.

It is noteworthy here as the above discussion shows that associated risk with the technology, significantly determining the consumers' intention towards the technology. However, there is great contradicting findings regards the plausibility of this factor. There are elements that contribute towards the effect of this factor. In another way, there seems to be moderating effect of certain factors that carry the impact of this factor on the intention construct. As such, the current study introduces the moderating effect of situational factors on the relationship between perceived risk and behavioral intention for adopting mobile banking technology. This is in response to a recent call by Nysveen et al. (2005), which is greatly ignored in the literature. After a rigorous review on related literature in the area on SST technologies, Nysveen and colleagues suggested incorporating the moderating effect of situational factors. After publication of that review paper by Nysveen and colleagues, there were very few studies addressed this issue (Wang et al., 2012); this according to the best knowledge of the researcher. Therefore, this study formulates the following hypotheses:

H4.1: Perceived risk will have significant negative influence on the Sudanese consumers' adoption of mobile banking technology.

H4.2: Waiting time will have significant moderating effect on the relationship between perceived risk and intention to adopt.

H4.3: Task interruption will have significant moderating effect on the relationship between perceived risk and intention to adopt.

2.9.6 Subjective norms and Intention to Adopt

It has been argued that reference group has an influence on individuals to perform a certain behavior. Conceptually, Fishbein and Ajzen (1975) defined subjective norms or social norms as "an individuals' perception that most people who are important to them think they should or should not perform the behavior in question" and it determined by " the total set of accessible normative beliefs concerning the expectations of important friends. Individuals often respond to social normative influences to establish a favorable image in a reference group" (Chitungo & Munongo, 2013, p.56).

There are other variables that capture the same meaning of subjective norms namely social influence, social norms, reference group, image, and normative pressure. All of these constructs are referring to the pressure made by an individual's immediate contacts such as friends, family members, co-workers, teachers, and classmates. It has been suggested that this pressure is significantly determining information system or information technology intention and usage (Amin, Hamid, Tanakinjal, & Lada, 2006; Nysveen et al., 2005; Venkatesh & Morris, 2000).

Scholars discussed two types of subjective norms namely descriptive norms and injunctive norms. Descriptive norms has been defined as "typical patterns of behavior, generally accompanied by the expectation that people will behave according to the pattern" whereas injunctive norms is defined as "prescriptive (or proscriptive) rules specifying behavior that persons ought (or ought not) to engage in" (Kitts & Chiang, 2008).

Venkatesh et al.(2003, p.451) defined social influence as "the degree to which an individual perceives that important others believe he or she should use the new system". They

argued that social influence is represented with other constructs in other theories and models. For example, social influence as a direct predictor of intention is represented by subjective norms in Theory of Reasoned Action (TRA), TAM2, Theory of planned behavior (TPB) and decomposed TAM-TPB. It is also represented by social factors in Model of PC Utilization (MPCU) and image in innovation diffusion theory (IDT) (Venkatesh et al., 2003). It is also represented by social norms in other studies as social norms in another study (Thompson, Higgins, & Howell, 1991). However, although it seems that these variables are different but they are measuring one thing and "each of these constructs contains the explicit or implicit notion that the individual's behavior is influenced by the way in which they believe others will view them as a result of having used the technology" (Venkatesh et al., 2003, p.451). Furthermore, it is noteworthy social influence was established on subjective norms from TRA and image from IDT theories (Venkatesh et al., 2003).

Previous studies on the consumer adoption of online services such as online banking and online shopping and e-procurement suggested that subjective norms was a significant determinant of behavioral intention to adopt the service(Aboelmaged, 2010; Javadi, Dolatabadi, Nourbakhsh, Poursaeedi, & Asadollahi, 2012; Taib, Ramayah, & Razak, 2008). In an e-commerce adoption, Bhattacherjee (2000) reported a significant positive effect of subjective norms towards consumers' intention to adopt electronic Brokerages service in United States of America. Venkatesh and Davis (2000) conducted a longitudinal study and reported a direct relationship between subjective norms and intention.

In the context of mobile banking, Aboelmaged and Gebba (2013) examined the influential factors of adopting mobile banking in United Arab Emirates and reported that subjective norms is a salient factor influencing the consumers' intention to adopt the technology. As well, subjective norms was also good predictor of consumers' intention to adopt mobile banking in Malaysia (Amin & Ramayah, 2010) and Brazil (Püschel et al., 2010). In addition, other similar constructs such social norms (Chitungo & Munongo, 2013; Riquelme

& Rios, 2010), social factors (O. Bankole & Cloete, 2011), and social influence (Kazi & Mannan, 2013; Mashagba & Nassar, 2012; Sayid et al., 2012; Yu, 2012; Zhou et al., 2010) were reported to be determinant of mobile banking adoption among consumers in Zimbabwe, Singapore, South Africa, Pakistan, Jordan, Somalia, and China.

Few studies examining mobile banking adoption concluded that social factor or social influence have no impact on consumers' intention to adopt mobile banking in Malaysia (Amin et al., 2007), Nigeria (O. Bankole & Cloete, 2011), Somalia (A. Y. S. Ali & Dhaha, 2014)and Portugal (Oliveira et al., 2014). It means that the consumer is not considering what his or her important other (friends, family members, co-workers, classmates) are thinking about a behavior he or she should perform.

With these contradicting findings regarding the parsimoniousness of perceived risk as a determining of behavioral intention to adopt mobile banking, the researcher feels that there should be a moderating effect of some other variables that carry the effect directly or indirectly. Few studies reported moderating effect of situational factors in areas such as self-service technologies such as touch screen for ordering in a fast food restaurant (Dabholkar & Bagozzi, 2002). They found that consumer traits and situational factors such as waiting time and social anxiety had moderating effect on the relationship between intention and major variables (perceived ease of use, fun, and attitude). In another study, Wang, Harris, and Patterson (2012)examined moderating effect of situational factors on the relationship between attitude and actual usage in the context of self-service technology in a supermarket in Australia. They found that situational factors exerted significant moderating effect between attitude and actual usage among consumers. Based on prior research, the researcher hypothesizes the following:

H5.1: Descriptive norms will have significant influence on the Sudanese consumers' adoption of mobile banking technology.

H5.2: Injunctive norms will have significant influence on the Sudanese consumers' adoption of mobile banking technology.

H5.3: Waiting time will have significant moderating effect on the relationship between descriptive norms and intention to adopt.

H5.4: Waiting time will have significant moderating effect on the relationship between injunctive norms and intention to adopt.

H5.5: Task Interruption will have significant moderating effect on the relationship between descriptive norms and intention to adopt.

H5.6: Task Interruption will have significant moderating effect on the relationship between injunctive norms and intention to adopt.

2.9.7 Service Quality and Intention to Adopt

SERVQUAL model was based on the works of Parasuraman and colleagues for the last two decades(Parasuraman et al., 2005, 1985, 1988; Zeithaml et al., 1996). The model has faced a plenty of criticisms and challenges as discussed in section 13 of this chapter. This study addresses some of the limitations of the models by integrating additional elements which are specific to the context of banking whether it is online or offline or mobile banking, as the model was being criticized for unsuitability for financial services, because the models was developed in the context of consumer service other than financial(Katwalo& Muhanji, 2014; Kumar et al., 2010).

Previous studies had extended the SERVQUAL model by integrating additional dimensions which are important in the banking context (Ali & Zhou, 2013; Horn & Rudolf, 2011; Joseph, McClure, & Joseph, 1999; Katwalo & Muhanji, 2014; Ravichandran, 2010). Dimensions incorporated include price, technology, competence, satisfaction, efficiency, convenience, queue management, accessibility, customization and complaint management.

The current study adopts four dimensions to measure service quality namely reliability, responsiveness from the original model, as well as efficiency and convenience from mobile banking related studies. The reason for adopting these dimensions is two-fold. First, reliability and responsiveness are more relevant in the context of banking or mobile banking, where the

consumers expect from the bank to be dependable and responsive to their needs, inquires and information seeking regarding the service or any related matter such as compliance. Second, efficiency and convenience were reported in previous studies as an important element for mobile banking service quality. In addition, assurance and empathy are not stable where they reported to combine items from seven dimension in the second testing of the model (Parasuraman et al., 1988). For that reason, this study will not incorporate assurance and empathy in the model. As for the tangibility, this dimension refers to the physical facilities, appearance of the staff and other customers as well as equipment in the bank or store. Thus, we are not including it in the model because mobile banking is a virtual service where customers are not required to go to the counter and evaluate the tangible things in the bank. Therefore, the following paragraphs will provide further details on each dimension:

1) Reliability:

This dimension refers to extent of fulfilling the promise made by the banks accurately and dependably (Parasuraman et al., 1988). It specifically refers to the accuracy in billing, keeping records correctly, and performing the service at stipulated time.

Reliability has been reported to be an import and satisfying dimension when it comes the consumers' evaluation of the perceived service quality particularly in the mobile banking context(Aghdaie& Faghani, 2012; Ali & Zhou, 2013; Cheng et al., 2013; Lau et al., 2013). Reliability has been reported to have significant correlation with customer satisfaction in above studies, and contributed indirectly to the behavioral intention to adopt mobile banking service (Cheng et al., 2013). As a factor, perceived service quality was reported to have significant positive impact on consumers' intention to adopt (Woo & Ennew, 2005). However, previous studies did not look at specific moderating effect contributing in this regard. As such, this study will incorporate the moderating effect of situational factors on the relationship between reliability and mobile banking adoption. Therefore, the following two hypotheses are put forward:

H6.1: Reliability dimension will have significant negative influence on the Sudanese consumers' adoption of mobile banking technology.

H6.2: Waiting time will have significant moderating effect on the relationship between reliability and intention to adopt.

H6.3: Task interruption will have significant moderating effect on the relationship between reliability and intention to adopt.

2) Responsiveness:

Responsiveness refers to the "willingness or readiness of the employees to provide service" (Parasuraman et al., 1988, p.47). It specifically considers calling customer back quickly and providing prompt service regarding the transaction. Customers are expecting from the bank to communicate with them regarding transaction related information and how long will take to solve their problem or processing their request.

Responsiveness was found to be robust and stable when measuring service quality. Several studies have reported to be import for the consumers (Angur, Nataraajan, & Jahera, 1999; Katwalo & Muhanji, 2014; Lassar, Manolis, & Winsor, 2000; Lau et al., 2013; Mosahab et al., 2010; Newman, 2001; Parasuraman et al., 1985, 1988; Ravichandran, 2010; Woo & Ennew, 2005; Zeithaml et al., 1996). From the perspective of mobile banking, it also has been reported that responsiveness is an important for evaluating consumers' perceived service quality of mobile banking. as well, it is also found that responsiveness positively correlated with customers satisfaction (Aghdaie & Faghani, 2012; F. Ali & Zhou, 2013; Cheng et al., 2013; Lau et al., 2013). Perceived service quality as a one construct has been reported to have direct impact on consumers' behavioral intention to adopt electronic banking service (Woo & Ennew, 2005). In this study, the researcher will introduce the moderating of situational factors to see whether they moderate significantly the relationship between responsiveness and mobile banking adoption. Thus, the following two hypotheses are formulated:

H7.1: Responsiveness dimension will have significant negative influence on the Sudanese consumers' adoption of mobile banking technology.

H7.2: Waiting time will have significant moderating effect on the relationship between responsiveness and intention to adopt.

H7.3: Task Interruption will have significant moderating effect on the relationship between responsiveness and intention to adopt.

3) Efficiency

Efficiency is an important dimension in marketing research addressing service delivery mechanisms (Kelley, 1989). Two approaches have been suggested by Kelley for examining efficiency in service delivery, namely technological approach and humanistic approach. As such, efficiency in the context of electronic banking incorporates these two approaches. Joseph et al. (1999) refers efficiency as less waiting time, connecting immediately with the customer, inclusion of all banking needs in the menu options, help menu for educating customer on how to use, providing direction and instruction for the new users, and finally adequate menu options. In an electronic banking context, efficiency refers to the simplicity to use the site, structure of the site is proper, and "requires minimum of information to be input by the customer (Parasuraman et al., 2005). It is simply defined by these authors "the ease and speed of accessing and using the site" (p.8).

Few studies reported the importance of efficiency aspect as service quality dimension particularly in the banking context and online banking(Joseph et al., 1999; M. Kim, Kim, & Lennon, 2006; Parasuraman et al., 2005; Santos, 2003; Sun, Wang, & Cao, 2009; Yen & Lu, 2008; Zeithaml, Parasuraman, & Malhotra, 2002). All these studies reported the importance of this dimension in various settings and contexts. Zeithaml et al.(2002)explained that is one of the most important dimensions for measuring e-service or electronic websites. However, this study will add an additional element to hypothesize relationship between efficiency and mobile

banking adoption, which is the moderating effect of situational factors, which were neglected in prior research of online and mobile banking. Thus, these hypotheses will be tested:

H8.1: Efficiency dimension will have significant negative influence on the Sudanese consumers' adoption of mobile banking technology.

H8.2: Waiting time will have significant moderating effect on the relationship between efficiency and intention to adopt.

H8.3: Task Interruption will have significant moderating effect on the relationship between efficiency and intention to adopt.

4) Convenience

This is the last dimension among service quality dimensions adopted for the context of this study. The convenience dimension refers to the accurate records in the transaction, guaranteeing of the transaction to be taken place, conducting transactions accurately, convenient in conducting transactions, providing customer feedback service, and satisfying customer complaints immediately (Joseph et al., 1999). Kumar et al. (2010) concluded that convenience is an important dimension and suggested for the banks to give full attention to it along with competence.

In addition, previous studies also reported the importance of convenience as one dimension of service quality particularly in the context of electronic banking whether the customer needs to perform his or her financial transactions at their own convenience (Cronin & Taylor, 1992; Joseph et al., 1999; Parasuraman et al., 2005; Zeithaml et al., 2002).

However, these studies did not look any possible moderating effect as well the contribution of this dimension towards behavioral intention of mobile banking adoption. As such, this study will establish a relationship between convenience and adoption of mobile banking as well as test the moderating effect of situational factors on the relationship between these two variables. Therefore, the following hypotheses are postulated:

H9.1: Convenience dimension will have significant negative influence on the Sudanese consumers' adoption of mobile banking technology.

H9.2: Waiting time will have significant moderating effect on the relationship between convenience and intention to adopt.

H9.3: Task interruption will have significant moderating effect on the relationship between convenience and intention to adopt.

Chapter Summary

The second chapter had provided a detailed discussion and presentation on the related concepts and theories. It first started with a background about the self-service technologies; its functions and major types, followed by a discussion on electronic banking and mobile banking from the perspective of diverse contexts drawing on studies conducted on different continents. In addition, the chapter provided a deeper discussion on related theories and models such as technology acceptance model, theory of reasoned action, and service quality theory. Finally, the chapter concluded with justification of why the model was chosen and the actual conceptual model and then deriving relevant hypotheses to be tested.

CHAPTER THREE

METHODOLOGY

3.1.Introduction

This chapter presents the methodology used in this study beginning with the description on the selected research design, followed by a discussion on research population whether the sample will be drawn. The chapter also displays a discussion on sampling procedures as well as the sample size selection from the population. It also discusses instrument used in this study and research measures. Further, the chapter exhibits with a detailed discussion on techniques used for data analysis, as well as validity and reliability indicators. Finally, the chapter concludes with a brief summary on the discussed topics.

3.2 Research Design

A consideration is to be given to the type of data needed to be collected particularly during the planning process of any research study. It has been divided the data to be collected into qualitative data and quantitative data based on the approach of analyzing the data. As such, this study falls under the second category, which is quantitative approach as indicated by the research objectives and research questions. Quantitative approach has been defined as "a means for testing objective theories by examining the relationship among variables. These variables, in turn, can be measured, typically on instruments, so that numbered data can be analyzed using statistical procedures" (Creswell, 2009, p.4).This approach also involves numerical data obtained from the real world in number forms (Punch, 2005), which the researchers are converting into real world actions by means of data labelling and the process of measurement.

Quantitative approach constitutes two broad categories namely survey and experimental research designs. This study adopts the first type which survey design. Survey design is defined as an approach which "provides a quantitative or numeric description of trends, attitudes, or opinions of a population by studying a sample of that population" (Creswell, 2009, p.145). He

contends that the basic intent is to generalize the results from the sample perspective to the wider population which they were selected from.

There are numerous types of surveys; the most popular types include cross-sectional surveys and longitudinal surveys(Creswell, 2009). The first is the main target for the current study as the time and financial constraints would not allow the researcher to collect the data from the respondents at several times within a specified timeframe. Therefore, cross-sectional survey design is deemed suitable for the current study.

Cross-sectional research designs are a prevalent techniques in social sciences and "involves observations of a sample, or cross section, of a population or phenomenon that are made at one point in time" (Babbie, 2011, p.110). Bryman (2012) defined cross-sectional research as a design that "entails the collection of data on more than one case (usually quite a lot more than one) and at a single point in time in order to collect a body of quantitative or quantifiable data in connection with two or more variables (usually many more than two), which are then examined to detect patterns of association" (p.58). This design can be used as an explanatory or descriptive in nature. In this research design, the researcher explains and describes the situation of target population. In simple words, cross-sectional are based on observations or data collected in a single point of time.

Cross-sectional surveys are widely adopted by researchers, mostly from social sciences to study phenomenon of interest. Survey design has been chosen for this study because it has been described it as "the best method available to the social researcher who is interested in collecting original data for describing a population too large to observe directly" (Babbie, 2011, p.270). Survey design is also useful for measuring perception and attitude of a large population towards certain issues. As described by Babbie (2011), Surveys include the use of a questionnaire which is an "instrument designed to elicit information that will be useful for analysis" (p.271). The survey designs allows the research to collect a large scale of data from the respondents in an easy and efficient ways, which provides an opportunity to the researcher

to analyse these data in many different ways (Babbie, 2011; Bryman, 2012; Creswell, 2009).The survey strategy is used because it is a popular and common strategy in business and management research.

3.3. Research population

The target population of this study was individual and business customers of banking industry in the country since customers represent a good source of information to analyze the a given phenomenon. Currently, there are two banks which provide mobile banking services namely Alsalam bank and Faisal Islamic Bank of Sudan. There is no comprehensive customer directory in Sudan, while the number of mobile-Banking users is remaining unknown. However, there are currently almost twenty thousand customers registered with these two banks, with a total of 19,334 as shown in the below table.

Table 3.1: The target population of the study

No	BANK	Target population
1	▸ Faisal Islamic Bank	15,304
2	▸ Alsalam Bank	4,030
Total		**19,334**

3.4. Sampling procedure

Sampling is a process defines the means of selecting the target subjects from a large segment of a population. There are two broad types of sampling, namely probability sampling and non-probability sampling (Babbie, 2011; Bryman, 2012; Wolfer, 2007). The full set of cases from which a sample is taken is called the population. In sampling, the term ‘population’ is not used in its normal sense, as the full set of cases need not necessarily be people. Collecting data from a sample, which represents the entire population, would provide results that are more useful (Saunders, Lewis, & Thornhill, 2009).

This study uses a quota sampling procedures to collect the desired information from the target population. Quota sampling is a part of nonprobability family and used when there is no

systematically defined structure of the subjects under investigation(Babbie, 2011; Saunders et al., 2009) and does not apply random selection, therefore it is not representative of the whole population (Wolfer, 2007). This approach is useful because its main purpose is "to produce a sample that reflects a population in terms of the relative proportions of people in different categories, such as gender, ethnicity, age groups, socio-economic groups and region of residence, and in combinations of these categories" (Bryman, 2012, p.203).

This technique of sampling is most appropriate when it is needed to represent each proportion of the population in the sample (Wolfer, 2007). As described by Babbie (2011), quota sampling start with "a matrix, or table, describing the characteristics of the target population" (p.208). As such, this sampling procedure is more suitable for the current study and it has numerous advantages including that the "sample [drown through this approach] will have the same distribution of characteristics assumed to exist in the population being studied" (Babbie, 2011, p.208).

It depends on the research purpose which defines the structure and characteristics of the population. Therefore, this study drives the characteristics of mobile banking customers in the country, by drawing on two banks which provide mobile banking services in the country, namely Alsalam bank and Faisal Islamic Bank of Sudan. As suggested by Bryman (2012), the researcher should decide the number of respondents for each category or in a more formal way known as *Quotas*. The main Quotas here in this study are the customers of the two banks. In addition, the other Quotas include gender and employment status.

3.5. Sample size

The sample size allows generating findings that are representative of the whole population. According to Israel (1992) the sample size can be shown in high or low numbers based on the level of precision (e) in any research study. However, the level of precision in this research study used (.05 percept).

Wolfer (2007)asserted that large sample size can decrease the sampling error and thus make the results more accurate. In order to select a sample size for a population of over 10 million people, the researcher needs a sample size of less than 1%. It is impossible to study the whole population because of many factors including time constraints, financial constraints, unavailability, or inaccessibility. Moreover, Bryman (2012)assumes that the decision on sample size is always affected by time and cost considerations. In this context, he assumes that, 1,000 individuals in the UK hold the same validity of 1,000 in the USA, regardless of the larger population between the two countries.

As shown in Figure 3.1 below, the actual sample size for this study is 400. However, the researcher distributed 500 questionnaires in order to increase response rate and support statistical analysis as the model is somewhat complex containing more than 7 constructs. More sample size was allocated to the Faisal Islamic Bank (n=396) as its population is larger than the Alsalam Bank. Therefore, it will not be fair to select equal samples from the two banks.

Table 3.2: The sample size of the study

No	**Name of banks**	**Sample size**
1	▸ Faisal Islamic Bank	396
2	▸ Alsalam Bank	104
Total		**500**

Figure 3.1
Sample Size Formula

$$\mathbf{n} = \frac{N}{1 + N(e)^2} = \frac{19334}{1 + 19334(.05)^2} = 400$$

Where:

- n is the required sample size
- N is the target population
- e is the margin of error (0.05 or 5%).

3.6. Research instrument

This study used a questionnaire instrument to elicit information and data from the respondents regarding the main variables and concepts in the study. The instrument contained close-ended questions and Likert scale questions. List questions were offered to the respondents any of which may be selected. The researcher had distributed 500 questionnaires across the two Banks based on the defined sample size. It consisted of three main sections. The first section collected background information of the respondents such as gender, age groups, education level, occupation, marital status, experience with the bank as well as experience with the mobile banking service.

The second section intended to elicit information regarding usage of mobile banking among the customers, asking them to provide their frequency of usage per week, time spent online through mobile phone, which mobile banking they are subscribing to, and finally their main reasons to use mobile banking services.

Finally, the third section collected information and responses regarding the main variables used in the hypothesized model. Five main constructs represented service quality dimensions, namely reliability, responsiveness, efficiency and convenience. Three constructs represented TAM model: perceived usefulness, perceived ease of use, and behavioural intention, while two contrast representing bank associated perceptions: perceived risk and perceived trust. Subjective norms of Theory of reasoned action consisted of two dimensions: descriptive norms and injunctive norms.Finally, this section also collected responses regarding the main moderators (situational factors) in the study namely waiting time and task interruption.

3.7. Research measurements and operational definitions

A survey has been adopted with a questionnaire consisting of several items, which tries to elicit some information and responses regarding the main constructs in the models as well the related

demographic characteristics, and experience with mobile banking technology. The major variables in this study were measured using five-point Likert scale ranging from:

1. Strongly disagree (SD)
2. Disagree (D)
3. Neutral (N)
4. Agree (A)
5. Strongly Agree (SA)

3.7.1. Perceived Usefulness Measurement

Perceived usefulness is about the consumers' perceptions about the effectiveness of mobile banking in helping the consumers to perform the financial transactions quickly and efficiently. This variable is measured with seven (7) items derived from previous studies as shown in table 3.3 below.

Table 3.3: Perceived usefulness measurement

No.	Items	SD	D	N	A	SA	Source (Adapted from)
1.	Use of M-Banking will allow me to do things faster;						F. Davis et al., (1989); Lu, Liu, Yu, & Wang, (2008)
2.	Use M-Banking can significantly increase the quality or output of my life;						
3.	Use of M-Banking can increase the effectiveness of my performance;						
4.	M-Banking can increase the quality of output for same amount of effort;						
5.	Considering all tasks, the use of M-Banking could assist my study/life;						
6.	M-Banking can increase my degree of mobility;						
7.	I find M-Banking useful in my daily life;						

3.7.2. Perceived Ease Of Use Measurement

Perceived ease of use is operationalized as the consumers' perceptions about the mental and physical efforts required for performing financial transactions using mobile banking. Perceived ease of use is the second most important factor in TAM model. The variable is measured with five items tapping easiness of operation, accomplishing transactions, mental efforts required to perform, easiness of sending and receiving money through mobile banking and finally the overall perceived easiness. Respondents were asked to indicate their level of agreement or disagreement with the items using five-point Likert scale as shown in Table 3.4.

Table 3.4: Perceived ease of use measurement

No.	Items	SD	D	N	A	SA	Source
1.	Learning to operate M-Banking is easy for me;						F. Davis et al., (1989); Lin, (2011)
2.	It is easy to adopt M-Banking to accomplish banking transactions;						
3.	Interaction with M-Banking requires a little of mental effort;						
4.	Using M-Banking I can easily send and receive money;						
5.	I believe that adopting M-Banking is easy to use;						

3.7.3. Behavioral intention to adopt mobile banking

Behavioral intention is the third construct in TAM variables and the only dependent variable in the hypothesized conceptual model. Behavioral intention is about the assumption if the consumers are given the chance what they should do. It is measured with five items capturing the frequency of intention, prediction to use, continuance to use, and recommendation to friends and family members.As shown in Table 3.5, Respondents were asked to indicate their level of agreement or disagreement with the above items based on five-point Likert scale.

Table 3.5: M-Banking Adoption measurement

No.	Items	SD	D	N	A	SA	Source
1.	Assuming I have access to M-Banking, I intend to use it frequently;						Lu et al., (2008); Ali & Dhaha, (2014)
2.	Given that I have access to M-Banking, I predict that I would use it;						
3.	I intend to continue using M-Banking;						
4.	I intend to recommend for my friends to use M-Banking;						
5.	I intend to recommend for my family members to use M-Banking;						

3.7.4. Perceived risk

The construct is about the consumers' perception on associated risk with using mobile banking technology for financial transactions and about uncertain negative consequences of using the technology. It captures the perception of maturity of the technology, completeness of the service, quality of the technology, and availability of sufficient experts in the service provider. The variable was measured with four items with Likert scale of agreement-disagreement form as displayed in Table 3.6.

Table 3.6: Perceived risk measurement

No.	Items	SD	D	N	A	SA	Source
1.	I believe that the current M-banking technology is not yet mature;						Teng, Lu, & Yu, (2009); Ali & Dhaha, (2014)
2.	I believe that the current M-banking services are not yet complete;						
3.	I believe that the quality of the current M-banking handsets is not yet stable;						
4.	I believe that the company, which provides M-Banking, has no enough experts.						

3.7.5. Perceived Trust Measurement

Trust is an important element when it comes to online and mobile banking adoption. The acceptance of the consumers to adopt mobile banking technology depends on how much trust they place on the technology and service provider. In this study, trust refers to the perception of the consumers regarding confidentiality of their information, security of the transaction, privacy, safety of the environment and finally the caring from the staff. It has measured with five items as presented in the table below, based on five-point Likert scale.

Table 3.7: Perceived trust measurement

No.	Items	SD	D	N	A	SA	Source
1.	Using M-Banking, I believe my information is kept confidential;						Foon & Fah, (2011); Yu, (2012)
2.	Using M-Banking, I believe my transactions are secured;						
3.	Using M-Banking, I believe my privacy is secured;						
4.	Using M-Banking, I believe the banking environment is safe;						
5.	Using M-Banking, I believe the staff take care of my information						

3.7.6. Subjective norms

It refers the influence from social surroundings have on someone to perform or not perform a behavior. There are two types of subjective norms: descriptive norms which refer to do what your friends, family member and highly social status have done, and injunctive norms which refer to what your social surrounding think you should do. In the first, you are just following your social surrounding while in the latter; you are complying to fit with the group. As shown in Table 3.8, both of the dimensions were measured with three items each following five-point Likert scale.

Table 3.8: subjective norms measurements

No.	Items	SD	D	N	A	SA	Source
Descriptive norms							Li, Dong, & Chen, (2012); Ajzen, (2006)
1.	I would use M-banking service if my friends use it;						
2.	I would use M-banking service if my family uses it;						
3.	I would use M-banking service if prestigious people (such as experts) use it;						
Injunctive norms							
1.	My friends think I should use M-banking						
2.	My family would want me to use M-banking						
3.	people whose opinion I value would prefer me to use M-banking						

3.7.7. Measurement of reliability dimension of service quality

Reliability is the first dimension of the service quality construct and it refers to the feeling of the consumers that the mobile banking technology is reliable and dependable. It specifically taps the fulfillment of the promise made by the bank, accurateness of the records from the bank, and time required for processing the transactions. It is measured with three items based on five-point Likert scale (table 3.9).

Table 3.9: Reliability dimension measurement

No.	Items	SD	D	N	A	SA	Source
1.	Mobile banking provides me the services exactly as promised						Parasuraman et al., (1985)Kumar et al., (2010)
2.	My mobile banking provides accurate records of all my transactions						
3.	My mobile banking transaction are processed accurately						

3.7.8. Measurement of responsiveness dimension of service quality

Responsiveness is the second dimension of service quality construct and it refers to how the staff of the bank are responsive to the needs, inquires and information-seeking of the consumers. It refers to the promptness of the responses if the transaction is not completed, how quick the staff to handle mistakes and errors, clarity of the information related to the charges made by the bank, as well as informing the consumer the exact time required to perform the transaction. The construct is measured with four items following five-point Likert scale as exhibited in the Table below.

Table 3.10: Responsiveness dimension measurement

No.	Items	SD	D	N	A	SA	Source
1.	My mobile banking provides prompt responses if my transaction is not processed						Parasuraman et al., (1985)
2.	If there is a mistake, my mobile makes it right quickly and effectively						
3.	Mobile banking charges related to transaction, are clearly informed to me						
4.	I know exactly when my transaction will be performed						

3.7.9. Measurement of efficiency dimension of service quality

Efficiency indicates how and easy effective mobile banking technology for performing financial transactions. It specifically focused in this study the easiness of navigation features, efforts required for using mobile banking, simplicity of registration process, and possibility of creating positive experience with the usage of mobile banking. Efficiency in this study is measured with four items based on agreement-disagreement form.

Table 3.11: Efficiency dimension measurement

No.	Items	SD	D	N	A	SA	Source
1.	It is easy to navigate i.e. get anywhere on the mobile banking site						Joseph et al., (1999); (Parasuraman et al., 2005)
2.	Using Mobile Banking does not require lots of efforts						
3.	The Mobile Banking registration process is simple						
4.	Mobile Banking creates a positive experience for me						

3.7.10. Measurement of convenience dimension of service quality

Convenience is the last dimension used to measure service quality factor and it refers to the feelings of the consumers about how convenient mobile technology is. Specifically, the dimensions refers to the quickness of performing transaction using mobile banking, saving the time for the consumers, easiness for looking banking information, variety of communication medium, availability of customer service representative when there is a need or problem, receiving relevant transaction confirmation within a short period of time, and availability of the service all the time. Convenience is measured with seven items using five-point Likert scale of agree-disagree format.

Table 3.12: Convenience dimension measurement

No.	Items	SD	D	N	A	SA	Source
1.	Mobile Banking enables me to complete a banking transaction quickly						Joseph et al., (1999); Kumar et al., (2010)
2.	Using Mobile Banking saves time compared to going to branch, ATM or using computer						
3.	It is easy to look for banking information						
4.	The bank provides all communication medium like SMS, email, toll free no. to communicate problems related Mobile banking						
5.	I can speak to customer service representative if there is a problem related to mobile banking transaction						
6.	All my mobile banking relevant transaction confirmation details are sent by SMS or e-mail within 24 hours						
7.	Mobile Banking is available all the time						

3.7.11. Situational factors as moderators

Situational factors in this study refer to two broad perceptions of consumers about the waiting time the process will take as well as the Task interruption. Therefore, two dimensions will be used in this study to act as moderators namely waiting time and Task interruption. The first one refers to the delay can the graphics make to the application, time taken by uploading the information, obtaining confirmation regarding the inquiry, and finally time taken by the whole process to complete the transaction.

On the other hand, Taskinterruption refers to the stability of the network for performing transactions on mobile banking, simplicity of methodsfor conducting transaction on mobile banking and finally whether mobile banking is frustrating or not. Furthermore, waiting time was measured with three items whereas task redundancy was measured with three items, using five-point Likert scale for both the dimension as shown in the table below.

Table 3.13: Situational factors measurements

No.	Items	SD	D	N	A	SA	Source
Waiting time							
1.	The graphics on the application delayed my transaction.						Dabholkar & Bagozzi (2002); Rajamma, Paswan, & Hossain, (2009); Wang et al., (2012)
2.	I had to wait for some time (e.g. for more than 10 sec) for the application to upload.						
3.	It took a while to get confirmation for my inquiry.						
4.	It took more than ten seconds to process my transaction.						
Task interruption							
1.	Using M-banking requires a lot of intellectual trials.						
2.	Using M-banking can be frustrating.						
3.	M-banking is a simple method to conduct banking transactions.						

3.8. Data Gathering Procedure

The researcher translated the questionnaire into Arabic language. A questionnaire written in Arabic language was distributed to the respondents. The researcher obtain data collection permission letter from Postgraduate faculty of Sudan University of Sciences and Technology (SUST). The letter requested to give the researcher a full access that can help her gather the required information and pledges that the information gathered from the respondents will only be used for an academic purpose. The researcher collected data using hand delivery method and some assistance from friends. The researcher delivered the questionnaires by hand to each respondent and collected later. This type of questionnaire is called delivery and collection questionnaires.

3.9. Data analysis techniques

The survey strategy allowed the researcher collecting quantitative data; therefore, the researcher exercised quantitative techniques to analyze and interpret the data. Quantitative is used as a synonym for any data collection technique (such as a questionnaire) or data analysis procedure (such as graphs or statistics) that generates or uses numerical data(Saunders et al., 2009).According to Allison (1998), if a study has more than one independent variable, then a multiple regression test is the strongest possible technique to be employed. In order to conduct this advanced analysis, the study tested the reliability of the questionnaire to ensure the validity of the result.

This study employed Statistical Package for Social Sciences (SPSS) version 20.0 to analyze the data collected from the respondents. Both descriptive and inferential statistics were used. The following statistical techniques were employed in this study:

- Factor analysis: to assure the goodness of measurements.
- Cronbach's alpha: for reliability to measure the internal consistency of the main variables of the study.
- Descriptive statistics to describe the respondents' characteristics.

- Pearson correlation is to see the degree of correlation between main variables.
- Multiple regression:to test the effect of IV to DV effect as well as to analyse the moderating effect.

Descriptive statistics was applied to organize, summarize, and present data in an informative way. The interpretations of the mean values are shown in a table 3.14. In addition, the researcher will test the hypothesis using linear regression and multiple regression in chapter one. Relationship testing will use correlation analysis to determine whether there is a relationship between main variables. Table 3.15 shows the meaning of the values of correlation coefficient**.** The researcher also used factor analysis methods to determine the strength of the items, as well to achieve convergent and discriminant validity.

Table 3.14: The interpretations of the mean values

No.	Mean Range	Interpretation
1.	1.00 up to 1.80	Strongly Disagree
2.	1.80 up to 2.60	Disagree
3.	2.60 up to 3.40	Neither
4.	3.40 up to 4.20	Agree
5.	4.20 up to 5.00	Strongly Agree

Table 3.15: The meaning of the values of correlation coefficient

No	Coefficient correlation	Meaning
1.	-1	Perfect negative
2.	-0.7 up to -1	Strong negative
3.	-0.5 up to -0.7	Moderate negative
4.	-0.3 up to 0.5	Weak negative
5.	0	Perfect independency
6.	0.3 up to 0.5	Weak positive
7.	0.5 up to 0.7	Moderate positive
8.	0.7 up to 1	Strong positive
9.	1	Perfect positive

3.10 Validity and reliability

Validity is an important aspect to be carefully considered when measuring social sciences theories, it refers to the extent that the measures of the questionnaire exactly measure what it supposed to be measuring (Antonius, 2003; Neuman, 2007). It has been argued that validity

"suggests truthfulness and refers to the match between a construct, or the way a researcher conceptualizes the idea in a conceptual definition and a measure" (Neuman, 2007, p.115). There are several types of validity such as face validity, content validity, criterion validity and construct (measurement) validity. However, we are concerned in this research two types of validity namely face validity, and construct validity.

Face validity is conducted to see whether the instrument, by looking at, measures what intended to measure and can be achieved through consultation with experts (Wimmer & Dominick, 1994). Therefore, the researcher consulted the experts before administering the instrument to the respondents for seeking their suggestion and feedback on the relevance of indicators measuring the constructs. There were no modifications or suggestions from the experts as the items derived from the established literature.

On the other hand, construct validity or measurement validity refers to "how well conceptual and operational mesh with other. The better the fit, the greater the measurement validity" (Neuman, 2007, p.118). Construct validity assesses "evaluates a measure by how well the measure conforms with theoretical expectations" (De Vaus, 2002, p.54). The construct validity in this study will be established using factor analysis for the variables in the model to examine their convergence and discriminant validities. The first one (convergence validity) refers whether the items are converging each other. In another way, the items should highly load on the intended factors, while discriminant validity refers to the extent that the constructs are different from each other and have not high correlation among them (Hair et al., 2010).

Reliability, on the other hand, is an important indictor which tells us the dependability and stability of the instrument. It refers consistency among items itself and if they were repeated in a similar context they should be stable or reach a minimum level by obtaining a desirable score (De Vaus, 2002; Hair et al., 2010; Neuman, 2007). There are two common types of reliability that is used in social sciences namely test-retest reliability and internal reliability. However, test-retest was considered to be poor and not recommended for social sciences (De

Vaus, 2002). In this study, we are concerned with internal reliability by using Cronbach's alpha coefficient. It has been suggested several ways to improve reliability, namely 1) Clearly conceptualized construct, 2) use a precise level of measurement, 3) use multiple indicators, and 4) use pilot-test (Neuman, 2007, p.116). in addition, in order to improve reliability De Vaus(2002) suggested to use multiple items, careful question wording, and avoiding questions people have no opinion or knowledge, which can simply lead to "do not know" response. A construct is considered if Cronbach's alpha coefficient is .70 above (De Vaus, 2002), although it is acceptable in the case of exploratory nature to have lower than this threshold (Hair et al., 2010).

3.11 Ethical consideration

The researcher will treat ethical issues that arose across the stages and duration of a research project by maintaining of the confidentiality of data provided by participants and their anonymity; ensuring voluntary nature of participation and the right to withdraw partially or completely from the process and avoiding of embarrassment, stress, discomfort, pain and harm to participants. The collected responses will only be used for academic purposes. **Chapter Summary**

The chapter has discussed various issues related to the methodology and approached used for data collection, management as well as data analysis. It started first with the research design approach, population, sampling procedure, determining sample size, research instrument, research measures and operational definitions. The chapter also has discussed data gathering procedure, data analysis techniques, validity and reliability. Finally, the chapter had concluded with a discussion of ethical considerations for conducting the research; thus ensuring voluntariness, anonymity, and confidentiality of the responses given by the consumers and its usage for academic purposes only.

CHAPTER FOUR

FINDINGS OF THE STUDY

4.1. INTRODUCTION

This chapter presents the results of the study with a detailed description on both descriptive and inferential statistics. The chapter first starts with data entry and data cleaning using frequencies to detect any error or mistyping. The chapter discusses validity and reliability using factor analysis and Cronbach's alpha coefficient respectively. It also presents normality test analysis, descriptive statistics for all dimensions used in the model and zero-order correlations among all dimensions before testing the hypotheses of the study.

4.2. DATA ENTRY AND CLEANING

The filled questionnaires, obtained from the respondents, were entered into the program of Statistical Package for Social Sciences (SPSS) version 20.0. A master coding was prepared prior to data entry by labeling the variables and providing the values for the scales. After all data were entered into the program, a data cleaning and screening test was conducted using frequencies to detect any error in the entered data. Several wrong entries were identified and were corrected accordingly. Therefore, the error was eliminated and the analysis was run again to ensure no more errors in the data. After making the required correction and data screening, the next step is to proceed for the further analysis starting with descriptive statistics.

4.3. PROFILE OF RESPONDENTS

This section presents the profile of those who responded to the current study. A total of 349 customers of mobile banking services provided by Bank Salaam and Bank Islamic Faisal had participated and filled the questionnaires measuring the underlying factors that contribute to the respondents' behavioral intentions to adopt mobile banking services. Table 4.1 displays the profile of the respondents. The study collected some background information regarding gender, marital status, age, educational levels, occupation and marital status.

More than half of the respondents (57%) were male, whereas the rest (43%) were females. In terms of age categories, more than half of the respondents (58%) were aged between 26-35 years, followed by those who are less than 25 years old (23%). Few of the respondents (14%) were aged between 36-45 years whereas very few of them were older than 45 years (6%).

As for educational levels, about two-thirds (66%) of the study participants were bachelor degree holders. Less than a quarter of the respondents were either high school certificate holder (17%) or postgraduate degree holders (16%). With regard to occupation, almost half the respondents (43%) were working as government officers, followed by those who work as private employees (37%). Less than a quarter of them (16%) were doing their own business while very few of them identified themselves as students (4%). The last category of the respondents' profile was pertaining to the marital status. Slightly more than half of the study participants (52%) were married and about one-third were single at the time of data collection. Very few of the respondents were either divorced (8%) or widowed (3%).

Table 4.1
Profile of the Respondents of the Study

Profile of the Respondents	Category	Frequency	Percentage
Gender	Male	199	57.0
	Female	150	43.0
	Total	**349**	**100.0**
Age	Less than 25 years	79	22.6
	26-35 years	201	57.6
	36-45 years	49	14.0
	Above 45 years	20	5.7
	Total	**349**	**100.0**
Educational level	High school or less	60	17.3
	Bachelor	230	66.3
	Post graduate	57	16.4
	Total	**347**	**100.0**
Occupation	Business	54	15.5
	Governmental officer	151	43.3
	Employee	129	37.0
	Student	15	4.3
	Total	**349**	**100.0**
Marital status	Single	129	37.2
	Married	181	52.2
	Divorced	27	7.8
	Widow	10	2.9
	Total	**347**	**100.0**

4.4. Mobile banking usage

This section discussed the mobile banking usage among the study participants. Table 4.2 displays the detailed usage among the respondents. In terms of experience with the bank, about half of the respondents (52%) had an experience of 2-5 years, followed by those who had less than one year experience (28%). Less than one-fifth of the respondents (17%) reported having experience of 6-10 years, whereas very few of them reported more than 11 years of experience (3%).

When it comes to experience with the mobile banking, almost close to half of the respondents (46%) reported about 7-12 months experience; about one-third of them had less

than 6 months experience with mobile banking; about one-fifth of them had experience of 13-18 months (13%); and very few of them (7%) reported experience of more than 19 months.

With regard to frequency of mobile banking usage, almost half of the respondents (48%) reported using the mobile banking between 1-3 times per day; about a quarter of them said less than 1 time per day (24%); about one-fifth of them had used mobile banking between 4-6 times per day. Very few of the respondents (10%) reported using mobile banking more than 7 times per day.

As for time spent in using mobile banking per week, about two-thirds of the respondents had used mobile banking between 1-5 hours per week (61%), followed by those who used less than 1 hour per week (28%). However, very few of the respondents reported using mobile banking between 6-10 hours per week (8%) and more than 11 hours per week (2%).

The last category addressed the reasons for using mobile banking among the respondents. Slightly more than one-third of the study participants (39%) mentioned that they had used mobile banking because of the need for urgent transactions. About one-third of them (31%) had used it to save their time, followed by those who used it for convenience of time (19%) and were not able to go to bank's branch (12%).

Table 4.2
Mobile banking usage

Mobile Banking Usage	Category	Frequency	Percentage
Experience with the bank	Less than 1 year	97	27.8
	2-5 years	183	52.4
	6-10 years	59	16.9
	More than 11 years	10	2.9
	Total	**349**	**100.0**
Experience with the mobile banking	Less than 6 months	158	34.3
	7-12 months	46	45.5
	13-18 months	24	13.3
	More than 19 months	158	6.9
	Total	**347**	**100.0**
Frequency of using M-banking	Less than 1 times	85	24.4
	1-3 times	168	48.1
	4-6 times	62	17.8
	7-9 times	20	5.7
	More than 10 times	14	4.0
	Total	**349**	**100.0**
Time spent using mobile banking per week	Less than 1 hour	98	28.3
	1-5 hours	212	61.3
	6-10 hours	28	8.1
	11-15 hours	8	2.3
	Total	**346**	**100.0**
Reasons for using mobile banking services	Convenience of time	65	19.0
	Need for urgent transactions	133	38.8
	Time saving	105	30.6
	Unable to go to bank's branch	40	11.7
	Total	**343**	**100.0**

4.5 Validity for All Constructs in the Model

This section presents the results of validation of all constructs in the model. A separate factor analysis process was performed for TAM model dimensions (perceived usefulness, perceived ease of use, perceived trust, and perceived risk); service quality dimensions (responsiveness, reliability, convenience, and efficiency); subjective norms dimension (descriptive norms and injunctive norms), situational factors dimensions (waiting time and perceived complexity) and finally for behavioral intention of adopting mobile banking.

4.5.1. Factor analysis for TAM dimensions

In order to validate the TAM model constructs, a factor analysis were conducted for the four dimensions namely perceived usefulness (seven items), perceived ease of use (five items), perceived trust (five items), and perceived risk (four items) by using principle components (PC) with Varimax rotation. PC is widely used and it is most appropriate when data reduction and validation are the major concerns of the researcher (Hair, Black, Babin, & Anderson, 2010).

Prior running the factor analysis, the researchers conducted analysis to test the assumptions of factor analysis. Several criteria as suggested by Hair et al. (2010) were used before interpreting the extracted components. First, it was determined that the sample size of this study is sufficient enough to run for factor analysis. Measure of sampling adequacy (MSA) was conducted using Kaiser-Olkin Measure (KMO) Bartlett's test of sphericity. KMO should be greater than 0.50, while Bartlett's test should be significant at 0.05 (Hair et al. 2010, Kline, 2010).

Table 4.3

Sampling adequacy for TAM dimensions

Kaiser-Meyer-Olkin Measure of sampling adequacy (KMO)		
KMO	:	.799
Bartlett's test of sphericity		
Approx. Chi square	:	1396.312
df.	:	91
Sig.	:	.000

Several criteria for factor extraction and interpretation were used, including latent root criterion (Eigenvalue greater than one), priori criterion since the items were adopted from previous studies, followed by percentage of variance that was explained, factor loadings, and communalities (Hair et al, 2010).

As recommended by Hair et al. (2010), the percentage of variance should be greater than 60% and in some cases in social science, a below 60% is observed. Factor Loadings should be greater than .5 for practical significant and interpretation of a factor, and communalities should be greater than .50, which means that each item contributes to the factor. Tables 4.4 and

4.5 as well figure 4.1 show factor loadings, scree plot, Eigenvalues, descriptive statistics, communalities, variance explained and the reliability of each variable.

Table 4.4
Descriptive statistics and communalities for TAM dimensions

Label	Items for TAM dimensions (N=258)	Mean	*SD*	Communalities
PU2	Use M-Banking can significantly increase the quality or output of my life.	3.99	.779	.568
PU3	Use of M-Banking can increase the effectiveness of my performance.	4.03	.783	.653
PU4	M-Banking can increase the quality of output for same amount of effort.	3.91	.836	.612
PEU1	Learning to operate M-Banking is easy for me.	4.03	.801	.725
PEU2	It is easy to adopt M-Banking to accomplish banking transactions.	3.93	.783	.509
PEU5	I believe that adopting M-Banking is easy to use.	3.91	.856	.569
PT1	Using M-Banking, I believe my information is kept confidential.	3.86	.832	.557
PT2	Using M-Banking, I believe my transactions are secured	3.83	.852	.744
PT3	Using M-Banking, I believe my privacy is secured.	3.74	.925	.711
PT4	Using M-Banking, I believe the banking environment is safe.	3.59	1.085	.549
PR1	I believe that the current M-Banking technology is not yet mature.	2.96	1.311	.756
PR2	I believe that the current M-Banking services are not yet complete.	2.98	1.284	.825
PR3	I believe that the quality of the current M-Banking handsets is not yet stable.	2.90	1.273	.815
PR4	I believe that the company, which provides M-Banking, has no enough experts.	2.93	1.273	.697

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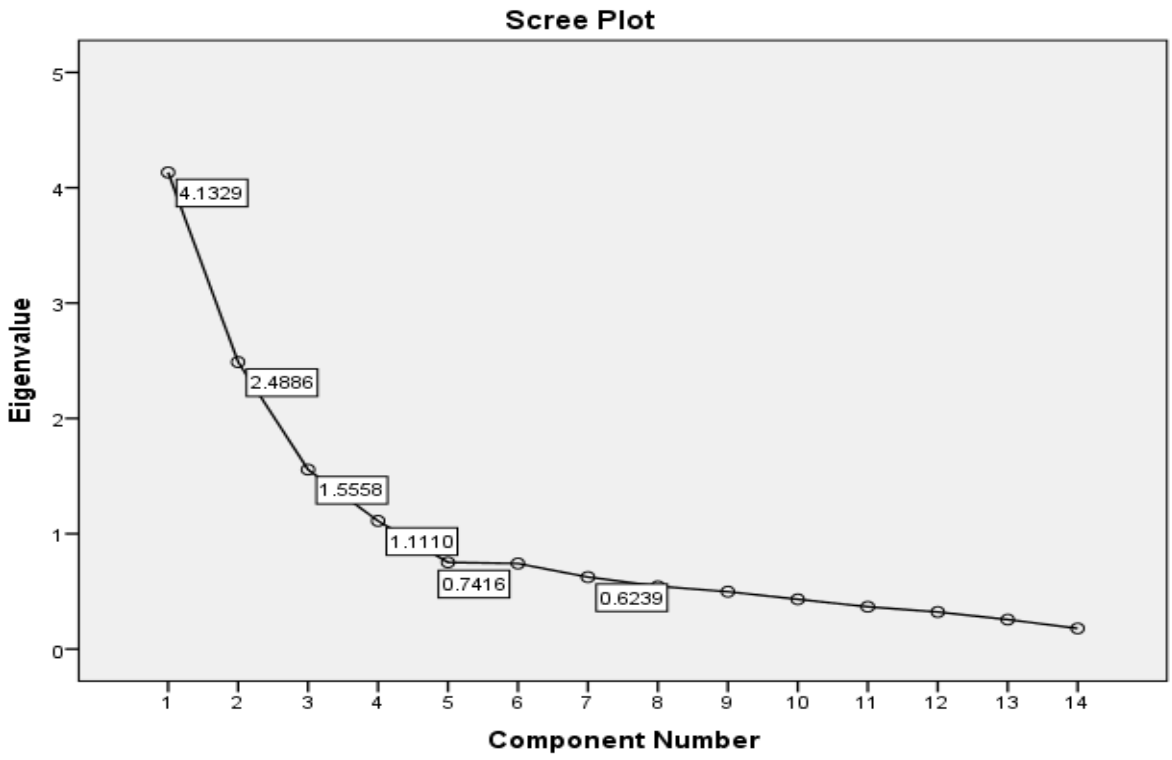


Figure 4.1: Scree Plot for TAM dimensions

As shown in Tables 4.4 and 4.5, all constructs of TAM dimensions in this study obtained an acceptable level in terms of validity and reliability. The entire dimensions in TAM obtained higher loadings (<.50) which show that they are practically important (Hair et.al, 2010). All the dimensions managed to explain more than 66% of variance with Eigenvalues of greater than one, and a communality ranging .509 and .825. With regard to the reliability coefficient, all of the dimensions obtained a high coefficient alpha of more than .60, showing that they are internally consistent (Hair et.al, 2010; Bagozzi & Yi, 1988).

Few items were removed to due low communalities and cross loadings. For example, PU1 (communality=.497), PU6 (communality=.422) and PU5 (communality=.471) from perceived usefulness and PEU4 (communality=.444) were deleted due to low communality score which is lower than the threshold of .50 and above. Furthermore, PU7 from perceived usefulness and PT5 from perceived trust were also eliminated due to cross-loading highly on other factors such as perceived ease of use and perceived risk respectively. Finally, PEU4 from perceived ease of use was removed from the analysis due to its stand as a separate factor and only item cannot make up a factor. As such, this item was disregarded from further analysis.

Table 4.5
Factor analysis for TAM Model Dimensions

Factors			Factor Loading			
	Item Label	**Items**	**F1**	**F2**	**F3**	**F4**
F1: Perceived risk	PR2	I believe that the current M-Banking services are not yet complete.	**.898**	.135	.020	.002
	PR3	I believe that the quality of the current M-Banking handsets is not yet stable.	**.891**	.089	.098	-.054
	PR1	I believe that the current M-Banking technology is not yet mature.	**.857**	.114	.079	.039
	PR4	I believe that the company, which provides M-Banking, has no enough experts.	**.821**	.148	-.004	-.038
F2: *Perceived trust*	PT2	Using M-Banking, I believe my transactions are secured	.111	**.851**	.028	.081
	PT3	Using M-Banking, I believe my privacy is secured.	.180	**.821**	.063	.010
	PT1	Using M-Banking, I believe my information is kept confidential.	.005	**.635**	.390	.048
	PT4	Using M-Banking, I believe the banking environment is safe.	.396	**.592**	.194	.054
F3: Perceived ease of use	PEU1	Learning to operate M-Banking is easy for me.	.074	.014	**.839**	.125
	PEU2	It is easy to adopt M-Banking to accomplish banking transactions.	.107	.128	**.668**	.188
	PEU5	I believe that adopting M-Banking is easy to use.	-.011	.392	**.643**	.038
F4: Perceived usefulness	PU3	Use of M-Banking can increase the effectiveness of my performance.	-.013	-.001	.228	**.775**
	PU4	M-Banking can increase the quality of output for same amount of effort	.064	.089	-.065	**.772**
	PU2	Use M-Banking can significantly increase the quality or output of my life.	-.097	.044	.207	**.717**
		Eigenvalues	3.242	2.393	1.873	1.780
		Percentage Variance Explained	23.154	17.096	13.376	12.717
		Overall variance explained		66.344		
		Reliability	**.904**	**.758**	**.618**	**.629**
		Overall reliability		**.806**		

Note: the scale used in these factors ranged from 1 = strongly disagree to 5 = strongly agree

4.5.2. Factors Analysis for Service Quality Dimensions:

Factor analysis was also conducted to establish the validity of service quality dimensions. Four dimensions have been used in this study namely responsiveness, reliability, convenience and efficiency. A principal component with Varimax rotation has been performed and all items for the above-mentioned dimensions involved in the process.

Before interpreting the factor structure, sampling adequacy for running the factor analysis was tested using Kaiser-Meyer-Olkin (KMPO) and Bartlett's test of sphericity. As shown in table 4.6 below, the KMO value was higher than the recommended threshold of .50

(KMO=.846) whereas the chi square for the Bartlett's test was statistically significant at 0.05 (X^2= 1163.460, df=153, p=.000). This indicates that there are sufficient correlations and the sample size for the current study is sufficiently enough to conduct a factor analysis. Therefore, the researcher proceeds to interpret the factor rotation process.

Table 4.6
Sampling adequacy for Service quality dimensions

Kaiser-Meyer-Olkin Measure of sampling adequacy (KMO)		
KMO	:	.846
Bartlett's test of sphericity		
Approx. Chi square	:	1163.460
df.	:	153
Sig.	:	.000

As presented in table 4.7, the communalities for all items were all above 0.50 ranging .507 to .696. However, all items for responsiveness dimension has been eliminated due to low communalities ranging from .248 to .398 (communalities for Res1=.248, Res2=.373, Res3=.398, Res4=.340). Therefore, this dimension could not be validated by the empirical data.

In addition, three items from convenience were dropped due to low communalities (Conv1=.451, Conv6=.440, and Conv7=.284). Another item (Conv62) from convenience was deleted due cross loading with reliability dimension which is theoretically related.

Table 4.7 also presents means and standard deviation for all valid items. Respondents of this study showed high level of agreement towards the items of service quality ranging from 3.76 to 4.00. The highest mean (M=4.00, SD=.825) obtained by the third item from convenience (It is easy to look for banking information) whereas the lowest mean (M=3.76, SD=.900) belonged to fourth item of convenience (I can speak to customer service representative if there is a problem related to mobile banking transaction).

Table 4.7

Descriptive statistics and communalities for Service quality dimensions

Label	Items for Service quality dimensions (N=305)	Mean	*SD*	Communalities
Rel1	Mobile banking provides me the services exactly as promised	3.87	.856	.546
Rel2	My mobile banking provides accurate records of all my transactions	3.93	.796	.507
Rel3	My mobile banking transaction are processed accurately	3.99	.799	.595
Conv3	It is easy to look for banking information	4.00	.825	.531
Conv4	The bank provides all communication medium like SMS, email, toll free no. to communicate problems related Mobile banking	3.92	.865	.557
Conv5	I can speak to customer service representative if there is a problem related to mobile banking transaction	3.76	.900	.646
Eff2	Using Mobile Banking does not require lots of efforts	3.95	.832	.569
Eff3	The Mobile Banking registration process is simple	3.95	.830	.696
Eff4	Mobile Banking creates a positive experience for me	3.97	.792	.564

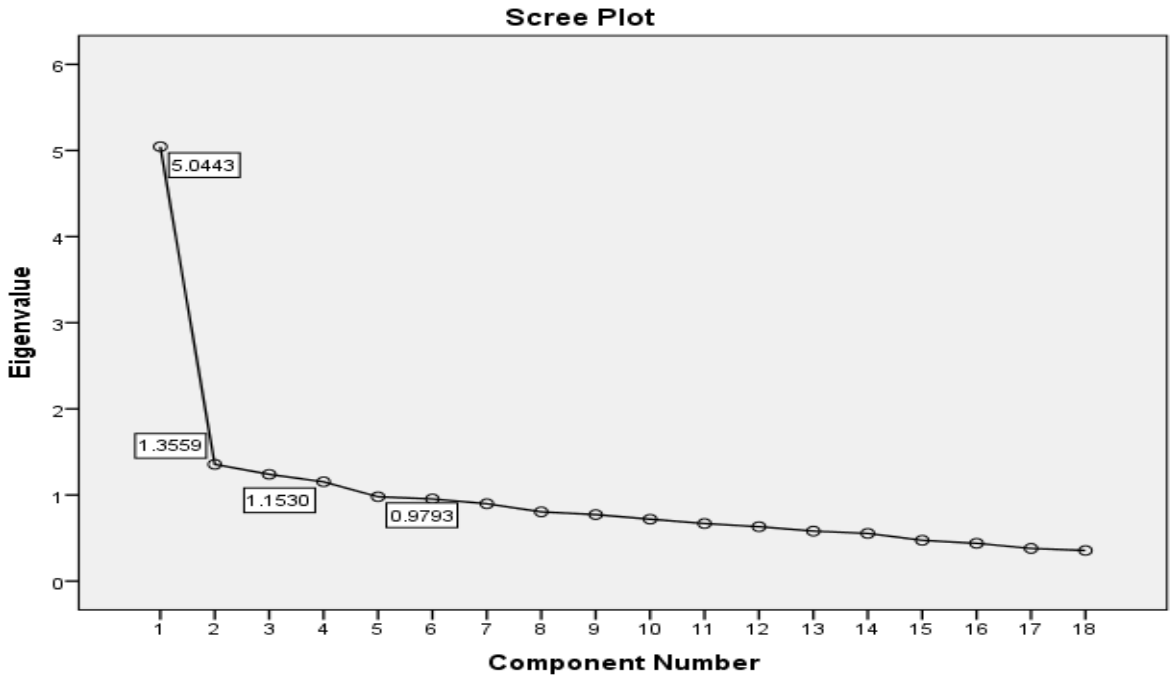


Figure 4.2: Scree Plot for Service quality dimensions

In order to decide how many factors should be extracted, it has been used eigenvalue as criteria for number of components to be extracted from the analysis. Figure 4.2 shows the Scree plot for the service quality dimensions and graphically shows the eigenvalue. Only three components obtained eigenvalue greater than 1 as it can be seen from this figure.

Table 4.8 displays the extracted factors with their items, factor loadings, eigenvalues, variances explained as well as the reliability scores. The first factor was efficiency dimension

consisting of three items after dropping one item, and obtained high factor loadings ranging from .821 to .716. As well, the dimension obtained an eigenvalue of 1.875 which is greater than 1 as recommended in the literature. This dimension managed to explain about 21% of variance in service quality with an acceptable Cronbach's alpha of .666 (Bowling, 2009).

The second dimension of service quality is reliability as extracted from rotation process. The dimension managed to be stable as there was no item deleted from original items. This dimension consisted of three items with good factor loadings and eigenvalue of greater than 1. It managed to explain about 20% of variance in service quality and obtained an acceptable Cronbach's coefficient alpha of .599 (Bowling, 2009).

The third and last dimension of service quality is convenience as extracted from rotation process. This dimension initially consisted of seven 7 items, however, only three items remained valid while the rest were dropped due to low communality and cross loading. The dimension managed to obtain good factor loadings of .800 (conv5), .692 (conv4) and .544 (conv3) with an eigenvalue of 1.493. it explained about 17% of variance in service quality with an acceptable reliability coefficient value of .518 (Bowling, 2009). The overall variance explained by all the three dimensions is 58% which is close to 60% as explained by Hair et al. (2010). They asserted that in social science a variance between 50-60% is common particularly when the study is exploratory in nature. Further, the overall reliability score (α=.738) for all the three dimensions were high and acceptable (Bagozzi & Yi, 1988; Bowling, 2009; Hair et al., 2010).

Table 4.8
Factor analysis for Service Quality dimensions

Factors	Item Label	Items	F1	F2	F3
F1: Efficiency	Eff3	Using Mobile Banking does not require lots of efforts	**.821**	.149	.020
	Eff2	The Mobile Banking registration process is simple	**.716**	.082	.220
	Eff4	Mobile Banking creates a positive experience for me	**.716**	.213	.075
F2: Reliability	Rel3	My mobile banking transaction are processed accurately	.095	**.755**	.12 4
	Rel1	Mobile banking provides me the services exactly as promised	.090	**.732**	.052
	Rel2	My mobile banking provides accurate records of all my transactions	.249	**.663**	.071
F3: Convenience	Conv5	I can speak to customer service representative if there is a problem related to mobile banking transaction	-.014	-.075	**.800**
	Conv4	The bank provides all communication medium like SMS, email, toll free no. to communicate problems related Mobile banking	.189	.207	**.692**
	Conv3	It is easy to look for banking information	.244	.418	**.544**
		Eigenvalues	1.875	1.843	1.493
		Percentage Variance Explained	20.833	20.479	16.593
		Overall variance explained		57.905	
		Reliability	**.666**	**.599**	**.518**
		Overall reliability		**.738**	

Note: the scale used in these factors ranged from 1 = strongly disagree to 5 = strongly agree

4.5.3. Factor Analysis for Subjective Norms

Factor analysis was conducted to check the validity of the subjective norms dimensions. Principal components was used, and Varimax rotation as the criteria for extracting components. Like previous factor analysis processes, a sampling adequacy was conducted using KMO and Bartlett's test of sphericity. As presented in Table 4.9 below, sample size for this study is sufficient enough for performing factor analysis as KMO is .755 which is greater than the required level of .50. As well, chi square for the Bartlett's test was also significant at 0.05 (X^2=1043.299, df=21, p=.000), which indicates the existence of sufficient correlations among the items involved in the process.

Table 4.9
Sampling adequacy for Subjective norms dimensions

Kaiser-Meyer-Olkin Measure of sampling adequacy (KMO)		
KMO	**:**	.775
Bartlett's test of sphericity		
Approx. Chi square	**:**	1043.299
df.	**:**	21
Sig.	**:**	.000

As shown in Table 4.10, the communalities for the two dimensions of subjective norms were acceptable and achieved the required level of cut-score. The communalities ranged from .361 to .828 for the all items. Further, the fourth item for injunctive norms (IN4) obtained low communality value (.361); however, this was retained due to the number of items per factor which will be less than 3 items if this item is removed. Another reason for obtaining this item is that it has a good factor loading of .570. In addition, the first item (IN1) was dropped due to cross loading with descriptive norms, which is not supposed to belong to it. The rest of the items have obtained and met the criteria and were retained for further analysis. The table also presents the means and standard deviations for the valid items. The means ranged from 2.78 to 3.40 which indicated a slight agreement towards the items. The highest mean (M=3.40, SD=1.194) obtained by the second item from injunctive norms (My family would want me to use M-banking) while the lowest mean (M=2.78, SD=1.304) goes to the first item from descriptive norms (I would use M-banking service if my friends use it).

Table 4.10
Descriptive statistics and communalities for Subjective norms dimensions

Label	Items for subjective norms dimensions (N=310)	Mean	*SD*	Communalities
DN1	I would use M-banking service if my friends use it.	2.78	1.304	.793
DN2	I would use M-banking service if my family uses it.	2.83	1.300	.828
DN3	I would use M-banking service if prestigious people (such as experts) use it.	2.99	1.253	.771
DN4	I would use M-banking service if advertisement is good.	3.11	1.192	.692
IN2	My family would want me to use M-banking.	3.40	1.194	.696
IN3	Advertisement encourages me to use M-banking.	3.35	1.074	.795
IN4	People whose opinion I value would prefer me to use M-banking.	3.35	1.130	.361

Figure 4.3 below presents the Scree Plot for the subjective norms dimensions which shows the initial number of factors to be extracted based on eigenvalue. The Scree plot suggested that only two factors can be extracted which is conforming to the original number of dimensions.

Two factors were extracted which are similar to the original components of the construct namely descriptive norms (3 times) and injunctive norms (2 items). The first

dimension (descriptive norms) obtained high factor loadings ranging from .805 to .900 and an eigenvalue of 3.055 which is greater than 1. The dimension managed to explain about 44% of variance with a reliability score of .898 which is too high and above the recommended cut-score (Hair et al., 2010). The second dimension consisted of only two items, and obtained an acceptable factor loadings ranging from .570 to .882. It managed to obtain an eigenvalue of 1.882 with a 26% of variance explained. It also obtained a good reliability score of .670. Finally, the overall reliability and overall variance explained were high and within the acceptable range (.810 and 71% respectively).

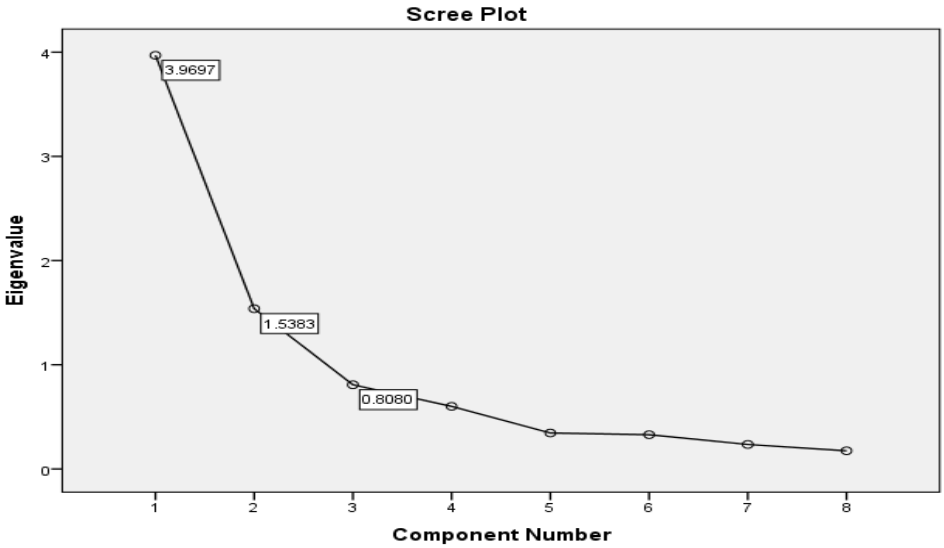


Figure 4.3: Scree Plot for Subjective norms

Table 4.11
Factor analysis for Subjective norms dimensions

Factors	Item Label	Items	F1	F2
F1: Descriptive norms	DN2	I would use M-banking service if my family uses it	**.900**	.132
	DN1	I would use M-banking service if my friends use it	**.885**	.097
	DN3	I would use M-banking service if prestigious people (such as experts) use it	**.871**	.111
	DN4	I would use M-banking service if advertisement is good.	**.805**	.211
F2: Injunctive norms	IN3	Advertisement encourages me to use M-banking.	.134	**.882**
	IN2	My family would want me to use M-banking.	.030	**.834**
	IN4	People whose opinion I value would prefer me to use M-banking.	.189	**.570**
		Eigenvalues	3.055	1.881
		Percentage Variance Explained	43.646	26.871
		Overall variance explained	**70.517**	
		Reliability	**.898**	**.670**
		Overall reliability	**.810**	

Note: the scale used in these factors ranged from 1 = strongly disagree to 5 = strongly agree

4.5.4. Factor Analysis for Situational Factors

Factor analysis was also conducted for the dimensions of situational factors in order to establish their validity before proceeding and using them in further analysis. A principal component was used with Varimax rotation as extraction criteria. All the items involved in the process of factor analysis. Prior to proceeding to extract the factors, a sampling adequacy measures was conducted to determine the sample size and correlation among the items, using KMO and Bartlett's test of sphericity. As shown in Table 4.12, the KMO value (.843) was higher than the required threshold of .50, which indicates that the sample size is sufficient enough for performing factor analysis, while the chi square for sphericity test was significant at 0.05 (X^2=1337.033, df=21, p=.000), which means the existence of sufficient correlations among the items. Based on this, the researcher has proceeded to further interpret the factors extracted.

Table 4.12

Sampling adequacy for Situational Factors dimensions

Kaiser-Meyer-Olkin Measure of sampling adequacy (KMO)		
KMO	:	.843
Bartlett's test of sphericity		
Approx. Chi square	:	1337.033
df.	:	21
Sig.	:	.000

Table 4.13 presents descriptive statistics and communalities for situational factors dimensions. The communalities of all items were all high and above the required criteria of .50, ranging from .647 to .843. No item was deleted from both the dimensions as all of them fulfilled the required level of threshold. In addition, the table presents the means and standard deviations for all the items. The means for the items suggested a low agreement ranging from 2.62 to 2.90. The highest mean (M=2.90, SD=1.243) obtained by the fourth item from waiting time (It took more than ten seconds to process my transaction), whereas the lowest mean (M=2.62, SD=1.243) goes to the first items from task interruption (Using M-banking requires a strong signal).

Table 4.13

Descriptive statistics and communalities for Situational Factors dimensions

Label	Items for situational factors dimensions (N=310)	Mean	*SD*	Communalities
WT1	The graphics on the application delayed my transaction.	2.82	1.226	.647
WT2	I had to wait for some time (e.g. for more than 10 sec) for the application to upload.	2.83	1.316	.843
WT3	It took a while to get confirmation for my inquiry.	2.80	1.270	.807
WT4	It took more than ten seconds to process my transaction.	2.90	1.243	.736
TI1	Using M-banking requires lot of intellectual trials.	2.62	1.243	.786
TI2	Using M-banking can be frustrating.	2.65	1.229	.805
TI3	M-banking is a simple method to conduct banking transactions.	2.91	1.287	.773

The Scree Plot presented in figure 4.4 suggested that it can be extracted from the factor analysis only two components, which is conforming to the original number of dimensions under situational factors. Therefore, it can be proceeded to interpret the rotated components.

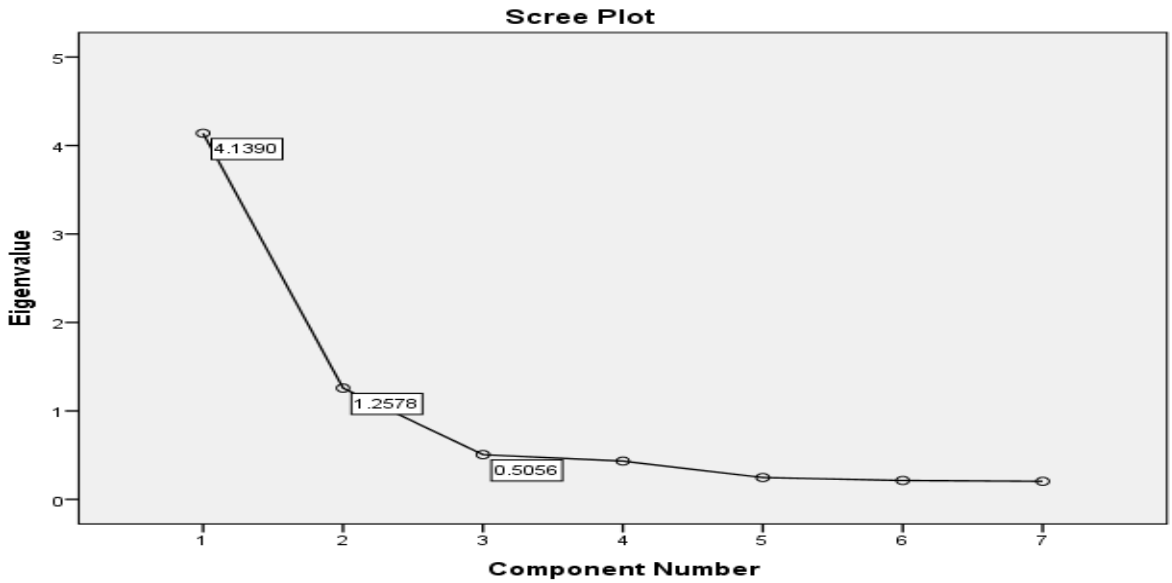


Figure 4.4: Scree plot for Situational factors dimensions

The first factor extracted from the rotation process is waiting time and no item was no deleted from original version for the construct. The dimension consisted of four items with high factor loadings ranging from .780 to .908 which are above the recommended values. The dimension has obtained an eigenvalue of 3.205 which is greater than the criteria of 1. The reliability score for the dimension was high while the variance explained was about 46%. The second dimension was Task interruption which consisted of three items and no item was

deleted from the original pool of the items for the construct. The dimension's factor loadings were high and above the threshold of .50 ranging from .736 to .879, with an eigenvalue of greater than 1 (2.192). The dimension managed to explain about 31% of variance in situational factors construct and obtained a high reliability score of .830. Finally, the overall reliability for the situational factors was also high and above the criteria (α=.880), whereas the overall variance explained also surpassed the recommended cut-score of 60% (77% for the situational factors). Table 4.14

Factor analysis for Situational factors dimensions

Factors	Item Label	Items	F1	F2
F1: Waiting time	WT2	I had to wait for some time (e.g. for more than 10 sec) for the application to upload.	**.908**	.140
	WT3	It took a while to get confirmation for my inquiry.	**.877**	.194
	WT4	It took more than ten seconds to process my transaction.	**.803**	.302
	WT1	The graphics on the application delayed my transaction.	**.780**	.195
F2: Task Interruption	TI3	M-banking is a simple method to conduct banking transactions.	.013	**.879**
	TI2	Using M-banking can be frustrating.	.338	**.831**
	TI1	Using M-banking requires a lot of intellectual trials	.494	**.736**
		Eigenvalues	3.205	2.192
		Percentage Variance Explained	45.781	31.316
		Overall variance explained	**77.098**	
		Reliability	**.891**	**.830**
		Overall reliability	**.880**	

Note: the scale used in these factors ranged from 1 = strongly disagree to 5 = strongly agree

4.5.5 Factor Analysis of Mobile Banking Adoption

The last factor analysis performed in this study intended to validate the dependent variable in this study which is behavioral intention of mobile banking adoption. Principle component analysis was conducted using Varimax rotation as extraction criteria. Similar to previous factor analyses, a sampling adequacy measures was performed using KMO and Bartlett's test of sphericity. As shown in Table 4.15, the value of KMO was acceptable (.770) achieving the threshold of .50, while the chi square for the Bartlett's test was also statistically significant at 0.05 (X^2=415.703, df=6, p=.000). This test indicated that the sample size is adequate to run for factor analysis as well as there are sufficient correlations among the items. Therefore, the researcher proceeds to interpret the factor structure based on rotated components.

Table 4.15
Sampling adequacy for M-banking adoption

Kaiser-Meyer-Olkin Measure of sampling adequacy (KMO)		
KMO	:	.770
Bartlett's test of sphericity		
Approx. Chi square	:	415.703
df.	:	6
Sig.	:	.000

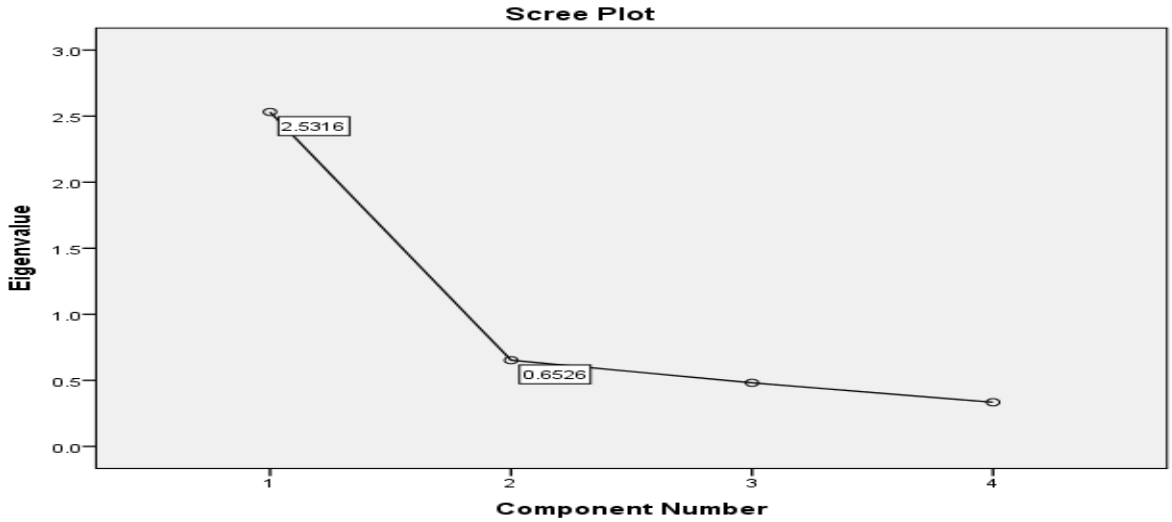


Figure 4.5: Scree Plot for m-banking adoption

Five items involved in the process analysis representing behavioral intention construct. The Scree plot, presented in Figure 4.5, suggested that only one component can be extracted, which means that all the items can be factorized into single dimension which is conforming to the original version of the construct.

Table 4.16 presents descriptive statistics, communalities, factor loadings, eigenvalue and reliability score for the behavioral intention. As shown in this table, all the communality values for all items were high and acceptable except first items (adop1) which was deleted due to low communality (.447). The rest of the communalities ranged from .505 to .749 which is above the recommended score of .50. In addition, the Table presents the means and standard deviations for the valid. Respondents showed a good agreement level with the four remaining items ranging from 3.74 to 3.95. The highest mean (M=3.95, SD=.846) belonged to the third

item (I intend to continue using M-banking) whereas the second item (given that I have access to M-banking, I predict that I would use it) obtained the lowest mean (M=3.74, SD=.915).

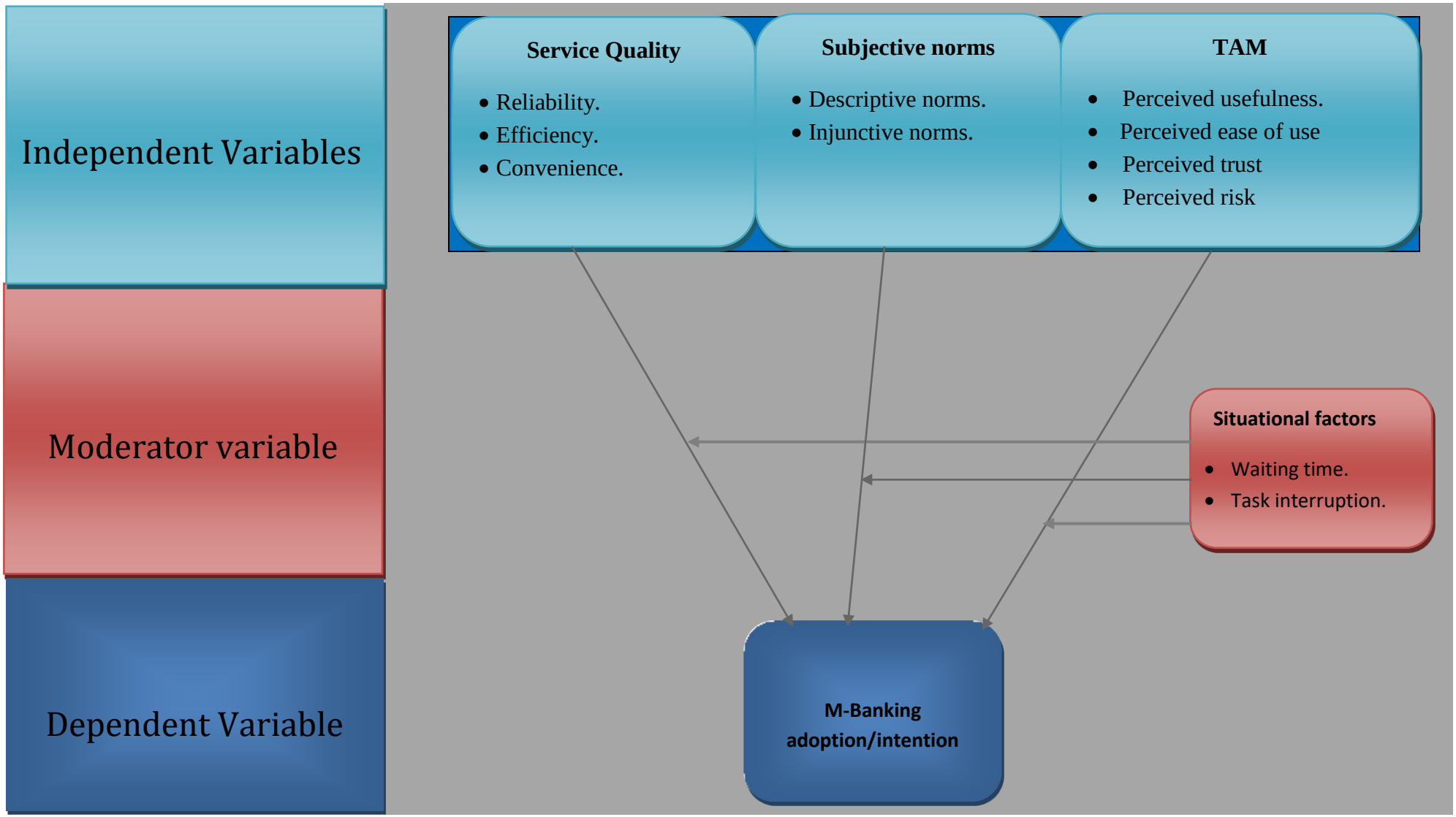
Moreover, the factor loadings for all the items were high and above the required level of .50, ranging from .711 to .866 with an eigenvalue of 2.532 which is above of criteria of 1. All the items managed to explain 63% of variance in behavioral intention with a reliability score of .803 which is too high and above the required threshold (Hair et al., 2010).

Table 4.16
Factor analysis for mobile banking adoption

Factors	Item Label	Items	F1	Mean	SD	Communality
F1: Behavioral intention	Adop4	I intend to recommend for my friends to use M-Banking.	.866	3.85	.887	.749
	Adop3	I intend to continue using M-banking.	.810	3.95	.846	.656
	Adop5	I intend to recommend for my family members to use M-banking.	.788	3.88	.843	.621
	Adop2	Given that I have access to M-Banking, I predict that I would use it.	.711	3.74	.915	.505
		Eigenvalues	**2.532**			
		Percentage Variance Explained	**63.291**			
		Reliability	**.803**			

Note: the scale used in these factors ranged from 1 = strongly disagree to 5 = strongly agree.

Figure 4.6: Modified Framework of the Study



4.6. Reliability Analysis

After the factor analysis, the reliability test was conducted using Cronbach's Alpha coefficient in order to make sure the internal consistency and coherence among the items. In this study there were twelve main variables measured with several items each. Each variable was conducted for the reliability separately. Table 4.17 shows the number of items for each variable, number of items deleted (if any), and the Cronbach's alpha coefficient scores. A variable is considered reliable and internally consistency when it obtained a Cronbach's alpha of more than .70 as suggested by Hair et al. (2010). However, a Cronbach's alpha of .50 and above is also considered acceptable in the literature (Bowling, 2009).

Table 4.17
Cronbach's alpha for the study variables

No.	Variables	Number of items	Items deleted	Cronbach's Alpha
1.	Reliability	3	-	.600
2.	Convenience	7	4	.518
3.	Efficiency	4	1	.666
4.	Perceived usefulness	7	2	.629
5.	Perceived ease of use	5	2	.618
6.	Perceived trust	5	1	.758
7.	Perceived risk	4	-	.904
8.	Descriptive norms	4	-	.898
9.	Injunctive norms	4	1	.670
10.	Waiting time	4	-	.891
11.	Task interruption	3	-	.830
12.	Behavioral intention	5	1	.803

As shown in table 4.17, the values of Cronbach's alpha in this study ranged from .518 to .904 suggesting that these scores are within the recommended values. The highest value of reliability obtained by perceived risk dimension from TAM model (alpha=.904), followed by descriptive norms dimension from subjective norms (alpha=.898), waiting time from situational factors (alpha=.891), task interruption from situational factors (alpha=.830), behavioral intention (alpha=.803), and perceived trust (alpha=.758), whereas the lowest alpha goes to convenience dimension from service quality (alpha=.518) and reliability dimension (alpha=.6).

In addition, other dimensions such as injunctive norms (alpha=.670), efficiency (alpha=.666), perceived usefulness (alpha=.629) and perceived ease of use (alpha=.618) were also reliable and internally consistent. Overall, all the variables in this study obtained the suggested cut-scores for the reliability test. Therefore, it is safe to proceed and use these variables for further analysis. As well, the researcher performed computation process in order to get average or summated score for all variables to use them in further analysis.

4.7 Zero-Order Correlations among All Variable in this Study

Bivariate zero-order correlation using Pearson correlation was conducted to test relationship among the all variables used in this study namely perceived usefulness, perceived ease of use, perceived trust, and perceived risk, efficiency, reliability, convenience, descriptive norms, injunctive norms, waiting time, Task interruption and finally behavioral intention. Table 4.23 presents the results of the Pearson correlation of zero-order correlations

As shown in the Table below, the results suggested significant and positive correlations of perceived usefulness with perceived ease of use (r=.299, p=.000), perceived trust (r=.146, p=.013), efficiency (r=.230, p=.000), reliability (r=.302, p=.000), convenience (r=.255, p=.000), and behavioral intention (r=.143, p=.014). However, perceived usefulness was not correlated with perceived risk (r=.003, p=.955), descriptive norms (r=.092, p=.111), injunctive norms (r=.079, p=.173), waiting time (r=.037, p=.523), and task interruption (r=.014, p=.806).

The results also suggested that perceived ease of use was significantly and positively correlated with perceived trust (r=.403, p=.000), perceived risk (r=.124, p=.034), efficiency (r=.344, p=.000), reliability (r=.395, p=.000), convenience (r=.181, p=.002), injunctive norms (r=.144, p=.012), behavioral intention (r=.286, p=.000) and negatively with task interruption (r=-.172, p=.003). Two insignificant relationships of perceive ease of use with descriptive norms (r=.015, p=.796) and waiting time (r=.010, p=.858) was observed.

In addition, perceived trust had significant and positive relationship with perceived risk (r=.368, p=.000), efficiency (r=.212, p=.000), reliability (r=.278,p=.000), convenience (r=.157, p=.007), descriptive norms (r=.243, p=.000) and behavioral intention (r=.346, p=.000). On the other hand, perceived trust was not correlated with injunctive norms (r=.111, p=.059), waiting time (r=.113, p=.058) and task interruption(r=-.040, p=.499).

Perceived risk was found to have significantly and positively correlated with descriptive norms (r=.533, p=.000), waiting time (r=.383, p=.000), and task interruption(r=.216, p=.000). Conversely, perceived risk was not associated with efficiency (r=.047, p=.417), reliability (r=.036, p=.537), convenience (r=-.004, p=.947), injunctive norms (r=.051, p=.378), and behavioral intention (r=.047, p=.428).

The results also revealed that efficiency is significantly and positively correlated with reliability (r=389, p=.000), convenience (r=.355, p=.000), injunctive norms (r=.115, p=.041), behavioral intention (r=.339, p=.000) and negatively with task interruption (r=-.119, p=.037). However, no relationship was observed for efficiency with descriptive norms (r=-.011, p=.846) and waiting time (r=.009, p=.871).

Moreover, reliability dimension of service quality was significantly and positively related to convenience (r=.348, p=.000), injunctive norms (r=.127, p=.026), and behavioral intention (r=.309, p=.000). There was no relationship of this variable with descriptive norms (r=.012, p=.840), waiting time (r=.020, p=.723) and task interruption (r=-.065, p=.261).

Convenience was correlated significantly and positively with behavioral intention (r=.144, p=.012). However, it is not correlated with descriptive norms (r=-.003, p=.961), injunctive norms (r=.109, p=.052), waiting time (r=-.009, p=.874) and task interruption(r=-.017, p=.771).

Descriptive norms was found to have significant and positive correlation with injunctive norms (r=.295, p=.000), waiting time (r=.226, p=.000), and Task interruption(r=.256, p=.000) but not correlated with behavioral intention (r=.007, p=.907). Moreover, injunctive norms was significantly and positively correlated with waiting time (r=.154, p=.006) and task interruption(r=.204, p=.000). However, no correlation was observed between injunctive norms and behavioral intention (r=.003, p=.954). At the same time, there was strong significant and positive relationship between waiting time and task interruption(r=.532, p=.000) and week positive relationship between injunctive norms and behavioral intention (r=.161, p=.005). Conversely, there was no correlation between Task interruption and behavioral intention (r=-.035, p=.542).

It is notable from the zero-order correlation table and the discussion above that majority of the independent variables (perceived usefulness, perceived ease of use, perceived trust, efficiency, reliability, and convenience) were significantly and positively correlated with the dependent variable in this study (behavioral intention to adopt mobile banking) except perceived risk, descriptive norms and injunctive norms. The dependent variable was also correlated with one of the moderators (waiting time), while it is not correlated with task interruption. Moreover, the highest correlation observed was between waiting time and task interruption(r=.532, p=.000), followed by the relationship between perceived ease of use and perceived trust (r=.403, p=.000) as well as the relationship between perceived ease of use and reliability (r=.395, p=.000). On the other hand, the lowest relationship obtained from zero-order correlation was between injunctive norms and efficiency (r=.115, p=.041), followed by the relationship between task interruption and efficiency (r=-.119, p=.037) as well as the relationship between perceived ease of use and perceived risk (r=.124, p=.034). Generally, the correlations were not too high which can pose a multicollinearity issue (Chatterjee & Yilmaz, 1992; Farrell, 2010).

Table 4.18
Zero-order Correlations among all variables in this study

No.	Variables	1	2	3	4	5	6	7	8	9	10	11	12
1.	Perceived usefulness	**1**											
2.	Perceived ease of use	.299**	**1**										
3.	Perceived trust	.146*	.403**	**1**									
4.	Perceived risk	.003	.124*	.368**	**1**								
5.	Efficiency	.230**	.344**	.212**	.047	**1**							
6.	Reliability	.302**	.395**	.278**	.036	.389**	**1**						
7.	Convenience	.255**	.181*	.157*	-.004	.355**	.348**	**1**					
8.	Descriptive norms	.092	.015	.243**	.533**	-.011	.012	-.003	**1**				
9.	Injunctive norms	.072	.144*	.111	.051	.115*	.127*	.109	.295**	**1**			
10.	Waiting time	.037	.010	.113	.383**	.009	.020	-.009	.226**	.154*	**1**		
11.	Task interruption	.014	-.172*	-.040	.216**	-.119*	-.065	-.017	.256**	.204**	.532**	**1**	
12.	Behavioral intention	.143*	.386**	.346**	.047	.339**	.309**	.144**	.007	.003	.161*	-.035	**1**

4.8 Normality Test

The normality test was performed using the most popular tools of Skewness and Kurtosis. The normality test is important when conducting a research as it can affect the results and make biased conclusion.

The normality test involved by computed variables: perceived usefulness, perceived ease of use, perceived trust, perceived risk, efficiency, reliability, convenience, descriptive norms, injunctive norms, waiting time, task interruption, and behavioral intention. Table 4.19 provides the normality test scores of Skewness and kurtosis. A variable is considered normally distributed when its Skewness and kurtosis should be between -2 and +2 (Hair et al., 2010; Tabachnick & Fidell, 2013).

As shown in table below, scores of the Skewness and kurtosis were found to be less than the recommended cut-score (the bold and italic scores). Therefore, we can proceed to further analysis using these variables. As such, there was no need to conduct transformation as were no problematic variables.

Table 4.19
Normality test using Skewness and Kurtosis

Variables						Skewness		Kurtosis	
	N	Minimum	Maximum	M	SD	Statistic	Std. Error	Statistic	Std. Error
Perceived Risk	313	1.00	5.00	2.8890	1.13133	***-.197***	.138	***-1.084***	.275
Perceived Trust	303	1.00	5.00	3.7310	.70729	***-.409***	.140	***.452***	.279
Perceived ease of use	317	2.00	5.00	3.9685	.60156	***-.401***	.137	***.500***	.273
Perceived usefulness	318	2.00	5.00	3.9748	.59798	***-.186***	.137	***.177***	.273
Efficiency	332	1.33	5.00	3.9608	.62520	***-.744***	.134	***1.910***	.267
Reliability	327	1.67	5.00	3.9154	.60048	***-.503***	.135	***1.391***	.269
Convenience	334	1.67	5.00	3.8852	.61006	***-.538***	.133	***1.209***	.266
Descriptive norms	325	1.00	5.00	2.9369	1.10618	***-.184***	.135	***-.923***	.270
Injunctive norms	332	1.00	5.00	3.3715	.86823	***-.734***	.134	***.486***	.267
Waiting Time	323	1.00	5.00	2.8344	1.09277	***-.073***	.136	***-1.126***	.271
Task interruption	323	1.00	5.00	2.7389	1.08137	***.001***	.136	***-1.040***	.271
Behavioral intention to adopt mobile banking	317	1.00	5.00	3.8573	.69265	***-.446***	.137	***1.044***	.273
Valid N (listwise)	203								

4.9 Hypotheses Testing

Before proceeding with testing of the hypotheses, the assumptions of multiple regression analysis were checked. Greeen and Salkind (2005) suggested testing the assumptions before interpreting the regression results. It is possible if the assumptions violated to get inaccurate results and not representing the population of the study. There are several assumptions for the regression, include:

1) Variables (both dependent and independent) should be continuously measured.
2) Dependent variable should be normally distributed on the independent variables.
3) There is must be linear relationship.
4) There should not be multicollinearity.
5) There should not be any outliers.

The above assumptions were checked before the results were interpreted. The first assumption was achieved since all items of the five variables were measured with five-point Likert scale. Then their summated score were calculated, making it continuous data.

The second assumption was checked by using two major techniques: Histogram graph. The Histogram technique, which is graphically shows the normality, suggested a normal distribution of the all variables.

As for the third assumption, residual scatterplot between standardized residuals and standardized predicted value was performed. The results of the scatterplot suggested that the criterion and predictors were linearly correlated.

Regarding the multicollinearity (fourth assumption), tolerance and variance inflation factor (VIF) was checked. There is no multicollinearity concern when there is low/moderate correlation among the independent variables, and it is achieved when the values of tolerance and VIF are less than 1 and 5 respectively (Chatterjee & Yilmaz, 1992). Therefore, as it can be

seen from tables for each regression analysis, there were no multicollinearity concerns. The scores of tolerance and VIF were below the recommended thresholds.

The last assumption was checked using Mahalanob is distance to detect if there is an outlier. The test of Mahalanob is suggested no outliers in the study. As such, it is safe to proceed for the interpretation of the results.

To test the main effect hypotheses of the study, multiple regression analysis was conducted using "enter method". Regression analysis is conducted when the researcher's intention is to investigate the impact of one independent or several independent variables on a dependent variable. Three main regression analyses were conducted; the first is to test the impact of TAM dimensions on behavioral intention; the second is to test the effect of subjective norms dimensions on behavioral intention; while the third intended to test the impact of service quality dimensions on behavioral intention. The researcher also conducted three hierarchical multiple regression analyses to test the moderation effect of situational factors on the relationship between main variables and behavioral intention.

4.9.1 TAM Dimensions with M-Banking adoption

Multiple regression analysis was conducted to the test the relationships of perceived usefulness, perceived ease of use, perceived trust and perceived risk with behavioral intention to adopt mobile banking among the respondents after controlling the demographic variables and experiences such as gender age, education, experience with the banking and experience with the mobile banking. The results of the analysis are presented in table 4.20 The following hypotheses were presented in chapter two to be tested:

H1.1: *Perceived usefulness will have significant influence on the Sudanese consumers' adoption of mobile banking technology.*

H2.1: Perceived ease of use will have significant influence on the Sudanese consumers' adoption of mobile banking technology.

H3.1: *Perceived trust will have significant influence on the Sudanese consumers' adoption of mobile banking technology.*

H4.1: *Perceived risk will have significant negative influence on the Sudanese consumers' adoption of mobile banking technology.*

As shown in Table 4.20, the results suggested that there are significant predictors among the four independent variables which entered into the regression ($F_{9, 227}$=5.728, p=.000) in the second model while there are no predictors in the first model for the control variables ($F_{5, 231}$=.904, p=.479). The first model (control variables) had only contributed to mobile banking adoption a minimal percentage (1.9%), whereas the second model (the four predictors) contributed about 17% of the variance in mobile banking adoption.

The results depicted that perceived usefulness had no significant influence on behavioral intention to adopt mobile banking among the participants (β=.016, t=.248, p=.804), which means that first sub hypothesis (H1.1) is not supported by the empirical data.

Regarding the second sub hypothesis (H2.1), the findings of the study revealed a significant positive influence of perceived ease of use on the behavioral intention to adopt mobile banking (β=.203, t=2.880, p=.004), indicating that this hypothesis is fully supported. It means the higher the perception of easiness towards mobile banking, the higher the rate of adoption among the participants.

As for the third sub hypothesis (H3.1), the results of regression analysis suggested that perceived trust had significant positive influence on behavioral intention to adopt mobile banking among the customers (β=.302, t=4.241, p=.000). This exerts full support for the

hypothesis, and means that the higher the level of trust towards service provider, the higher the rate of adoption of the service.

The last hypothesis regarding TAM dimensions proposed a significant influence of perceived risk on behavioral intention (H4.1). The results of regression test, presented in Table 4.20, found that perceived risk had significant negative influence on behavioral intention to adopt mobile banking among those surveyed (β=-.122, t=-1.880, p=.031). Thus, H4.1 was fully supported by the data. This indicates that the higher the risk perceived by the consumers, the less likely to adopt mobile banking in their life.

All the independent variables managed to explain 17% (R^2=.138) of the variance in behavioral intention to adopt mobile banking. Moreover, the researcher checked, if any, outliers and multicollinearity problem by using *Mahallanobis* test and *Variance Inflation Factor* (VIF) with *tolerance.* As discussed earlier, tolerance and VIF should be less than 1 and 5 respectively. As such, all the values in Table 4.20, ranging from .709 and .982 for tolerance, and 1.018 to 1.411 for VIF, are below the threshold, which suggests that there are no multicollinearity problems.

Moreover, the Mahallanobis test of outliers suggested few respondents who had deviant responses regarding the variables of interest. These respondents were excluded from analysis of regression for only TAM dimensions and were retained for other regression analysis unless they still remain problematic (respondents' numbers who were excluded due to outliers are 28, 72, 81, 172, 198, 268). The results improved after dropping these outliers. All the independent variables were linearly related to the dependent variable as the results of scatterplot showed.

Table 4.20

Multiple regression analysis for m-banking adoption with the four predictors from TAM with control variables

Model	Predictors	*β*	T	P	Collinearity Statistics		Model Summary			
					Tolerance	VIF	R^2	R^2 change	F change	Sig F change
	Control variables						.019	.019	.904	.479
	Gender	.002	.025	.980	.982	1.018				
	Age	-.007	-.098	.922	.828	1.208				
1	Education	.130	1.849	.066	.864	1.157				
	Experience with banking	.033	.487	.627	.899	1.113				
	Experience with mobile Banking	-.006	-.081	.935	.844	1.185				
	Main predictors						.185	.166	11.551	.000
	Perceived usefulness	.016	.248	.804	.878	1.139				
2	Perceived ease of use	.203	2.880	**.004**	.720	1.389				
	Perceived Trust	.302	4.241	**.000**	.709	1.411				
	Perceived Risk	-.122	-1.880	**.031**	.851	1.175				

Table 4.21

Multiple regression analysis for M-banking adoption with the two predictors of subjective norms with control variables

Model	Predictors	*β*	T	P	Collinearity Statistics		Model Summary			
					Tolerance	VIF	R^2	R^2 change	F change	Sig F change
	Control variables						.013	.013	.770	.572
	Gender	.017	.283	.778	.982	1.019				
	Age	.026	.399	.690	.836	1.197				
1	Education	.118	1.813	.071	.818	1.223				
	Experience with banking	.014	.226	.822	.908	1.101				
	Experience with mobile Banking	.011	.169	.866	.831	1.203				
	Main predictors						.015	.001	.187	.830
2	Descriptive norms	.039	.611	.541	.880	1.136				
	Injunctive norms	-.013	-.200	.842	.870	1.150				

4.9.2 Subjective Norms Dimensions with M-Banking adoption

This section presents hypothesis testing procedure for dimensions of subjective norms namely descriptive norms and injunctive norms. Like previous reported, a linear multiple regression analysis has been performed to test the influence of descriptive norms and injunctive norms on the behavioral intention to adopt mobile banking among the customers. Two main hypotheses were proposed for testing:

H5.1: Descriptive norms will have significant influence on the Sudanese consumers' adoption of mobile banking technology.

H5.2: Injunctive norms will have significant influence on the Sudanese consumers' adoption of mobile banking technology.

The results of regression analysis are presented in Table 4.21. No significant prediction were observed regarding the subjective norms dimensions ($F_{7, 281}$=.600, p=.756) as well as for the control variables ($F_{5, 283}$=.770, p=.572). The results revealed that descriptive norms (β=.039, t=.611, p=.541) and injunctive norms (β=-.013, t=-.200, p=.842) had no significant impact on the dependent variable: behavioral intention to adopt mobile banking among the participants. This suggests that H5.1 and H5.2 were not supported by the empirical data.

In order to make the accuracy of the results, the assumptions of regression analysis were checked and found to be no problematic issues, which means that any insignificant issues will be due to the respondents' perception, not due to error. The values of tolerance and the *Variance Inflation Factor* were within the range of recommendation criterion. Therefore, no multicollinearity issue is found. Also, any possibility of outliers was also checked and no outliers were detected.

4.9.3 Service Quality Dimensions with M-Banking adoption

The study was also interested to gauge the effects of service quality dimensions on the behavioral intention to adopt mobile banking adoption among selected customers. This study adopts four dimensions of service quality namely reliability, responsiveness, efficiency, and convenience. One dimension (responsiveness) was eliminated during factor analysis and was included in further analysis. The following three hypotheses will be tested using multiple linear regression analysis:

H6.1: Reliability dimension will have significant negative influence on the Sudanese consumers' adoption of mobile banking technology.

H8.1: Efficiency dimension will have significant negative influence on the Sudanese consumers' adoption of mobile banking technology.

H9.1: Convenience dimension will have significant negative influence on the Sudanese consumers' adoption of mobile banking technology.

The results of regression analysis, displayed in Table 4.22, suggested significant prediction among the three dimensions on the behavioral intention ($F_{8, 274}$=6.892, p=.000) for the second model (predictors), whereas no significant contribution by the control variables in the first model ($F_{5, 277}$=.565, p=.727). In addition, the results revealed that reliability dimension exerted significant and positive influence on behavioral intention to adopt mobile banking (β=.209, t=3.319, p=.001). This indicated that the higher the perceived reliability by the respondents towards the service, they are more likely to adopt the service. Therefore, this suggests a full support for H7.1.

Likewise, a significant positive influence of efficiency dimension (β=.278, t=4.447, p=.000) on behavioral intention to adopt mobile banking was noticed. This means that the higher the respondents' perception regarding how efficient mobile banking, the higher the rate of adoption of the technology. Thus, H8.1 was fully supported by the data.

In contrast, the results suggested that convenience dimension of service quality did not influence respondents behavioral intention to adopt mobile banking (β=-.027, t=-.433, p=.666), meaning that H9.1 was not supported. This implies that the participants of this study are not concerned about the convenience of the usage of the technology when adopting mobile banking for their financial transactions. The two independent variables (reliability and efficiency dimensions) had explained 16% (R^2=.157) of variance in behavioral intention.

Further, the researcher has checked relevant assumptions particularly outliers and multicollinearity. As shown in Table 4.22, the scores for tolerance were below 1 while the scores for VIF were also below 5, suggesting that no multicollinearity issues detected. However, there were several outliers as suggested by the Mahalanobis test and were accordingly excluded from the analysis. These are the numbers of respondents who were excluded from the analysis: 3, 19, 40, 41, 44, 66, 79, 81, 93, 103, 107, 108, 175, & 248. As such, the results improved and allowed to make accurate interpretation.

Table 4.22
Multiple regression analysis for m-banking adoption with the three predictors from service quality using enter method

Model	**Predictors**	***β***	**T**	**P**	**Collinearity Statistics**		**Model Summary**			
					Tolerance	**VIF**	**R^2**	**R^2 change**	**F change**	**Sig F change**
	Control variables						.010	.010	.565	.727
	Gender	.002	.030	.976	.988	1.012				
	Age	.012	.179	.858	.843	1.187				
1	Education	.092	1.418	.157	.850	1.177				
	Experience with banking	.001	.018	.986	.900	1.111				
	Experience with mobile Banking	.030	.458	.647	.831	1.203				
	Main predictors						.168	.157	17.273	.000
	Reliability	.209	3.319	**.001**	.764	1.308				
2	Efficiency	.278	4.447	**.000**	.777	1.288				
	Convenience	-.027	-.433	.666	.804	1.244				

4.9.4 Moderation test

To test the moderating effect of situational factors namely waiting time and perceived risk on the relationships of independents variables with the dependent variable, a hierarchical regression analysis with three steps was performed for each hypothesis testing. It is notable here that the moderating test was conducted only for those variables that had significant direct influence on the dependent variable. The variables that showed significant impact on behavioral intention to adopt mobile banking include perceived trust, perceived ease of use, efficiency, and reliability

4.9.4.1 Perceived usefulness–M-banking adoption- Moderating effect of waiting time

A three-step hierarchical regression analysis was conducted to test the moderating effect of waiting time on the relationship between perceived usefulness (PU) and behavioral intention to adopt mobile banking (BI). The following hypothesis was proposed to test in this study:

H1.2: *Waiting time will have significant moderating effect on the relationship between perceived usefulness and intention to adopt.*

The independent variable (PU) was entered into the first step; the moderating variable (waiting time) was entered into the second step; while the interaction effect (product of perceived usefulness and waiting time) was entered into the third step. In order to get a moderating effect, the third step should produce R square increase with significant F change.

As shown in Table 4.23, the first model provides the influence of perceived usefulness on behavioral intention; the second model is about the impact of waiting on the behavioral intention; whereas the third model gives the interaction effects. Moreover, the results suggested that there is no sufficient R square increase with significant F change since the P-value is greater than the cut-score of 0.05 ($F_{1,\ 345}$=2.533, p=.112). As such, there is no

moderating effect of waiting time on the relationship between perceived ease of use and behavioral intention to adopt mobile banking. Therefore, H1.2 was not supported by the data.

Table 4.23
Model Summary of moderating effect of waiting time on PU- BI relationship

					Change Statistics				
Model	R	R^2	Adjusted R^2	SE	R^2 Change	F Change	df1	df2	Sig. F Change
1	.137[a]	.019	.016	.65477	.019	6.613	1	347	.011
2	.201[b]	.041	.035	.64839	.022	7.868	1	346	.005
3	.218[c]	.048	.039	.64695	.007	2.533	1	345	.112

The results in Table 4.24 suggested that perceived usefulness had significant and positive influence on behavioral intention (β=.137, t=2.572, p.011) in the first model. It had also impact in the second model with the presence of waiting time but with reduced beta (β=.132, t=2.498, p=.013). When the moderator (waiting) entered into the second step, it was found to have significant and positive impact on behavioral intention (β=.148, t=2.805, p=.005). However, the interaction terms or moderation effect was not significant in the third step, which suggests that the hypothesis of moderation effect of waiting time on the relationship between perceived usefulness and behavioral intention to be rejected.

Table 4.24
Hierarchical Regression: Moderating of waiting time on the Relationship between perceived usefulness and M- banking adoption

Model	**Predictors**	**Unstandardized Coefficients**		**Standardized Coefficients**	**t**	**p**
		B	**SE**	**Beta (β)**		
1	**(Constant)**	3.229	.247		13.074	.000
	Perceived usefulness	.158	.061	.137	2.572	**.011**
2	**(Constant)**	2.989	.259		11.541	.000
	Perceived usefulness	.152	.061	.132	2.498	**.013**
	Waiting Time	.093	.033	.148	2.805	**.005**
3	**(Constant)**	3.389	.360		9.406	.000
	Perceived usefulness	.041	.093	.035	.443	.658
	Waiting Time	-.051	.096	-.081	-.531	.596
	Interaction term (PU*WT)	.039	.025	.265	1.592	.112

4.9.4.2 Perceived ease of use – Behavioral intention: Moderating effect of waiting time

Hierarchical regression analysis with three steps was also conducted to test the moderating effect of waiting time on the relationship between perceived ease of use and behavioral

intention to adopt mobile banking among Sudanese consumers. This hypothesis was put forward in the second chapter:

H2.2: *Waiting time will have significant moderating effect on the relationship between perceived ease of use and intention to adopt.*

The table below (Table 4.25) provides the test of the moderating effect of waiting on the relationship between perceived ease of use and behavioral intention. The results suggested a low R square change (R^2=.002) with insignificant F change ($F_{1, 344}$= .685, p=.408). This indicates that there is no moderation effect of waiting time on the above mentioned relationship. It means that waiting does not interact with perceived ease of use to influence behavioral intention; however, each of them separately has an influence on it.

Table 4.25
Model Summary of moderating effect of waiting time on PEU- BI relationship

					Change Statistics				
Model	R	R^2	Adjusted R^2	SE	R^2 Change	F Change	df1	df2	Sig. F Change
1	.275[a]	.076	.073	.63633	.076	28.405	1	346	.000
2	.314[b]	.098	.093	.62947	.022	8.585	1	345	.004
3	.316[c]	.100	.092	.62976	.002	.685	1	344	.408

The three steps of hierarchical regression analysis, presented in Table 4.26, shows the moderation effect of waiting time on the relationship between perceived ease of use and behavioral intention. Like in previous moderation test, the results suggested that independent variable (PEU) showed significant effect on behavioral intention (β=.275, t=5.330, p=.000) with another significant beta in the second step (β=274, t=5.360, p=.000). Also, the moderating variable (WT) had significant impact on the dependent variable (β=.150, t=2.930, p=.004).

However, when the interaction of PUE and WT was entered into the third step, no significant impact of waiting time (β=.032, t=.213, p=.832) and interaction term (β=.135, t=.828, p=.408) were observed, indicating that there no moderating effect of waiting time on

the relationship between perceived ease of use and behavioral intention. Thus, H2.2 was rejected by the study.

Table 4.26
Hierarchical Regression: Moderating of waiting time on the Relationship between perceived ease of use and M- banking adoption

Model	Predictors	Unstandardized Coefficients		Standardized Coefficients	t	p
		B	SE	Beta (β)		
1	**(Constant)**	2.599	.239		10.891	.000
	Perceived ease of use	.317	.060	.275	5.330	.000
2	**(Constant)**	2.339	.252		9.274	.000
	Perceived ease of use	.316	.059	.274	5.360	.000
	Waiting Time	.094	.032	.150	2.930	.004
3	**(Constant)**	2.545	.355		7.175	.000
	Perceived ease of use	.258	.091	.224	2.847	.005
	Waiting Time	.020	.095	.032	.213	.832
	Interaction term (PEU*WT)	.020	.024	.135	.828	.408

4.9.4.3 Perceived trust – Behavioral intention: Moderating effect of waiting time

Using hierarchical regression analysis, the third hypothesis presented below, was tested using three steps approach, where the first step is sought to gauge the impact of the independent variable (perceived trust "PT") on the dependent variable (behavioral intention "BI"); the second step is to test the effect of moderating variable (waiting time "WT") on the dependent variable, while the third step intended to determine the moderating effect of waiting time on the relationship between perceived trust and behavioral intention to adopt mobile banking.

H3.2: Waiting time will have significant moderating effect on the relationship between perceived trust and intention to adopt.

As shown in Table 4.27, the results of regression suggested first and second models to be significant in F change, but the third model, which is to examine the moderation effect was found to have no enough R square change (R^2=.000) with significant F change ($F_{1,342}$=.005, p=.943). This indicates that there is no moderation effect on waiting time, which rejects the third hypothesis (H3.2).

Table 4.27
Model Summary of moderating effect of waiting time on PT- BI relationship

					Change Statistics				
Model	R	R^2	Adjusted R^2	SE	R^2 Change	F Change	df1	df2	Sig. F Change
1	.318[a]	.101	.099	.62938	.101	38.720	1	344	.000
2	.340[b]	.116	.111	.62517	.015	5.647	1	343	.018
3	.340[c]	.116	.108	.62608	.000	.005	1	342	.943

Moreover, results in Table 4.28 provided further details on the test, where the impact of perceived trust is consistent with previous results (β=.318, t=6.223, p=.000) in the first model. Another significant beta coefficient for perceived trust was also observed for the second model (β=.306, t=5.990, p=.000) as well the third model (β=.301, t=3.802, p=.000). For the moderating variable, it has been found that it has significant impact on behavioral intention in the second model (β=.121, t=2.376, p=.018) but not in the third model (β=.113, t=.903, p=.367). Finally, the interaction term was not significant (β=.010, t=.072, p=.943), suggesting that there is no moderation effect happened.

Table 4.28
Hierarchical Regression: Moderating of waiting time on the Relationship between perceived trust and M- banking adoption

Model	**Predictors**	**Unstandardized Coefficients**		**Standardized Coefficients**	**t**	**p**
		B	**SE**	**Beta (β)**		
1	**(Constant)**	2.668	.194		13.753	.000
	Perceived Trust	.319	.051	.318	6.223	.000
2	**(Constant)**	2.499	.206		12.157	.000
	Perceived Trust	.306	.051	.306	5.990	.000
	Waiting Time	.076	.032	.121	2.376	.018
3	**(Constant)**	2.513	.284		8.860	.000
	Perceived Trust	.302	.079	.301	3.802	.000
	Waiting Time	.071	.079	.113	.903	.367
	Interaction term (PT*WT	.002	.022	.010	.072	.943

4.9.4.4 Perceived risk – Behavioral intention: Moderating effect of waiting time

The below hypothesis was posed in chapter for testing moderating effect of waiting time (WT) on the relationship between perceived risk (PR) and behavioral intention to adopt mobile banking (BI). To test this hypothesis, a 3-step hierarchical regression analysis was performed, using PR in the step, WT in the second step, and their interaction in the third step. Results are presented in Tables 4.29 and 4.30.

H4.2: *Waiting time will have significant moderating effect on the relationship between perceived risk and intention to adopt.*

As presented in Table 4.29, there is no moderation of effect of waiting time on the relationship between perceived risk and behavioral intention, as there no were no enough R square change with significant F change in the third model ($F_{1, 343}$=.003, p=.958). This indicates that waiting time and perceived risk do not interact to jointly determine the behavioral intention to adopt mobile banking.

Table 4.29
Model Summary of moderating effect of waiting time on PR- BI relationship

					Change Statistics				
Model	R	R^2	Adjusted R^2	SE	R^2 Change	F Change	df1	df2	Sig. F Change
1	.043[a]	.002	-.001	.66228	.002	.644	1	345	.423
2	.153[b]	.023	.018	.65606	.021	7.566	1	344	.006
3	.153[c]	.023	.015	.65702	.000	.003	1	343	.958

Moreover, the results of Beta coefficients in Table 4.30 revealed that the perceived risk had no impact on behavioral intention which is consistent with previous results reported in Table 4.28 when discussing TAM dimensions' influence on the dependent variable (β=.043, t=.802, p=.423) in the first model. It has also no significant impact observed both in the second model (β=-.012, t=-.206, p=.837) and third model (β=-.017, t=-.152, p=.879). When gauged the impact of the moderating variable, it has been found that waiting time had significant impact in the second model (β=.156, t=2.751, p=.006) but not in the third model (β=.152, t=1.452, p=.147). Lastly, the interaction of waiting time and perceived risk did not produce significant beta (β=.008, t=.053, p=.958), which no moderating effect of waiting time on the relationship between perceived risk and behavioral intention.

Table 4.30
Hierarchical Regression: Moderating of waiting time on the Relationship between perceived risk and M- banking adoption

Model	Predictors	Unstandardized Coefficients		Standardized Coefficients	t	p
		B	SE	Beta(β)		
1	**(Constant)**	3.780	.102		37.015	.000
	Perceived Risk	.027	.033	.043	.802	.423
2	**(Constant)**	3.600	.121		29.831	.000
	Perceived Risk	-.007	.035	-.012	-.206	.837
	Waiting Time	.098	.036	.156	2.751	.006
3	**(Constant)**	3.607	.185		19.524	.000
	Perceived Risk	-.010	.068	-.017	-.152	.879
	Waiting Time	.095	.066	.152	1.452	.147
	Interaction term (PR*WT)	.001	.021	.008	.053	.958

4.9.4.5 Descriptive norms – Behavioral intention: Moderating effect of waiting time

This study hypothesized that there is significant moderating effect of waiting on the relationship between descriptive norms dimension of subjective norms and behavioral intention to adopt mobile banking among the customers. To test this hypothesis, like previous analysis, a hierarchical regression analysis with three-steps was performed. Descriptive norms (DN) was entered into the first step as the independent variable; followed by waiting time (WT) in the second step as the moderator; while their interaction product was entered into the third step to see whether is moderating effect or not.

H5.3: Waiting time will have significant moderating effect on the relationship between descriptive norms and intention to adopt.

The results, shown in Table 4.31, suggested that there is no moderating effect of waiting time on the relationship between descriptive norms and behavioral intention as there was no enough R square increase with significant F change increase ($F_{1, 344}$=1.049, p=.306). This suggested that no moderation effect happened, meaning that their effect is separate if it exist. Therefore, the above hypothesis (H5.3) was not supported.

Table 4.31
Model Summary of moderating effect of waiting time on DN- BI relationship

					Change Statistics				
Model	R	R^2	Adjusted R^2	SE	R^2 Change	F Change	df1	df2	Sig. F Change
1	.007[a]	.000	-.003	.66192	.000	.015	1	346	.903
2	.155[b]	.024	.018	.65492	.024	8.434	1	345	.004
3	.164[c]	.027	.018	.65488	.003	1.049	1	344	.306

Regarding the beta coefficients in below table (Tale 4.32), it has been found that descriptive norms had no significant influence on behavioral intention to adopt mobile banking (β=.007, t=.121, p=.903) in the first model, which is consistent with the previous results. Also, this variable had no significant impact in the second model (β=-.027, t=-.490, p=.624) as well as the third model (β=-.118, t=-1.130, p=.259). In addition, waiting time was found to have significant influence in the second model with the presence of descriptive norms (β=.158, t=2.904, p=.004) but not in the third model (β=.052, t=.446, p=.656). On the other hand, the interaction terms was found to be insignificant (β=.163, t=1.024, p=.306), indicating that no moderation effect occurred.

Table 4.32
Hierarchical Regression: Moderating of waiting time on the Relationship between descriptive norms and M- banking adoption

Model	**Predictors**	**Unstandardized Coefficients**		**Standardized Coefficients**	**t**	**p**
		B	**SE**	**Beta (β)**		
1	**(Constant)**	3.845	.104		37.017	.000
	Descriptive norms	.004	.033	.007	.121	.903
2	**(Constant)**	3.625	.128		28.346	.000
	Descriptive norms	-.016	.034	-.027	-.490	.624
	Waiting Time	.099	.034	.158	2.904	.004
3	**(Constant)**	3.786	.203		18.640	.000
	Descriptive norms	-.073	.065	-.118	-1.130	.259
	Waiting Time	.033	.073	.052	.446	.656
	Interaction term (DN*WT)	.022	.022	.163	1.024	.306

4.9.4.6 Injunctive norms – Behavioral intention: Moderating effect of waiting time

The moderating effect of waiting time on the relationship between injunctive norms dimension of subjective norms and behavioral intention to adopt mobile banking has been posited in the

fourth sub hypothesis below. To test this hypothesis, a three-step analysis of hierarchical regression test was conducted.

H5.4: *Waiting time will have significant moderating effect on the relationship between injunctive norms and intention to adopt.*

As displayed in Table 4.33, no significant moderation effect of waiting time on the relationship between injunctive norms and behavioral intention was observed, as there no were significant R square increase with significant F change increase in the third step ($F_{1, 338}$=.054, p=.817). It means that waiting time did not interact with injunctive norms to jointly influence behavioral intention. Therefore, the hypothesis (H5.4) was rejected.

Table 4.33
Model Summary of moderating effect of waiting time on IN- BI relationship

					Change Statistics				
Model	R	R^2	Adjusted R^2	SE	R^2 Change	F Change	df1	df2	Sig. F Change
1	.003[a]	.000	-.003	.66775	.000	.003	1	340	.958
2	.154[b]	.024	.018	.66079	.024	8.195	1	339	.004
3	.154[c]	.024	.015	.66172	.000	.054	1	338	.817

Furthermore, the results of beta coefficients in Table 4.34 suggested, consistent with previous results, that injunctive norms had no significant impact on behavioral intention in the first model (β=.003, t=.053, p=.958), in the second model (β=-.020, t=-.367, p=.714) as well as in the model (β=.003, t=.023, p=.982). In contrast, waiting has produced significant impact on behavioral intention in the second model (β=.155, t=2.863, p=.004) but not in the third model when the independent variable and in the interaction are included (β=.189, t=1.206, p=.229). However, the interaction term or the moderating effect did not exist (β=-.045, t=-.232, p=.817).

Table 4.34
Hierarchical Regression: Moderating of waiting time on the Relationship between injunctive norms and M-banking adoption

Model	Predictors	Unstandardized Coefficients		Standardized Coefficients	t	p
		B	SE	Beta(β)		
1	**(Constant)**	3.850	.147		26.184	.000
	Injunctive norms	.002	.042	.003	.053	.958
2	**(Constant)**	3.633	.164		22.156	.000
	Injunctive norms	-.016	.042	-.020	-.367	.714
	Waiting Time	.098	.034	.155	2.863	.004
3	**(Constant)**	3.576	.297		12.050	.000
	Injunctive norms	.002	.087	.003	.023	.982
	Waiting Time	.119	.099	.189	1.206	.229
	Interaction term (IN*WT)	-.006	.028	-.045	-.232	.817

4.9.4.7 Reliability dimension – Behavioral intention: Moderating effect of waiting time

A three-step hierarchical regression analysis has been conducted to test the sixth hypothesis which posited that waiting time will exert a significant moderating effect on the relationship between reliability dimension of service quality and behavioral intention to adopt mobile banking among the consumers.

H6.2: *Waiting time will have significant moderating effect on the relationship between reliability and intention to adopt.*

The results in table 4.35 suggested that waiting time has no moderation impact on the relationship between reliability and behavioral intention since R square increase was zero while the F change increase was not significant ($F_{1, 344}$=.176, p=.675). This indicates no moderation effect is evident. Therefore, H6.2 was not supported by the data.

Table 4.35
Model Summary of moderating effect of waiting time on REL- BI relationship

					Change Statistics				
Model	R	R^2	Adjusted R^2	SE	R^2 Change	F Change	df1	df2	Sig. F Change
1	.298[a]	.089	.086	.63191	.089	33.663	1	346	.000
2	.332[b]	.110	.105	.62531	.022	8.338	1	345	.004
3	.333[c]	.111	.103	.62606	.000	.176	1	344	.675

Moreover, the results in the Table 4.36 is consistent with previous results, showing a positive significant influence of reliability on behavioral intention in the first model (β=.298, t=5.802, p=.000), in the second model (β=.295, t=5.806, p=.000) as well as in the third model

(β=.326, t=3.638, p=.000). As well, waiting time had significant positive influence on behavioral intention in the second model (β=.147, =t=2.888, p=.004) but not in the last model (β=.217, t=1.238, p=.217). As for the moderation, the interaction product in the last model was also not significant (β=-.080, t=-.420, p=.000) indicating that no moderation impact was observed.

Table 4.36
Hierarchical Regression: Moderating of waiting time on the Relationship between reliability and M-Banking adoption

Model	Predictors	Unstandardized Coefficients		Standardized Coefficients	t	p
		B	SE	Beta(β)		
1	**(Constant)**	2.533	.231		10.980	.000
	Reliability	.338	.058	.298	5.802	.000
2	**(Constant)**	2.285	.244		9.365	.000
	Reliability	.335	.058	.295	5.806	.000
	Waiting Time	.092	.032	.147	2.888	.004
3	**(Constant)**	2.156	.393		5.483	.000
	Reliability	.370	.102	.326	3.638	.000
	Waiting Time	.136	.110	.217	1.238	.217
	Interaction term (REL*WT)	-.012	.028	-.080	-.420	.675

4.9.4.8 Efficiency dimension – Behavioral intention: Moderating effect of waiting time

It has been posited in chapter two that waiting time will have significant moderating effect on the relationship between efficiency and behavioral intention to adopt mobile banking. To test this hypothesis, it has been used hierarchical regression analysis for the test with three-step approach.

H8.2: Waiting time will have significant moderating effect on the relationship between efficiency and intention to adopt.

The results of the test suggested a zero R square increase with non-significant F change increase in the third step ($F_{1, 342}$=.021, p=.881). It means that no moderation effect of waiting time on the relationship between efficiency and behavioral intention exist. Therefore, H8.2 was not supported.

Table 4.37
Model Summary of moderating effect of waiting time on EFF- BI relationship

					Change Statistics				
Model	R	R^2	Adjusted R^2	SE	R^2 Change	F Change	df1	df2	Sig. F Change
1	.328[a]	.107	.105	.62721	.107	41.371	1	344	.000
2	.360[b]	.130	.125	.62021	.022	8.808	1	343	.003
3	.360[c]	.130	.122	.62110	.000	.021	1	342	.884

In addition, the results in Table 4.38revealed impact of efficiency on behavioral intention is consistent as previously observed. It had significant positive impact on it in the first model (β=.328, t=6.432, p=.000), in the second model (β=.326, t=6.478, p=.000), and also in third model (β=.338, t=3.589, p=.000). In contrast, waiting had significant influence on behavioral intention only in the second model (β=.150, t=2.968, p=.003). as well, the interaction product in the third model suggested no moderating effect existed (β=-.030, t=-.146, p=.884).

Table 4.38
Hierarchical Regression: Moderating of waiting time on the Relationship between efficiency and M-banking adoption

Model	**Predictors**	**Unstandardized Coefficients**		**Standardized Coefficients**	**t**	**p**
		B	**SE**	**Beta(β)**		
1	**(Constant)**	2.452	.221		11.097	.000
	Efficiency	.355	.055	.328	6.432	.000
2	**(Constant)**	2.192	.235		9.309	.000
	Efficiency	.353	.055	.326	6.478	.000
	Waiting Time	.094	.032	.150	2.968	.003
3	**(Constant)**	2.144	.405		5.289	.000
	Efficiency	.366	.102	.338	3.589	.000
	Waiting Time	.111	.120	.177	.921	.358
	Interaction term (EFF*WT)	-.004	.030	-.030	-.146	.884

4.9.4.9 Convenience – Behavioral intention: Moderating effect of waiting time

Regarding convenience dimension, it has been hypothesized that that waiting time will be significantly moderating the relationship between convenience dimension of service quality and behavioral intention (H9.2). A three-step of hierarchical regression analysis was conducted to test this hypothesis. Tables 4.39 and 4.40 provided details of the test.

H9.2: Waiting time will have significant moderating effect on the relationship between convenience and intention to adopt.

As shown in Table 4.47, and consistent with previous analyzes, no moderation effect of waiting on the relationship between convenience and behavioral intention was found as there was minimal R square increase with insignificant F change increase in the third model ($F_{1, 343}$=.783, p=.377). This indicates that moderation of waiting time was not supported by the empirical data. It means that convenience did not interact with waiting time to predict behavioral intention.

Table 4.39

Model Summary of moderating effect of waiting time on CONV- BI relationship

					Change Statistics				
Model	R	R^2	Adjusted R^2	SE	R^2 Change	F Change	df1	df2	Sig. F Change
1	.139[a]	.019	.016	.65646	.019	6.797	1	345	.010
2	.207[b]	.043	.037	.64946	.024	8.482	1	344	.004
3	.212[c]	.045	.037	.64966	.002	.783	1	343	.377

Table 4.48 provided the results of beta coefficients of the variables. Inconsistent with previous results, it has been found that convenience had exerted significant influence on behavioral intention to adopt mobile banking in the first model (β=.139, t=2.607, p=.010) and in the second model (β=.140, t=2.661, p=.008). However, it has no effect when waiting time and interaction terms were present in the third model ((β=.065, t=.642, p=.521). It has also been found that waiting time had significantly influenced behavioral intention in the second model ((β=.154, t=2.912, p=.004), but no effect was observed in the third model ((β=-.019, t=-.093, p=.926). Finally, the interaction terms or moderating effect was absent as it the beta was not significant ((β=.193, t=.885, p=.377).

Table 4.40
Hierarchical Regression: Moderating of waiting time on the Relationship between convenience and M-bankingadoption

Model	Predictors	Unstandardized Coefficients		Standardized Coefficients	t	p
		B	SE	Beta(β)		
1	**(Constant)**	3.260	.232		14.064	.000
	Convenience	.154	.059	.139	2.607	.010
2	**(Constant)**	2.981	.249		11.992	.000
	Convenience	.155	.058	.140	2.661	.008
	Waiting Time	.096	.033	.154	2.912	.004
3	**(Constant)**	3.296	.434		7.593	.000
	Convenience	.071	.111	.065	.642	.521
	Waiting Time	-.012	.127	-.019	-.093	.926
	Interaction terms (CONV*WT)	.029	.033	.193	.885	.377

4.9.4.10 Perceived usefulness – Behavioral intention: Moderating effect of Task Interruption

Task interruption is another factor that proposed by this study to act as moderating effect along with waiting time on the relationships of independent variables with the dependent variable. Another nine separate hierarchical analyses was also conducted to test hypotheses related to Task interruption.

This study postulated that Task interruption will exert significant moderating on the relationship between perceived usefulness and behavioral intention to adopt mobile banking among the consumers.

H1.3: Task interruption will have significant moderating effect on the relationship between perceived usefulness and intention to adopt.

The results of hierarchical regression analysis, presented in Table 4.41, shows that no moderation effect of Task interruption is evident as the R square change was zero and the F change was insignificant in the third step ($F_{1, 345}$=.039, p=.844). It means that task interruption had no interaction with perceived usefulness to jointly predict behavioral intention. Therefore, H1.3 was rejected.

Table 4.41
Model Summary of moderating effect of Task interruption on PU- BI relationship

					Change Statistics				
Model	R	R^2	Adjusted R^2	SE	R^2 Change	F Change	df1	df2	Sig. F Change
1	.137[a]	.019	.016	.65477	.019	6.613	1	347	.011
2	.141[b]	.020	.014	.65531	.001	.435	1	346	.510
3	.142[c]	.020	.012	.65622	.000	.039	1	345	.844

On the other hand, the results in Table 4.42 revealed that perceived usefulness had influenced behavioral intention without the presence of the moderator in the first model (β=.137, t=2.572, p=.011) and also with the presence of the moderator in the second model (β=.137, t=2.578, p=.010). However, when the interaction was introduced, the effect of perceived usefulness had become insignificant (β=.125, t=1.568, p=.118). In addition, Task interruption had not predict behavioral intention either in the second model (β=-.035, t=-.659, p=.510) or in the third model (β=-.065, t=-.404, p=.686). Finally, the interaction of perceived usefulness and Task interruption suggested no moderation effect observed (β=.034, t=.197, p=.844).

Table 4.42
Hierarchical Regression: Moderating of Task interruption on the Relationship between perceived usefulness and behavioral intention

Model	**Predictors**	**Unstandardized Coefficients**		**Standardized Coefficients**	**t**	**p**
		B	**SE**	**Beta(β)**		
1	**(Constant)**	3.229	.247		13.074	.000
	Perceived usefulness	.158	.061	.137	2.572	.011
2	**(Constant)**	3.287	.263		12.511	.000
	Perceived usefulness	.159	.062	.137	2.578	.010
	Task interruption	-.022	.034	-.035	-.659	.510
3	**(Constant)**	3.337	.365		9.135	.000
	Perceived usefulness	.145	.093	.125	1.568	.118
	Task interruption	-.041	.102	-.065	-.404	.686
	Interaction term (PU*TI)	.005	.026	.034	.197	.844

4.9.4.11 *Perceived ease of use – Behavioral intention: Moderating effect of Task Interruption*

The study also postulated a significant moderating effect of Task interruption on the relationship between perceived ease of use and behavioral intention to adopt mobile banking. To test it, a three-step hierarchical regression analysis was conducted.

H2.3: Task interruption will have significant moderating effect on the relationship between perceived ease of use and intention to adopt.

The findings (Table 4.43) suggested that no moderation effect of Task interruption on the relationship between perceived ease of use and behavioral intention. There was no R square change and the F change was not significant ($F_{1, 344}$=.132, p=.717). This indicates that perceived ease of use individually predict behavioral intention without interacting with Task interruption

Table 4.43
Model Summary of moderating effect of Task interruption on PEU- BI relationship

					Change Statistics				
Model	R	R^2	Adjusted R^2	SE	R^2 Change	F Change	df1	df2	Sig. F Change
1	.275[a]	.076	.073	.63633	.076	28.405	1	346	.000
2	.276[b]	.076	.071	.63721	.000	.047	1	345	.829
3	.276[c]	.076	.068	.63801	.000	.132	1	344	.717

Similarly, the results in Table 4.44 revealed that perceived ease of use was found to have significant prediction on behavioral in the first model (β=.275, t=5.330, p=.000), second model (β=.277, t=5.288, p=.000) as well as in the third model (β=.299, t=3.775, p=.000). In addition, task interruption did not predict behavioral intention either in the second mode (β=.011, t=.216, p=.829) or in the third model (β=.069, t=.412, p=.681). However, the interaction effect of perceived ease of use and task interruption was also not significant (β=-.061, t=-.363, p=.717).

Table 4.44
Hierarchical Regression: Moderating of Task interruption on the Relationship between Perceived ease of use and behavioral intention

Model	Predictors	Unstandardized Coefficients		Standardized Coefficients	t	p
		B	SE	Beta(β)		
1	**(Constant)**	2.599	.239		10.891	.000
	Perceived ease of use	.317	.060	.275	5.330	.000
2	**(Constant)**	2.571	.272		9.457	.000
	Perceived ease of use	.319	.060	.277	5.288	.000
	Task interruption	.007	.033	.011	.216	.829
3	**(Constant)**	2.477	.376		6.583	.000
	Perceived ease of use	.344	.091	.299	3.775	.000
	Task interruption	.044	.106	.069	.412	.681
	Interaction term (PEU*TI)	-.010	.027	-.061	-.363	.717

4.9.4.12 Perceived trust- Behavioral intention: Moderating effect of Task interruption

A three-step hierarchical regression analysis was conducted to test the moderating effect of task interruption on the relationship between perceived trust and behavioral intention to adopt mobile banking as presented in the below hypothesis. The results are presented in Tables 4.53 and 4.45.

H3.3: Task interruption will have significant moderating effect on the relationship between perceived trust and intention to adopt.

As shown in table 4.46, the results suggested no moderating effect of task interruption on the relationship between perceived trust and behavioral intention due to almost zero R square change and insignificant F change increase ($F_{1, 341}$=.850, p=.357).

Table 4.45
Model Summary of moderating effect of Task interruption on PT- BI relationship

					Change Statistics				
Model	R	R^2	Adjusted R^2	SE	R^2 Change	F Change	df1	df2	Sig. F Change
1	.318[a]	.101	.099	.63030	.101	38.607	1	343	.000
2	.319[b]	.102	.096	.63106	.000	.173	1	342	.678
3	.322[c]	.104	.096	.63120	.002	.850	1	341	.357

In addition, the results of the beta coefficients suggested that perceived trust had significant influence on behavioral intention in all three models (β=.318, t=6.213, p=.000 for the first model, β=.317, t=6.186, p=.000 for the second model, β=.375, t=4.645, p=.000 for the

third model). Contrary to this, task interruption had no impact on behavioral intention either in the second model (β=-.021, t=-.416, p=.678) as well as the third model (β=.102, t=.712, p=.477). As well, the interaction term did not produce significant impact, indicating that there is no moderating effect of task interruption (β=-.142, t=-.922, p=.357).

Table 4.46
Hierarchical Regression: Moderating of task interruption on the Relationship between Perceived trust and behavioral intention

Model	Predictors	Unstandardized Coefficients		Standardized Coefficients	t	p
		B	SE	Beta(β)		
1	**(Constant)**	2.668	.194		13.733	.000
	Perceived Trust	.319	.051	.318	6.213	.000
2	**(Constant)**	2.709	.217		12.476	.000
	Perceived Trust	.318	.051	.317	6.186	.000
	Task interruption	-.014	.033	-.021	-.416	.678
3	**(Constant)**	2.508	.308		8.150	.000
	Perceived Trust	.375	.081	.375	4.645	.000
	Task interruption	.065	.091	.102	.712	.477
	Interaction term (PT*TI)	-.022	.024	-.142	-.922	.357

4.9.4.13 Perceived risk – Behavioral intention: Moderating effect of task interruption

Regarding the moderating effect of task interruption on the relationship between perceived risk and behavioral intention to adopt mobile banking, it has also conducted, like previous, a hierarchical regression analysis using the three-step approach. The following hypothesis was put forward for testing purposes:

H4.3: Task interruption will have significant moderating effect on the relationship between perceived risk and intention to adopt.

As exhibited in Table 4.47, the results suggested that hypothesized moderation effect of task interruption on the relationship between perceived risk and behavioral intention was not exist as there was no R square change increase as well as there was no significant F change increase in the last model ($F_{1, 343}$=.025, p=.874). This indicates that task interruption has neither direct influence nor moderated influence on behavioral intention. Thus, H4.3 was not supported by the data.

Table 4.47
Model Summary of moderating effect of Task Interruption on PR- BI relationship

Model	R	R^2	Adjusted R^2	SE	Change Statistics				
					R^2 Change	F Change	df1	df2	Sig. F Change
1	.043[a]	.002	-.001	.66228	.002	.644	1	345	.423
2	.061[b]	.004	-.002	.66263	.002	.631	1	344	.427
3	.061[c]	.004	-.005	.66357	.000	.025	1	343	.874

The results (Table 4.48) also supports the previous depiction that perceived risk has no influence on behavioral intention in all the three models (β=.043, t=.802, p=.423 for the first model, β=.052, t=.945, p=.346 for the second model, β=067, t=.619, p=.536 for the third model). Similarly, task interruption had no impact on behavioral intention neither in the first model (β=-.044, t=-.795, p=.427) nor in the third model (β=-.028, t=-.251, p=.802). As well, the interaction effect was also not significant (β=-.025, t=-.159, p=.874).

Table 4.48
Hierarchical Regression: Moderating of Task interruption on the Relationship between Perceived risk and behavioral intention

Model	**Predictors**	**Unstandardized Coefficients**		**Standardized Coefficients**	**t**	**p**
		B	**SE**	**Beta(β)**		
1	**(Constant)**	3.780	.102		37.015	.000
	Perceived Risk	.027	.033	.043	.802	.423
2	**(Constant)**	3.841	.127		30.174	.000
	Perceived Risk	.032	.034	.052	.945	.346
	Task interruption	-.028	.035	-.044	-.795	.427
3	**(Constant)**	3.817	.199		19.222	.000
	Perceived Risk	.041	.066	.067	.619	.536
	Task interruption	-.018	.071	-.028	-.251	.802
	Interaction term (PR*TI)	-.004	.022	-.025	-.159	.874

4.9.4.14 Descriptive norms – Behavioral intention: Moderating effect of task interruption

This study hypothesized that the task interruption will be significantly moderating the relationship between descriptive norms and behavioral intention to adopt mobile banking among the consumers. To test this proposition, a 3-step hierarchical regression analysis was conducted. The results are presented in Tables 4.49 and 4.50.

H5.5: Task interruption will have significant moderating effect on the relationship between descriptive norms and intention to adopt.

As exhibited in Table 4.49 below, the results suggested that there is no moderating effect of task interruption on the relationship between descriptive norms and behavioral intention. This is because there was no R square change increase as well as no F significant F change increase ($F_{1, 344}$=3.134, p=.078). This indicated descriptive norm had no direct or moderated influence on behavioral intention among the consumers. In addition, all beta coefficients for both the independent variable (descriptive norms) and the moderator (task interruption) were not significant in all the three models as shown in Table 4.50.

Table 4.49
Model Summary of moderating effect of task interruption on DN- BI relationship

					Change Statistics				
Model	R	R^2	Adjusted R^2	SE	R^2 Change	F Change	df1	df2	Sig. F Change
1	.007[a]	.000	-.003	.66192	.000	.015	1	346	.903
2	.036[b]	.001	-.004	.66245	.001	.444	1	345	.505
3	.102[c]	.010	.002	.66042	.009	3.134	1	344	.078

Table 4.50
Hierarchical Regression: Moderating of task interruption on the Relationship between descriptive norms and behavioral intention

Model	Predictors	Unstandardized Coefficients		Standardized Coefficients	t	p
		B	SE	Beta(β)		
1	**(Constant)**	3.845	.104		37.017	.000
	Descriptive norms	.004	.033	.007	.121	.903
2	**(Constant)**	3.894	.127		30.760	.000
	Descriptive norms	.010	.034	.015	.278	.782
	Task interruption	-.023	.035	-.037	-.667	.505
3	**(Constant)**	4.162	.197		21.091	.000
	Descriptive norms	-.092	.067	-.149	-1.379	.169
	Task interruption	-.135	.072	-.213	-1.873	.062
	Interaction term (DN*TI)	.040	.023	.285	1.770	.078

4.9.4.15 *Injunctive norms – Behavioral intention: Moderating effect of task interruption*

It also been conducted a three-step hierarchical regression test to examine the moderating effect of task interruption on the relationship between injunctive norms and behavioral intention to adopt mobile banking as proposed in the following hypothesis:

H5.6: Task interruption will have significant moderating effect on the relationship between injunctive norms and intention to adopt.

The results of the test (Table 4.51) suggested that no moderation was found for the task interruptionon the relationship between injunctive norms and behavioral intention as there were zero R square injunctive as well no significant F change increase ($F_{1, 338}$=.005, p=.945). This indicates that there are neither interaction effects nor main effects of injunctive norms and task interruptionon behavioral intention as confirmed by the beta coefficients presented in Table 4.52.

Table 4.51

Model Summary of moderating effect of Task Interruption on IN- BI relationship

					Change Statistics				
Model	R	R^2	Adjusted R^2	SE	R^2 Change	F Change	df1	df2	Sig. F Change
1	.003[a]	.000	-.003	.66775	.000	.003	1	340	.958
2	.035[b]	.001	-.005	.66833	.001	.404	1	339	.525
3	.035[c]	.001	-.008	.66932	.000	.005	1	338	.945

Table 4.52

Hierarchical Regression: Moderating of task interruption on the Relationship between injunctive norms and behavioral intention

Model	Predictors	Unstandardized Coefficients		Standardized Coefficients	t	p
		B	SE	Beta(β)		
1	**(Constant)**	3.850	.147		26.184	.000
	Injunctive norms	.002	.042	.003	.053	.958
2	**(Constant)**	3.893	.162		24.047	.000
	Injunctive norms	.008	.043	.010	.177	.859
	Task interruption	-.022	.035	-.035	-.636	.525
3	**(Constant)**	3.876	.288		13.440	.000
	Injunctive norms	.013	.085	.016	.149	.881
	Task interruption	-.015	.108	-.024	-.141	.888
	Interaction term (IN*TI)	-.002	.030	-.014	-.069	.945

4.9.4.16 Reliability dimension – Behavioral intention: Moderating effect of Task interruption

Regarding the reliability dimension of service quality, the study proposed that this variable's influences will be moderated by task interruption. A three-step hierarchical regression analysis was conducted to test this hypothesis.

H6.3: Task interruption will have significant moderating effect on the relationship between reliability and intention to adopt.

As presented in Table 4.53 below, there was no moderating effect of task interruption on the relationship between reliability dimension and behavioral intention. This is confirmed

by the insignificant F change increase with zero R square found by the study (F1, 344=.001, p=.976).

Table 4.53
Model Summary of moderating effect of task interruption on REL- BI relationship

					Change Statistics				
Model	R	R^2	Adjusted R^2	SE	R^2 Change	F Change	df1	df2	Sig. F Change
1	.298[a]	.089	.086	.63191	.089	33.663	1	346	.000
2	.298[b]	.089	.084	.63274	.000	.087	1	345	.768
3	.298[c]	.089	.081	.63366	.000	.001	1	344	.976

In contrast, the beta coefficients in Table 4.54 also suggested that reliability dimension has significant influence on behavioral intention in all three models (β=.298, t=5.802, p=.000 for the first model, β=.297, t=5.766, p=.000 for the second model, β=.295, t=3.703, p=.000 for the third model). However, task interruption was found to be insignificant predictor of behavioral intention in both second model (β=-.015, t=-.296, p=.768) and the third model (β=-.020, t=-.116, p=.908). Finally, the interaction term (β=.006, t=.031, p=.976) suggested no significant moderation effect.

Table 4.54
Hierarchical Regression: Moderating of task interruption on the Relationship between reliability and behavioral intention

Model	**Predictors**	**Unstandardized Coefficients**		**Standardized Coefficients**	**t**	**p**
		B	**SE**	**Beta(β)**		
1	**(Constant)**	2.533	.231		10.980	.000
	Reliability	.338	.058	.298	5.802	.000
2	**(Constant)**	2.564	.253		10.130	.000
	Reliability	.337	.058	.297	5.766	.000
	Task interruption	-.010	.033	-.015	-.296	.768
3	**(Constant)**	2.572	.362		7.099	.000
	Reliability	.335	.090	.295	3.703	.000
	Task interruption	-.013	.111	-.020	-.116	.908
	Interaction (REL*TI)	.001	.028	.006	.031	.976

4.9.4.18 Efficiency dimension – Behavioral intention: Moderating effect of task interruption

The study hypothesized a significant moderating effect of task interruptionon the relationship between efficiency dimension of service quality and behavioral intention to adopt mobile banking the customers as presented in the following hypothesis in chapter two. A three-step hierarchical regression analysis has been conducted to test this hypothesis.

H8.3: Task interruptionwill have significant moderating effect on the relationship between efficiency and intention to adopt.

To get a moderating effect the third model should produce a significant F change. As such, Table 4.63 suggested that there is significant moderating effect of task interruptionon the relationship between efficiency dimension and behavioral intention with significant R square increase (R^2=.012) and with significant F change increase ($F_{1, 343}$=4.685, p=.031). This is an indication of existence of moderating effect.

Table 4.55
Model Summary of moderating effect of task interruption on EFF- BI relationship

					Change Statistics				
Model	R	R^2	Adjusted R^2	SE	R^2 Change	F Change	df1	df2	Sig. F Change
1	.328[a]	.107	.105	.62630	.107	41.492	1	345	.000
2	.328[b]	.107	.102	.62721	.000	.004	1	344	.948
3	.346[c]	.119	.112	.62388	.012	4.685	1	343	.031

The results of the first model (Table 4.55) are consistent with previous results, showing a positive influence of efficiency dimension on behavioral intention in the first model (β=.328, t=6.441, p=.000), in the second model (β=.328, t=6.399, p=.000) as well as in the third model (β=.466, t=5.715, p=.000). In addition, the moderator has only significant impact in the third model (β=.358, t=2.086, p=.038) but not in the second model (β=.003, t=.065, p=.948). The

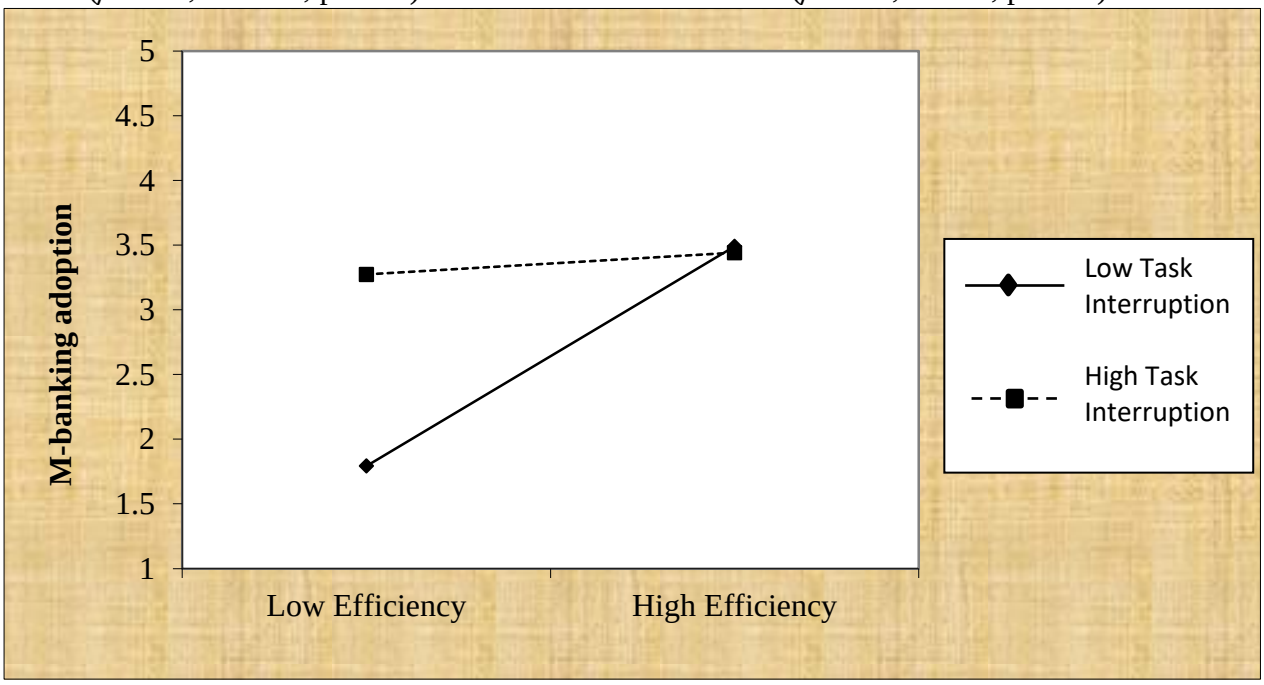


Figure 4.7: Interaction effect of TI on EFF-BI

interaction terms was also significant (β=-.382, t=-2.164, p=.031), indicating that task interruption has significantly moderated the relationship between efficiency dimension and behavioral intention. However, it is notable here that the interaction effect was negative, indicating that the higher task interruption reduces the relationship between efficiency dimension and behavioral intention. In other, task interruption significantly and negatively moderates the relationship between these two variables.

Figure 4.7 shows the visual presentation of the moderation effect of task interruption. As shown in the Figure, it is evident when the task interruption high, the efficiency is perceived low among the respondents.

Table 4.56
Hierarchical Regression: Moderating of Task interruption on the Relationship between efficiency and behavioral intention

Model	Predictors	Unstandardized Coefficients		Standardized Coefficients	t	p
		B	SE	Beta(β)		
1	**(Constant)**	2.452	.221		11.114	.000
	Efficiency	.355	.055	.328	6.441	.000
2	**(Constant)**	2.445	.248		9.841	.000
	Efficiency	.355	.055	.328	6.399	.000
	Task interruption	.002	.033	.003	.065	.948
3	**(Constant)**	1.867	.364		5.131	.000
	Efficiency	.504	.088	.466	5.715	.000
	Task interruption	.227	.109	.358	2.086	.038
	Interaction term (EFF*TI)	-.059	.027	-.382	-2.164	.031

4.9.4.19 Convenience dimension – Behavioral intention: Moderating effect of Task interruption

Finally, this study put forward that the relationship between convenience dimension of service quality and behavioral intention will be significantly moderated by Task interruption. For testing purposes, a three-step hierarchical regression analysis was conducted. The results are presented in Tables 4.57 and 4.58.

H9.3: Task interruption will have significant moderating effect on the relationship between convenience and intention to adopt.

As shown by the results in Table 4.57, there was no moderating effect of Task interruption on the relationship between convenience dimension and behavioral intention. This

is evidenced in such that no enough R square change increase and no significant F change increase were observed ($F_{1, 344}$=.495, p=.482), indicating that there interaction effect does not exist.

Table 4.57
Model Summary of moderating effect of Task interruption on CONV- BI relationship

					Change Statistics				
Model	R	R^2	Adjusted R^2	SE	R^2 Change	F Change	df1	df2	Sig. F Change
1	.139[a]	.019	.016	.65551	.019	6.817	1	346	.009
2	.142[b]	.020	.015	.65614	.001	.339	1	345	.561
3	.147[c]	.022	.013	.65662	.001	.495	1	344	.482

The results of the beta coefficients revealed that convenience had significant influence on behavioral intention only in the first model (β=.139, t=2.611, p=.009) and in the second model (β=.139, t=2.599, p=.010). However, it is effect was taken out with the presence of the interaction term (β=.091, t=1.051, p=.294). Moreover, Task interruption(the moderator) was found to have no significant impact on behavioral intention neither in the second model (β=-.031, t=-.582, p=.561) nor in the third model (β=-.154, t=-.843, p=.400). Finally, the interaction term was also found to be insignificant (β=.136, t=.704, p=.482).

Table 4.58
Hierarchical Regression: Moderating of Task interruption on the Relationship between convenience and behavioral intention

Model	**Predictors**	**Unstandardized Coefficients**		**Standardized Coefficients**	**t**	**p**
		B	**SE**	**Beta (β)**		
1	**(Constant)**	3.260	.231		14.085	.000
	Convenience	.154	.059	.139	2.611	.009
2	**(Constant)**	3.316	.251		13.217	.000
	Convenience	.153	.059	.139	2.599	.010
	Task interruption	-.020	.034	-.031	-.582	.561
3	**(Constant)**	3.511	.374		9.386	.000
	Convenience	.100	.095	.091	1.051	.294
	Task interruption	-.097	.116	-.154	-.843	.400
	Interaction term (CONV*TI)	.021	.030	.136	.704	.482

4.10 Summary of the Hypothesis

This study had examined the influential factors determining behavioral intention to adopt mobile banking adoption among Sudanese consumers. Four factors from TAM model, two factors from subjective norms, and four factors from service quality were hypothesized to have

direct impact on behavioral intention, while two variables of situational factors were hypothesized to moderate the relationship of these independent variables with the behavioral intention.

Initially, the researcher developed thirty hypothesis based on the conceptual model; however, three hypotheses were not tested, which concern responsive dimension of service quality, that were eliminated during factor analysis process due low validity concerns. Therefore, the final set of hypothesis tested here was twenty-seven hypotheses.

Regarding TAM dimensions, two hypotheses were supported; perceived ease of use and perceived trust were found to be influential factors in the context of mobile banking, whereas perceived usefulness and perceived risk had no any impact.

In terms of service quality dimensions, also two hypotheses were fully supported by the empirical data namely reliability and efficiency, whereas hypothesis about convenience was rejected.

All the two hypotheses that concern about subjective norms: descriptive norms and injunctive norms were not supported by the data. This means that subjective norms or social influence factors are not determining whether consumers to adopt mobile banking or not.

As for the moderating test, this study proposed eighteen sub hypotheses that attempted to examine the moderating of two factors (waiting time and task interruption) on the relationships of independent variables and the dependent variables. All the hypotheses regarding the moderation, except one, were rejected by the empirical data. It was only found that task interruption had moderating effect on the relationship between efficiency and behavioral intention.

Table 4.59
Summary of hypothesis

No.	Hypotheses	Remarks
H1.1	*Perceived usefulness will have significant influence on the Sudanese consumers' adoption of mobile banking technology.*	Supported
H1.2	*Waiting time will have significant moderating effect on the relationship between perceived usefulness and intention to adopt.*	Not supported
H1.3	*Task interruption will have significant moderating effect on the relationship between perceived usefulness and intention to adopt*	Not supported
H2.1	*Perceived ease of use will have significant influence on the consumers' adoption of mobile banking technology.*	Supported
H2.2	*Waiting time will have significant moderating effect on the relationship between perceived ease of use and intention to adopt.*	Not supported
H2.3	*Task interruption will have significant moderating effect on the relationship between perceived ease of use and intention to adopt.*	Not supported
H3.1	*Perceived trust will have significant influence on the Sudanese consumers' adoption of mobile banking technology.*	Supported
H3.2	*Waiting time will have significant moderating effect on the relationship between perceived trust and intention to adopt.*	Not supported
H3.3	*Task interruption will have significant moderating effect on the relationship between perceived trust and intention to adopt.*	Not supported
H4.1	*Perceived risk will have significant negative influence on the Sudanese consumers' adoption of mobile banking technology.*	Supported
H4.2	*Waiting time will have significant moderating effect on the relationship between perceived risk and intention to adopt.*	Not supported
H4.3	*Task interruption will have significant moderating effect on the relationship between perceived risk and intention to adopt.*	Not supported
H5.1	*Descriptive norms will have significant influence on the Sudanese consumers' adoption of mobile banking technology.*	Not supported
H5.2	*Injunctive norms will have significant influence on the Sudanese consumers' adoption of mobile banking technology.*	Not supported
H5.3	*Waiting time will have significant moderating effect on the relationship between descriptive norms and intention to adopt.*	Not supported
H5.4	*Waiting time will have significant moderating effect on the relationship between injunctive norms and intention to adopt.*	Not supported
H5.5	*Task interruption will have significant moderating effect on the relationship between descriptive norms and intention to adopt.*	Not supported
H5.6	*Task interruption will have significant moderating effect on the relationship between injunctive norms and intention to adopt.*	Not supported
H6.1	*Reliability dimension will have significant negative influence on the Sudanese consumers' adoption of mobile banking technology.*	Supported
H6.2	*Waiting time will have significant moderating effect on the relationship between reliability and intention to adopt.*	Not supported
H6.3	*Task interruption will have significant moderating effect on the relationship between reliability and intention to adopt.*	Not supported
H7.1	*Responsiveness dimension will have significant negative influence on the Sudanese consumers' adoption of mobile banking technology.*	Not tested
H7.2	*Waiting time will have significant moderating effect on the relationship between responsiveness and intention to adopt.*	Not tested
H7.3	*Task interruption will have significant moderating effect on the relationship between responsiveness and intention to adopt.*	Not tested

H8.1	*Efficiency dimension will have significant negative influence on the Sudanese consumers' adoption of mobile banking technology*	Supported
H8.2	*Waiting time will have significant moderating effect on the relationship between efficiency and intention to adopt.*	Not supported
H8.3	*Task interruption will have significant moderating effect on the relationship between efficiency and intention to adopt.*	Supported
H9.1	*Convenience dimension will have significant negative influence on the Sudanese consumers' adoption of mobile banking technology.*	Not supported
H9.2	*Waiting time will have significant moderating effect on the relationship between convenience and intention to adopt.*	Not supported
H9.3	*Task interruption will have significant moderating effect on the relationship between convenience and intention to adopt.*	Not supported

Chapter summary

This chapter presented the findings of the study starting with the background of the respondents and their mobile phone and mobile banking usage patterns. This study used quantitative approach with survey instrument as data collection method. The data were analyzed using the most popular statistical software (SPSS), using both descriptive statistics such as frequencies, percentages, means and standard deviations, as well as inferential statistics such as correlation and multiple regression analyses.

The chapter also discussed validity and reliability using factor analysis and Cronbach's alpha coefficient respectively, followed by normality test and descriptive statistics for all dimensions used in the conceptual model. Moreover, zero-order correlation using bivariate correlation was presented before hypotheses testing part. The hypotheses outlined in chapter two were tested using multiple regression analysis for main effects and hierarchical regression test for the moderation analysis.

CHAPTER FIVE

DISCUSSION AND CONCLUSION

5.1. INTRODUCTION

This chapter presents discussion and conclusion of the thesis, starts with a summary of the major findings followed a discussion of the findings in light of previous studies. The chapter also presents limitations of this study and gives the scope for future studies. Finally, the chapter explains about the contributions and significances of the study.

5.2. SUMMARY OF MAJOR FINDINGS

The main objective of this study was to examine the moderating effect of situational factors as well as the influential factors that affect the consumers' intention to adopt a self-service technology (SST) taking mobile banking as an example, drawing on the information systems use and acceptance literature.

Specifically, this study addressed several sub-objectives such as 1) to explore the determinants of mobile banking adoption among Sudanese; 2) to examine the effect of service quality dimensions (reliability, responsiveness, efficiency, and convenience) on the Sudanese's intention to adopt mobile banking service; 3) to measure the effect of TAM constructs (perceived usefulness and perceived ease of use, perceived trust and perceived risk) on Sudanese's intention to adopt mobile banking services; 4) to explore the effect of subjective norms (descriptive norms and injunctive norms) on Sudanese's intention to adopt mobile banking services; and finally 5) to test the moderating effect of situational factors (waiting time and task interruption) on the relationship between the main the independent variables (service quality dimensions, TPB constructs, and TAM-related constructs) and dependent variable (behavioral intention).

By using the stratified random sampling procedure, this study collected the data from 349 customers of mobile banking services provided by Bank Salaam and Bank Islamic Faisal

who had participated and filled the questionnaires measuring the underlying factors that contribute to the respondents' behavioral intentions to adopt mobile banking services as well as the moderating effect of situational factors.

Moreover, the study collected information related to the demographic profile such as gender, age, educational qualifications, occupation, and marital status. The results revealed more than half of the respondents (57%) were male, were aged between 26-35 years (58%) and were bachelor degree holders (66%). Most of them work as government officers and private employees and most of them were either married or single.

In addition, this study was also interested to know mobile banking experience among the consumers which may help boost our understanding on underlying factors that contribute towards mobile banking adoption. Most of the respondents had 2-3 years of experience in using banking transactions; few of them reported having more than six years of experience. This indicates that mobile banking consumers in this study are fresh consumers who can provide their experiences regarding the services provided by the studied banks.

Also, respondents had an experience with mobile banking services, with almost fifty percent of the consumers reporting to have 7-12 months with the service and very few of them reported an experience of more than 19 months. About two-thirds of the respondents reported spending 1-5 hours per week on mobile banking transactions and very few of them reported more than 11 hours per week. The study also interested to explore the reasons of using mobile banking among the consumers. The results revealed that most of the respondents used mobile banking because of need for urgent transactions and time saving. There were also other reasons, as reported by the respondents, such as convenience of time and inability to go to the bank's branches or ATMs.

This study also intended to establish the validity and reliability of major variables used in this study. To achieve this, a series of factor analysis had been conducted for TAM related constructs (perceived usefulness, perceived ease of use, perceived risk, and perceived trust), service quality dimensions (efficiency, reliability, responsiveness and convenience), subjective norms dimensions (descriptive norms and injunctive norms), situational factors (waiting time and task interruption) and finally the dependent variable in this study (behavioral intention to adopt mobile banking).

The validation procedure suggested that TAM related variable were found to be highly valid and reliable, thus supporting the original model and subsequent studies that adopted the model to different contexts including mobile banking and consumer texts. Some items have been dropped from perceived usefulness, perceived ease of use, and perceived trust, while perceived risk maintained all its original items.

Another factor analysis for validation purpose has been conducted for service quality dimensions namely efficiency, responsiveness, reliability and convenience. One dimension (responsiveness) has been eliminated during the process because of its failure of meeting the standard criteria for the validation. Few items were also dropped from convenience and efficiency, whereas reliability dimension has maintained its original items. Overall, the remaining dimensions with their items were found to be highly valid and reliable.

The validation process also tapped the subjective norms dimensions namely descriptive norms and injunctive norms. However, only item has been deleted from injunctive norms due to cross loading; all other items were highly valid and reliable; they have contributed to their respective dimension or factor.

Situational factors which consisted of two dimensions (waiting time and task interruption) also involved in validation process through factor analysis. The two dimension

were found to have sound validity and reliability; no item was deleted from both the dimensions as all of them fulfilled the required level of threshold. Finally, the only dependent variable (behavioral intention to adopt mobile banking) has also validated through factor analysis. After dropping only item, the validity and reliably of the construct has been established.

The study also found interesting findings regarding the correlation of independent variables with the dependent variable as well as the inter-relationships among the independent variables. The results revealed that the behavioral intention of mobile banking adoption (dependent variable) have been significantly and positively correlated with majority of the predictors such as perceived ease of use, perceived trust, perceived usefulness, efficiency, reliability, and convenience. On the other hand, among the predictors, perceived risk, descriptive norms, and injunctive norms were not significantly correlated with the behavioral intention. There was also significant correlation between behavioral intention and perceived complexity. In addition, the study suggested significant inter-correlations among majority of the independent variables, but were not too high as they can pose a multicollinearity issues if the correlations are high.

On the other hand, this study presented nine main hypotheses with several sub hypotheses to test the proposed conceptual framework of mobile banking adoption and its predictor and moderators. All hypotheses were tested with multiple regression analysis, controlling for demographic factors such as age, gender, education, experience with the banking, as well as experience with the mobile banking.

Among the TAM related constructs, perceived ease of use, perceived usefulness and perceived risk had significantly contributed towards mobile banking adoption among the participants of this study. Perceived usefulness was not a predictor of the dependent variable. It is notable here also that perceived risk negatively predicted the adoption, which means that the higher the risk associated with the usage of the technology, the less likely that the

consumers adopt the service. However, the effect of other potential influencers were controlled such as gender, age, education, experience with the banking and experience with mobile banking and were found to have minimal effect on the dependent variable. This indicates that the predictors accounted for the majority of the variance in behavioral intention.

Subjective norms dimensions such as descriptive norms and injunctive norms were found to have no significant contribution towards the adoption of mobile banking among the consumers in the country. In addition, the control variables were not predicting the dependent variable, which means that they have influence on how people adopt the mobile banking technology. Therefore, this findings suggests that significant others or peers have no influence on the participants of this study to adopt mobile banking technology, which don't consider it as a motivating factors towards adoption.

Two dimensions of service quality namely reliability and efficiency had significantly contributed towards participants' behavioral intention of adopting mobile banking technology. Convenience dimension did not exert any effect on the adoption process among the participants, which means that they don't care about whether the service usage is convenient or not, but they are more concern that the service should be efficient and reliable. Another dimension (responsiveness) has been eliminated during validation process due to its failure to meet the minimum standard criteria.

The study was also interested to test the moderating effect of situational factors on the relationship between independent variables and dependent variable. Using hierarchical regression analysis, the results suggested that there were no moderating effects for the majority of hypothesized relationships except the relationship between efficiency and behavioral intention which was negatively and significantly moderated by task interruption. This indicates that the more participants taskhigherinterruption, the less likely to adopt mobile banking technology. On the other hand, situational factors such as waiting time and task

interruptiondidnot improve or reduce the relationship between the independent variables and dependent variable, which means that these independent variables contribute to behavioral intention without any need for interacting effects from other factors.

5.3.DISCUSSION OF THE FINDINGS

5.3.1. Relationship between TAM – M-Banking adoption

This study posited that TAM related constructs such as perceived usefulness, perceived ease of use, perceived trust and perceived risk will be significantly contributing towards behavioral intention to adopt mobile banking technology among the target sample.

As presented in previous section, the results have found that perceived usefulness was found to have no impact on behavioral intention to adopt mobile banking among the consumers in this study. This implies that the participants don't care whether the technology is useful or not. This is in contrast with majority of previous studies which suggests the opposite. The literature suggested that perceived usefulness were a significant predictor of behavioral intention among many consumers in different countries such as China (Liu, Min, & Ji, 2009; Min, Lu, & Yinjun, 2011; Zhou, Lu, & Wang, 2010; Zhou, 2011), Malaysia (Amin, Baba, & Muhammad, 2007; Daud, Kassim, Said, & Noor, 2011; Shanmugam, Savarimuthu, & Wen, 2014), Singapore (Riquelme & Rios, 2010), South Korea (Chung & Kwon, 2009a; Gu, Lee, & Suh, 2009; Lee, Lee, & Kim, 2007), Taiwan (Luarn & Lin, 2005; Yu, 2012), India (Nayak, Nath, & Goel, 2014; Safeena, Date, Kammani, & Hundewale, 2012), Pakistan (Kazi & Mannan, 2013), Iran (Ghalandari, Ghahremanpour, & Hasanluei, 2013; Hanafizadeh, Behboudi, Abedini Koshksaray, & Jalilvand Shirkhani Tabar, 2014), Jordan (Khraim, Shoubaki, & Khraim, 2011; Mashagba & Nassar, 2012), Saudi Arabia (Al-Jabri & Sohail, 2012), and Australia (Wessels & Drennan, 2010).

However, the insignificant impact of perceived usefulness is consistent with the findings of Aboelmaged and Gebba (2013); Akturan and Tezcan (2012); Amin, Supinah, Aris, and

Baba, (2012); and Karma, Ibrahim, and Ali (2014) who conducted their studies on mobile banking adoption in United Arab Emirates, Turkey, Malaysia and Sudan respectively. This means that consumers are no longer considering the usefulness of the service or the technology but along it they are considering many others.

Perceive ease of use was found to have significant impact on behavioral intention to adopt the technology. It means that the more the user perceived the technology or systems is easy and does not require a lot mental efforts, the more the user will adopt it. This finding was supported by previous studies which found similar results particularly in the context of mobile banking technology in several countries such as South Korea (Chung & Kwon, 2009b; Gu et al., 2009), Iran (Hanafizadeh et al., 2014), Malaysia (Amin et al., 2007; Daud et al., 2011), Pakistan (Kazi & Mannan, 2013), Somalia (A. Y. S. Ali & Dhaha, 2014), and Zimbabwe (Marumbwa & Mutsikiwa, 2013). All these studies suggested that the higher the perception of easiness, the higher the rate of adoption of mobile banking technology among different consumers with different demographic characteristics.

Moreover, this study also posited that perceived trust will exert significant influence on behavioral intention to adopt mobile banking technology among the consumers. The results supported this hypothesis which in consistent with previous studies in the context of mobile banking in many countries. For example, many researchers from South Korea (Gu et al., 2009; G. Kim, Shin, & Lee, 2009; Lee et al., 2007) found that perceived trust is driving motivator of mobile banking adoption. Similarly, Hanafizadeh et al. (2014) identified trust an influential factor determining mobile banking adoption among consumers in Iran. This variable was found to be major determinant of the intention of the consumers to adopt mobile banking in China, Somalia, Sudan, Ghana and Zimbabwe (A. Y. S. Ali & Dhaha, 2014; Karma et al., 2014; Liu et al., 2009; Marumbwa & Mutsikiwa, 2013; Tobbin & Kuwornu, 2011; Tobbin, 2012).

However, this study is contrary to some studies that found that trust has no impact or direct impact on the consumers' intention towards adopting mobile banking technology (F. Bankole, Bankole, & Brown, 2011; Koenig-Lewis, Palmer, & Moll, 2010; Lee et al., 2007; Shambare, 2013).

In general, trust was considered the most important element in mobile banking adoption. The higher the level of trust perceived by the consumers, the higher the rate of adoption of the technology. In addition, the antecedents of trust or trust dimensions have been reported in the literature and were found to contribute towards adopting mobile banking (Luo, Li, Zhang, & Shim, 2010; Oliveira, Faria, Thomas, & Popovič, 2014).

Perceived risk is another factor that this study posited to have significant negative contribution towards mobile banking adoption among the consumers. The concept refers to the degree of discrepancies between the perception and judgment of the consumer and the actual behavior associated with the service (Al-Jabri & Sohail, 2012; Koenig-Lewis et al., 2010; Lee et al., 2007).

This concept is of great concern in the context of mobile banking adoption i since security threat and privacy invasion is mainly associated with technologies (Luarn & Lin, 2005). Customers are concerned with their information during mobile banking transactions, and this decreases their confidence in using the technology (Laforet & Li, 2005; Luarn & Lin, 2005).

This study suggested that perceived risk is negatively predicting behavioral intention of mobile banking adoption among Sudanese consumers. This findings is consistent with those found by Al-Jabri and Sohail (2012); Chitungo and Munongo (2013); and Kazi and Mannan (2013) in the context of Saudi Arabia, Zimbabwe, and Pakistan respectively. Also, other studies also reported the importance of perceived risk according to the consumers in Brazil,

South Korea, Iran, Sudan, Jordan, Germany, United States of America, China, Singapore, India, and Australia respectively (Cruz, Neto, Muñoz-Gallego, & Laukkanen, 2010; Gu et al., 2009; Hanafizadeh et al., 2014; Karma et al., 2014; Khraim et al., 2011; Koenig-Lewis et al., 2010; Lee et al., 2007; Luo et al., 2010; Min et al., 2011; Riquelme & Rios, 2010; Safeena et al., 2012; Wessels & Drennan, 2010).

In contrast to this study, some previous studies reported that perceived risk is not an issue for the consumers when adopting mobile banking technology. Daud et al. (2011) contended that perceived risk had no significant impact on the consumers' intention among Malaysians. Kim et al. (2009) reported an indirect significant impact of this variable on consumers' intention among South Koreans but no direct impact was observed. Further, A. Y. S. Ali and Dhaha (2014), Shambare (2013) and Tobbin and Kuwornu (2011) also reported no direct and indirect significant impact of perceived risk on consumers' intention to adopt mobile banking among Somali, South African as well as Ghanaian consumers respectively.

5.3.2. Relationship between Subjective norms dimensions – M-Banking adoption

Subjective norms or the social influence is consisted of two dimensions in this study namely descriptive norms and injunctive norms. The concept refers to the influence and pressure made by one's immediate contacts such as friends, family members and colleagues on ones' behaviors. This study posited that dimensions of subjective norms will have significant impact on behavioral intention to adopt mobile bank with among the consumers.

The results did not support this proposition and indicated that peer pressure and social influence have nothing to do with the consumers when are making the decision of adoption of mobile banking technology. This findings support some previous studies while it is contradicting with others. Early studies on adoption of information systems suggested that this constructs and its dimensions can influence the way people adopt a new system or technology

(Ajzen, 1991; Bhattacherjee, 2000; Fishbein & Ajzen, 1975; Venkatesh & Davis, 2000b; Venkatesh, Morris, Davis, & Davis, 2003).

This concept (subjective norms) was also found to have significant impact on mobile banking adoption among many consumers in United Arab Emirates (Aboelmaged & Gebba, 2013), Malaysia (Amin & Ramayah, 2010), and Brazil (Püschel, Mazzon, & Hernandez, 2010). It is also reported in the literature other similar concepts such social factors, social influence, image, and social norms, which were found to have significant impact on consumers in China, Singapore, Zimbabwe, South Africa, Pakistan, Jordan, and Somalia (Chitungo & Munongo, 2013; Kazi & Mannan, 2013; Mashagba & Nassar, 2012; Riquelme & Rios, 2010; Sayid, Echchabi, & Aziz, 2012; Yu, 2012; Zhou et al., 2010).

On the other hand, the findings of this study regarding subjective norms or social influence is in consistence with previous studies, which suggested that this variable have no impact on consumers' intention to adopt mobile banking in Malaysia (Amin et al., 2007), Nigeria (Bankole & Cloete, 2011), Somalia (Ali & Dhaha, 2014) and Portugal (Oliveira et al., 2014). It means that the consumer is not considering what his or her important other (friends, family members, co-workers, classmates) are thinking about a behavior he or she should perform.

5.3.3. Relationship between Service quality dimensions – behavioral intention

This study adopted two dimensions from the original service quality theory and two others adopted from mobile banking related studies as they are more prominent and relevant in the context of mobile banking. These dimensions were proposed to have significant impact mobile banking adoption among Sudanese consumers.

The results of regression analysis reported in previous chapter revealed that only two dimensions of service quality namely efficiency and reliability were significantly contributing

towards mobile banking adoption among the participants of this study. Convenience was found to have no impact on the consumers' behavioral intention to adopt mobile banking. However, responsiveness was not included in the regression analysis as it was eliminated during the validation process reported in chapter four. Therefore, responsiveness and convenience were not predictors of mobile banking adoption.

Reliability, which refers to extent of fulfilling the promise made by the banks accurately and dependably (Parasuraman, Zeithaml, & Berry, 1988), was found to determine the consumers' intention to adopt mobile banking. It means that consumers in this study agreed that the bank is reliable in its maintaining the accuracy in billing, keeping records correctly, and performing the service at stipulated time. Cheng, Jong, Chen, and Chen (2013) found that reliability dimension of service quality had indirect effect on consumers' intention to use mobile banking in Taiwan. The effect of this dimension was mediated by customer satisfaction. In another study, it has been reported that service quality as one component had significantly contributed towards behavioral intention to adopt mobile banking technology (Woo & Ennew, 2005). It means that the higher the perceived quality of the service, the higher the adoption rate of the service.

Efficiency is an important dimension in marketing research addressing service delivery mechanisms (Kelley, 1989). Two approaches have been suggested by Kelley for examining efficiency in service delivery, namely technological approach and humanistic approach. The concept has been referred as less waiting time, connecting immediately with the customer, inclusion of all banking needs in the menu options, help menu for educating customer on how to use, providing direction and instruction for the new users, and finally adequate menu options (Joseph, McClure, & Joseph, 1999).

Previous studies (Joseph et al., 1999; M. Kim, Kim, & Lennon, 2006; Parasuraman, Zeithaml, & Malhotra, 2005; Santos, 2003; Sun, Wang, & Cao, 2009; Yen & Lu, 2008;

Zeithaml, Parasuraman, & Malhotra, 2002) who examined the importance of efficiency in the context of electronic and online banking, had ignored the potential contribution of this dimension (efficiency) towards adoption of mobile banking. As such, this study proposed a positive impact of efficiency on behavioral intention to adopt mobile banking. Therefore, the results of this study, presented in regression analysis discussion, supported this hypothesis. Consequently, this study made a significant contribution to the literature in the context of efficiency dimension.

Convenience is another dimension that this study hypothesized that it should have significant impact on behavioral intention towards mobile banking adoption among Sudanese consumers. The results of the regression analysis did not support this hypothesis. It means that the participants in this study are not concerned about whether the service is convenience or not, but considered other factors. This may be related to the perception that the time of performing the transaction is less important than the efficiency and reliability of the service performed. The results of the study also hinted that convenience as a factor was considered by the consumers, but as a factor determining their adoption. They will adopt the service regardless of its convenience. This notion is supported by previous studies (Cronin & Taylor, 1992; Joseph et al., 1999; Parasuraman et al., 2005; Zeithaml et al., 2002), that concluded that convenience is important when dealing the financial transactions, but not a determinant of adoption. It rather depends of usage not the adoption.

The last dimension used in this study was responsiveness dimension of service quality. This dimension has been eliminated during the validation process. Therefore, the researcher will not discuss much in this regard, since it was not included in the analysis. In the literature, it has been found that responsiveness positively correlated with customers satisfaction, which indirectly contributed towards behavioral intention of adoption mobile banking (Aghdaie & Faghani, 2012; F. Ali & Zhou, 2013; Cheng et al., 2013; Lau, Cheung, Lam, & Chu, 2013). In

addition, perceived service quality as a one construct has been reported to have direct impact on consumers' behavioral intention to adopt electronic banking service (Woo & Ennew, 2005).

5.4. MODERATING EFFECT OF SITUATIONAL FACTORS

5.4.1. Moderating effect of waiting time

One of the main objectives of this study was to test the moderating effect of situational factors such as waiting time. This factor is important in the context of mobile banking as the time taken by the transaction is of great concern for the consumer. Based on a recent suggestion in the literature to incorporate the moderating effect of situational factors (Nysveen, Pedersen, & Thorbjornsen, 2005; Nysveen & Pedersen, 2011), this study adopted two factors namely waiting time and perceived complexity to represent the situational factors.

This study hypothesized eight linkages for the moderating test of waiting time towards the relationships of the independent variables (perceived usefulness, perceived ease of use, perceived trust, efficiency, reliability, convenience, descriptive norms, and injunctive norms) on the dependent variable (behavioral intention of adoption mobile banking). The results of hierarchical regression analysis suggested no significant moderating effect of waiting time on the relationships of independent variables with the dependent variable. However, the results suggested that waiting time had direct impact on the behavioral intention to adopt mobile banking technology. This means that consumers also adopt the service considering the waiting time regardless of interaction of waiting time with any of the independent variables. This result is in contrary to previous studies that reported dimensions situational factors had significantly moderated the relationship of independent variable with the dependent variable (Dabholkar & Bagozzi, 2002; Wang, Harris, & Patterson, 2012). Several situational factors have been reported by previous studies including waiting time.

5.4.2. Moderating effect of task interruption

This study also interested to examine the moderating effect of task interruption as a situational factor, on the relationship between the independents variables and the dependent variable. task interruption was first recently identified in the literature (Wang et al., 2012). It was reported that task interruption is important particularly in the context of self-service technologies (SST).

Majority of the hypothesized moderating effect of task interruption were not supported by the empirical data gathered from the respondents, except the relationship between efficiency and behavioral intention to adopt mobile banking among the consumers. There was a significant moderating effect of task interruption on this relationship; however, it is noticed here the direction of the moderation effect was negative that the higher the task interruption, the less the feelings of efficiency of the mobile banking technology. Briefly, task interruption significantly and negatively moderates the relationship between these two variables. This is in line with a previous study which reported task interruption as a salient moderating factor (Wang et al., 2012).

Other situational factors, reported as moderator variable, include social anxiety, self-consciousness (Dabholkar & Bagozzi, 2002) and companion influence (Wang et al., 2012). These factors moderated the attitude, intention and other related factors such as perceived usefulness and perceived ease of use.

5.5. Theoretical implications

This study has several theoretical implications which are summarized in the following points. The implications are regarding the three integrated models in this study namely TAM and its related constructs, service quality dimensions, and theory of reasoned action.

1. TAM variables namely perceived usefulness and perceived ease of use were major determinants of adoption of a new system or technology in the last two decades (Davis, Bagozzi, & Warshaw, 1989; Davis, 1986, 1989; King & He, 2006; Moon & Kim, 2001; Venkatesh & Davis, 2000a). in addition, these two variable have been explored in the context of self-service technologies (SST) including mobile banking and online banking (Chung & Kwon, 2009a; Karjaluoto, Mattila, & Pento, 2002; Karma et al., 2014; Luarn & Lin, 2005; Nayak et al., 2014; Sulaiman, Jaafar, & Mohezar, 2007). Therefore, the implication of lies in its support and contradiction particularly with the original model. The support is that perceived ease of use was a salient determinant of adoption while the contradiction is that perceived usefulness was a major factor influencing consumers to adopt mobile banking. In addition, this notion has been supported by previous studies, which challenges the original assumptions of TAM model (Aboelmaged & Gebba, 2013; Akturan & Tezcan, 2012; Amin et al., 2012; Karma et al., 2014). These studies were conducted in developing countries such as Sudan, Saudi Arabia, Turkey and Malaysia. For consumers in these countries, usefulness of the service is not an issue in this context. Therefore, this study asserts the challenge faced by TAM model in the context of the developing countries.
2. TAM related constructs such as perceived trust and perceived risk were proven in this study as a component of TAM model, which were found to be theoretically relevant to the model when it comes to mobile banking or new technologies. These two constructs were found to have significant impact with the behavioral intention to adopt mobile banking and significantly supported the discriminant validity as they were not highly related to other TAM variables such as perceived usefulness and perceived ease of use. Therefore, it is possible that subsequent and future studies to consider these two variables (perceived trust and perceived risk) to be part of TAM components. As such, a good support and challenge to TAM were presented in this study as a consequence of a need of a theoretical refinement.

3. Regarding the theory of reasoned action, subjective norms factor was considered a major factor determining directly a behavioral intention and indirectly the actual behavior. It has been found in the literature that peer influence or social influence had significantly determined the one's intention to perform certain behavior particularly the adoption of new technologies including the financial transactions (Ali & Dhaha, 2014; Kazi & Mannan, 2013; Venkatesh & Davis, 2000a; Venkatesh et al., 2003). However, this study had found that subjective norms with its two dimensions namely descriptive norms and injunctive norms had no impact on mobile banking adoption among the consumers in Sudan. This indicates that the adoption among the consumers is not affected the pressure from friends, family members, colleagues and co-workers. The decision to adopt mobile banking according to the participants of this study is their own decision. This has implication to the theory of reasoned action (Fishbein & Ajzen, 1975), which suggested that subjective norms plays a greater role in determining performing a behavior. This study also supports and confirms the challenge made by previous studies particularly in developing countries such as Nigeria, Somalia, Malaysia (Ali & Dhaha, 2014; Amin et al., 2007; Bankole et al., 2011) and as well as developing countries like Portugal (Oliveira et al., 2014).
4. This study has also implications for the service quality dimensions particularly in the context of mobile banking technology adoption. This study contributed to the theoretical understanding on the link between service quality dimensions and behavioral intention. Previous studies (Aghdaie & Faghani, 2012; F. Ali & Zhou, 2013; Cheng et al., 2013; Lau et al., 2013) have ignored that link. As such this study has contribution to the service quality theory since it has proven that reliability and efficiency are direct determinants and influential factors of behavioral intention towards adoption of mobile banking technology. The convenience dimension was not found to affect behavioral intention in this study. Another implication for the service quality dimension is that its dimensions are not consistent. Different study reports different dimensions. It has also been criticized for being

unsuitable for financial services, because the model was developed in the context of consumer service other than financial (Katwalo & Muhanji, 2014; Kumar, Kee, & Charles, 2010).

5. In addition, this study has implications to the integrated theories and models. It has been found that situational factors such as waiting time and task interruption had no moderating effect on the relationship between major independent variables and the dependent variable except one relationship between efficiency and behavioral intention which was moderated by task interruption. This indicates the higher the task interruption, the lower the rate of adoption of mobile banking technology. As previous studies (Dabholkar & Bagozzi, 2002; Wang et al., 2012), situational factors such as waiting time, perceived task complexity, companion influence, social anxiety and self-consciousness had significant moderating impact on the determinants of adoption and usage. As such, this study partially supports previous studies, and poses a challenge, on the other hand, to previous assumptions that the situational factors are stable. One of the explanations regarding the insignificant moderating effect of situational factors is that previous studies conducted studies on site-situational factors such as malls and groceries where there are normally many queues for check-up of the products purchased. However, the context of mobile banking is different where the interaction is virtual in nature. Therefore, consumers may think that time taken to perform the transaction and whether the transaction is complex is not an issue as they can easily master the features. Also, today's consumers normally use sophisticated smartphones with higher speeds, which reduces the complexity used to experience by the consumers.

5.6. Managerial implications

This study also had managerial implications for the professionals as well as service providers. There are several issues need to be taken into consideration when introducing or updating or upgrading mobile banking technologies in order to get higher rate of adoption, higher number

of sales and returns, customer loyalty and retention. The following points summarize the managerial implications.

1. Mobile banking was found to be acceptable to the sample of this study. Therefore, service provider should integrated more interactive features and options.
2. Managers and service provides to be aware of that the most important factor consumers will consider when are adopting or buying a new technology (mobile banking in this study) is perceived ease of use. If the consumers felt the adoption of the technology does not take a lot of mental effort, easy to master it, and it is more user-friendly and user-centered, they are more likely to adopt the technology. Therefore, an attention should be given to features of the service before presenting to the consumers. As well, the service providers should constantly check user-friendly of the technology.
3. Trust element has been considered an important aspect when adopting mobile banking technology among the consumers. The higher the credibility and trust associated with the service providers. They must focus to increase the perceived level of trust among the consumers.
4. Associated risk with the adoption and usage of the service was a factor increasing or decreasing the behavioral intention of adopting mobile banking technology. The service providers should try hard to reduce any risk associated with the service by providing them guarantees that protect the consumers. Consumers were more concerned about the security of their data and transaction, which requires the service provider to offer greater experience for the consumers.
5. Consumers in this study were more concerned with the reliability of the mobile banking. The more the technology is reliable the more likely that the consumers will adopt and subsequently continue using it while recommending to other friends and family members. Banks as well as service providers should adopt a good technique that can guarantee the reliability of the service.

6. In addition, consumers were also more concerned with the effectiveness of the mobile technology in performing their financial transactions. The more the mobile technology is perceived as efficient, the more likely to adopt mobile banking technology. It is more important that the banks should strive hard to make the service more efficient in order to increase the consumers' experience with mobile banking service.

5.7. Limitations and recommendations

This study is not without limitations and shortcomings. There are several limitations which are to be worth mentioning. First, this study had used convenience sampling to collect the data from the respondents, which can hinder the generalizability of the findings. In addition, second, the data was only collected from selected samples from Khartoum state. Future studies should use more system and random sampling and should expand to other states both urban and rural areas to increase the level of generalizability of the results.

Third, some of the links proposed in this study were not supported; future studies should incorporate more measures in order to increase percentage of variance explained in behavioral intention. Fourth, it is observed in this study and previous studies that perceived usefulness is overlapping with several items of other factors such as waiting time, efficiency, system quality, etc. Therefore, it is necessary to theoretically separate these items and corresponding variables. Fifth, only two dimensions of service quality have been found to have significant impact on behavioral intention. Future studies should incorporate more measures of service quality such as system quality, assurance, and other relevant elements. Finally, situational factors had been found to have minimal impact as moderators on the relationship between independent variables and the dependent variable. Therefore, future studies should take into consideration other elements of situational factors such as social anxiety and companion influence. They should also incorporate other moderators such as experience with the mobile banking as well as demographic factors.

5.8. CONCLUSION

The main objective of this study was to examine the moderating effect of situational factors (task interruption and waiting time) on the relationship between eight independent variables (perceived usefulness, perceived ease of use, perceived trust, perceived risk, efficiency, reliability, convenience, descriptive norms and injunctive norms) on the dependent variable (behavioral intention to adopt mobile banking).

The study collected the data from 349 customers of mobile banking service provided by Alsalam Bank and Faizal Islamic Bank in the country. The results suggested that consumers highly agreed on the perceived usefulness, perceived ease of use, and perceived trust, while they were not sure much on the risk associated with the usage of service. In addition, they had higher level of agreement on injunctive norms; not descriptive norms which obtained a neutral stand. Moreover, the results suggested a higher level of agreement towards the three dimensions of service quality.

It has been found that perceive ease of use, perceived trust, efficiency, reliability and perceived risk had significantly contributed towards behavioral intention to adopt mobile banking technology among the consumers. Convenience, injunctive norms, and descriptive norms had impact on the dependent variable in this, which means that the respondents are not concerned with these factors when adopting mobile banking service. On the other hand, there were no moderating effect of waiting time and task interruption on the relationships of the independent variables on the dependent variable, except task interruption which mediated the relationship between efficiency and behavioral intention. Despite the limitations surrounded with this study, there are several theoretical and managerial implications as discussed before.

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ADOPTION OF MOBILE BANKING IN SUDAN

Introduction:

This study explores the usage of Mobile-Banking technology among customers of Sudanese banks. Please answer the questions to the best of your ability. There is no right or wrong answer.

Your responses will be kept confidential and will be used for academic purposes only. This survey takes 10-15 minutes to complete. Thank you for your patience and Cooperation.

SECTION 1: PERSONAL INFORMATION:

Please tick (√) where applicable or fill in the blank space provided.

1. Gender:

a) Male ( ) **b).** Female ( )

2.Age:

a) Below 25( ) **b)** 26 – 35 ( ) **c)** 36 – 45 ( ) **d)** 46 or above ( )

3.Educational level

a) High school or below( ) **b)** Bachelor's degree( ) **c)** Master's degree or above ( )

4. Occupation

a) Business (enterprise)( ) **b)** Governmental officer ( ) **c).** Employee ( ) **d)** Student ( )

5. Marital status

a) Single ( ) **b)** Married ( ) **c)** Divorced ( ) **d)** Widow ( )

6. Experience with the bank (years)

a) Less than 1 ( ) **b)** 1 – 5 ( ) **c)** 6-10 ( ) **d)** 11 or more ( )

7. Experience with M-banking (Months)

a) Less than 6 ( ) b) 7 – 12 ( ) **c)** 13 – 18 ( ) **d)** 19 or more ( )

8. Frequency of using M-banking (times per week)

a) Less than 1 ( ) **b)** 1 to 3 ( ) **c)** 4 to 6 ( ) 4. 7 to 9( ) **d)** more than 10 ( )

9. Time spent online via mobile per week

a) Less than 1 hour( ) **b)** 1 to 5 hours( ) **c)** 11 to 15 hours( ) **d)** 16 to 20 hours( )

10. Select only one main reason for using mobile banking

a) Convenience of time ( ) **b)**Necessity need for some transactions ( )

c) Time saving ( ) **d)** Inconvenience for going to Bank branch ( )

SECTION 2: M-BANKING USAGE

Please indicate your level of agreement with the following statements, by using this scale:

1=Strongly disagree, 2=Disagree, 3= Neutral, 4= Agree, 5= Strongly agree

No.	Variables	1	2	3	4	5
Service Quality						
•	**Responsiveness**					
1	My mobile banking provides prompt responses if my transaction is not processed					
2	If there is a mistake, my mobile makes it right quickly and effectively					
3	Mobile banking charges related to transaction, are clearly informed to me					
4	I know exactly when my transaction will be performed					
•	**Reliability**					
5	Mobile banking provides me the services exactly as promised					
6	My mobile banking provides accurate records of all my transactions					
7	My mobile banking transaction are processed accurately					
•	**Convenience**					
9	Using Mobile Banking saves time compared to going to branch, ATM or using computer					
10	It is easy to look for banking information					
11	The bank provides all communication medium like SMS, email, toll free no. to communicate problems related to Mobile banking					
12	I can speak to customer service representative if there is a problem related to mobile banking transaction					
13	All my mobile banking relevant transaction confirmation details are sent by SMS or e-mail within 24 hours					
14	Mobile Banking is available all the time					
•	**Efficiency**					
15	It is easy to navigate i.e. get anywhere on the mobile banking application					
16	Using Mobile Banking does not require lot's of efforts					
17	The Mobile Banking registration process is simple					
18	Mobile Banking creates a positive experience for me					
TAM						
•	**Perceived Usefulness**					
19	Use of M-Banking will allow me to do things faster;					
20	Use M-Banking can significantly increase the quality or output of my life;					
21	Use of M-Banking can increase the effectiveness of my performance;					
22	M-Banking can increase the quality of output for same amount of effort;					

1=Strongly disagree, 2=Disagree, 3= Neutral, 4= Agree, 5= Strongly agree

		1	2	3	4	5
23	Considering all my tasks, the use of M-Banking could assist my study/life;					
24	M-Banking can increase my degree of mobility;					
25	I find M-Banking useful in my daily life;					
•	**Perceived Ease of Use**					
26	Learning to operate M-Banking is easy for me;					
27	It is easy to adopt M-Banking to accomplish banking transactions;					
28	Using M-Banking I can easily send and receive money;					
29	I believe that adopting M-Banking is easy to use;					
•	**Perceived Trust**					
30	Using M-Banking, I believe my information is kept confidential;					
31	Using M-Banking, I believe my transactions are secured;					
32	Using M-Banking, I believe my privacy is secured;					
33	Using M-Banking, I believe the banking environment is safe;					
34	Using M-Banking, I believe the staff take care of my information;					
•	**Perceived Risk**					
35	I believe that the current M-BANKING technology is not yet mature;					
36	I believe that the current M-BANKING services are not yet complete;					
37	I believe that the quality of the current M-BANKING is not yet stable;					
38	I believe that the Telecom company which provides M-Banking, has no enough experts;					
Subjective norms						
•	**Descriptive norms**					
39	I would use M-banking service if my friends use it;					
40	I would use M-banking service if my family use it;					
41	I would use M-banking service if prestigious people (such as experts) use it;					
42	I would use M-banking service if advertisement is good					
•	**Injunctive norms**					
43	My friends think I should use M-banking					
44	My family would want me to use M-banking					
45	people whose opinion I value would prefer me to use M-banking					
46	Advertisement encourage me to use M-banking service					

1=Strongly disagree, 2=Disagree, 3= Neutral, 4= Agree, 5= Strongly agree

Situational factors		1	2	3	4	5
•	**Waiting time**					
47	The graphics on the application delayed my transaction;					
48	I had to wait for some time (e.g. for more than 10 sec) for the application to upload;					
49	It took a while to get confirmation for my inquiry					
50	It took more than ten seconds to process my transaction;					
•	**Task Interruption**					
51	Using M-banking requires a lot of intellectual trials;					
52	Using M-banking can be frustrating;					
53	M-banking is a simple method to conduct banking transactions;					
Mobile Banking adoption						
54	Assuming I have access to M-Banking, I intend to use it frequently;					
55	Given that I have access to M-Banking, I believe that I would use it;					
56	I intend to continue using M-Banking;					
57	I intend to recommend for my friends to use M-Banking;					
58	I intend to recommend for my family members to use M-Banking;					

Thank your cooperation.