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Acceptance of Mobile Banking in Nigeria: A Modified TAM Approach

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Abstract: In order to reduce cash handling cost of banks amongst other objectives, the Central Bank of Nigeria introduced the 'cashless policy'. The success of this policy hinges on the adoption of alternative payment systems one of which is mobile banking. Thus it is imperative for policy makers and other relevant stakeholders to anticipate and deal with inhibitions surrounding the adoption of mobile banking by bank customers in the country. This study investigates the determinants of mobile banking adoption in Nigeria using a modified version of Technology Acceptance Model (TAM). This incorporates Perceived Risk, Facilitating Conditions and Demographic Characteristics (Age, Gender, Educational Qualification and Income) to Perceived Usefulness and Perceived Ease-of-Use as determinants of Mobile Banking Adoption. We also propose that this relationship is mediated by attitude towards mobile banking adoption. A total of 250 bank customers from the Lagos area were selected and a structured questionnaire was designed and copies distributed to them. Data was analysed using multiple regression and computed using SPSS 20.0 computer application. Results show that Perceived Usefulness, Perceived Ease-of-Use, perceived Risk, Facilitating Conditions, Age, Educational Qualifications and Income significantly determine Mobile Banking Adoption. However, the relationship between gender and Mobile Banking Adoption is not significant. The outcome of this study has some implications to m-banking policy formulation and implementation. It also throws more light into what should be done to improve m-banking adoption rate in Nigeria

Keywords: Mobile Banking, Technology Acceptance Model, Perceived Risk

1.0 Introduction

The introduction of Global Systems for Mobile Communication (GSM) in 2003 has changed the face of mobile communication all over the World. Virtually every aspect on human interaction is being affected by the use of mobile phones (Odumeru, 2013). Nowadays, mobile phones function as handheld personal computers in their own rights (Kiesnoski, 2000). The cheapest cell phone today has enough computing power to become a digital "mattress" and digital bank for the poor (Friedman, 2010). This is further proliferated by the phenomenal growth in mobile phone usage in the World. Fuelled by the fire of globalisation, mobile banking also known as m-banking is gaining prominence all over the world. For instance, the number of mobile transactions in South Korea rose on a daily average to 287,000 in 2005 up 104%, the number of registered users by 108% in comparison to 2004 (Korea Times, 2006). In the US, 30% of household are projected to bank using m-banking in 2010 alone (Mobile Marketing Association, 2009). The number of mobile banking users in China increased by 150% between 2010 and 2011 (Cellular News, 2011). In Europe, many bank customers are willing to pay extra for utilising mobile banking (Tiwari & Buse, 2006). Since the launch of Kenya's M-Pesa mobile money accounts, more than 13 million Kenyans are using their phones to pay for goods, get cash from ATMs, receive payments and hold savings, in a wave that has seen more than half the population now using financial services. Nigeria today has over 100 million active

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mobile subscriptions making the country a fertile ground for the use of m-banking. This perhaps informed the decision of the Central Bank of Nigeria (CBN) to licence 16 mobile money operators to carry out a pilot of a mobile financial services system for a period of four months to demonstrate that the system can work in the country (Daily Times Nigeria, 2011 & UNCTAD, 2012)

In 2012, the Federal Government of Nigeria through the regulatory financial institution: The Central Bank of Nigeria (CBN) introduced what it called the cashless policy to drive the country's development and modernisation of its payment system. This is expected to amongst other objectives; help Nigeria in its vision 2020 goal of making the country one of the 20 biggest economies by the year 2020. Other reasons for this policy is to reduce the cost of banking services (including cost of credit) and drive financial inclusion by providing more efficient transaction options and greater reach and to improve the effectiveness of monetary policy in managing inflation and driving economic growth. Lagos was chosen as the pilot states with plans to implement this policy nationwide. The policy stipulates cash handling charges on daily cash withdrawals or cash deposits that exceed N500,000 for Individuals and N3,000,000 for Corporate bodies. The policy also sets a withdrawal limit of N150,000 for all third party cheques. To ensure success of this policy, all banks are expected to deliver electronic banking channels and encourage customers to use same (CBN, 2011). However, the success of the cashless policy is predicated on the development and introduction of alternative payment systems some of which include e-banking, m-banking, e-wallet, ATM cards etc. Thus a study such as this will identify key factors affecting one of the alternative payment systems being encouraged by the CBN; Mobile Banking. Once these factors are empirically established, policy formulation on encouraging the use of mobile banking would be aided. Also, a model describing the acceptance of mobile banking in Nigeria will help policy makers anticipate inhibitions surrounding its acceptance, thus further strengthening the accuracy of relevant policies.

This paper investigates the key determinants of mobile banking in Nigeria using a modified version of the Davis (1997) Technology Acceptance Model (TAM). There are 5 sections in this paper; Section 1: introduction; Section 2: Problem Statement; Section 3: review of Relevant Literature; Section 4: Methodology; Section 5: Results and Discussion of Findings; Section 7: Conclusion and Recommendations

2.0 Statement of the Problem

The success of the cashless policy depends to a large extent on the ability of banks to deliver alternative payment options (including mobile banking) to customers and the rate at which they adopt such options (Odumeru, 2013). One of such alternatives is mobile banking. Available statistics show that there exists a huge growth potential for mobile banking in Nigeria and indeed Africa. According to statistics, 30% of the adult population (25.4 million people) of Nigeria has at least one bank account while 56.9 million adults are unbanked (UNCTAD, 2012). Out of the 23 banks in Nigeria today, virtually all of them offer m-banking services. Services on offer on most m-banking platforms include: account alerts, account balances update and history, customer services via mobile, bill payments, fund transfers and transaction verifications. Despite the huge potentials for the success of mobile banking in Nigeria, the rate of usage still low compared with what is obtainable in similar developing countries in Africa and Asia. Studies show that Kenya, South Africa, India and Botswana have a higher rate of usage of mobile payment systems than Nigeria (UNCTAD, 2011). The study of factors influencing the use of mobile banking in Nigeria is also sparse in literature.

With the high volume of active mobile phones in Nigeria, m-banking has the potential of contributing greatly to the success of the cashless policy. It is therefore imperative to determine those factors that influence the rate of adoption of m-banking in Nigeria so as to guide policy design and implementation aimed at encouraging its usage. This article will also fill the existing knowledge gap on factors influencing the use of m-banking.

3.0 Review of Relevant Literature

Mobile Banking refers to provision of banking and financial services with the help of mobile telecommunication devices. The scope of offered services may include facilities to conduct bank and stock market transactions, to administer accounts and to access customised information (Tiware & Buse, 2006). However, technology development keeps expanding the range of services the mobile banking offers. The objectives of mobile services provided by banks are to enhance customer communication and information and customer convenience. They are also to help customers: conduct banking transactions, create customer centricity, and enrich mobile banking experience to non-banking financial services and building customer relationships. Other objectives are to: extract best advantage of technology, provide value-added propositions, generate revenue streams for banks, reduce banking transaction costs, achieve multi-channel advantage and automated banking services and support (Hogarth, Kolodinsky & Gabor, 2008; Vaidya, 2011).

3.1 Theoretical Framework

Several theoretical underpinnings have been used by previous studies to determine the factors influencing the acceptance and adoption of a new technology. Three of such theories are Rogers Diffusion of Innovation (DOI) Theory, Theory of Planned Behaviour (TPB) and Technology Acceptance Model (TAM). The Diffusion of Innovation theory postulates that five key determinants influence the adoption of a new technology and all five are mediated by attitude of the adopter towards the new technology. These determinants are Relative Advantage, Complexity, Compatibility, Observability and Trialability of the new technology (Lee & Lee, 2000; Rogers, 2003). The

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Theory of Planned Behaviour on the other hand links belief with behaviour. According to the theory, Behavioural Intentions is a function of Attitude towards a Behaviour, Subjective Norms and Perceived Behavioural Control. Attitude towards behaviour is made up of two elements: strength of individual's beliefs and his/her evaluation of outcomes of the intended behaviour. Subjective Norms of the other hand comprises of strength of each normative belief and motivation to comply with the referent (Ajzen, 1985). Technology Acceptance Model asserts that the effects of the following factors are mediated by user attitude towards a new technology: Perceived Usefulness and Perceived Ease of Use (Kamakodi & Khan, 2008; Chuttur, 2009). This paper adopts a modified version of TAM as proposed by Vankatesh and Davis (2000) with some further modification to suit the context of mobile banking.

3.2 Empirical Framework

Research into the adoption of mobile banking is sparse in literature (Suoranta, 2003). However, the following are worth mentioning. In a study conducted to determine factors influencing the adoption of m-banking in Finland using Rogers' Diffusion of Innovation Theory as framework, it was discovered that relative advantage, compatibility, communication and trialability drive m-banking usage, while complexity and risk of using m-banking yield no support as barrier to adoption (Suoranta, 2003). However, the methodology adopted is simplistic and the outcome might be different if conducted in a developing economy of Asia or Africa

Kim, Shin and Lee (2009) conducted a research to determine the reveal the mechanisms associated with the initial formation of people's trust in mobile banking and intention to use the service. The study determined the effects of four antecedent variables (structural assurances, relative benefits, personal propensity to trust and firm reputation) on shaping a person's initial trust in mobile banking and its usage intention using a modified version of the DOI theory. The survey data were analysed using Structural Equation Modelling. The analysis showed that three variables (relative benefits, propensity to trust and structural assurances) had a significant effect on initial trust in mobile banking. Also, the perception of initial trust and relative benefits was vital in promoting personal intention to make use of related services. However, the reputation as a firm characteristics variable failed to attract people to mobile banking. We intend to verify whether the assertions of these researchers applies to the Nigerian environment

Yang (2009) investigated factors associated with adopting and resisting mobile banking technologies among university students in Taiwan. Adoption factors determined in the study includes the belief that mobile banking helps fulfil personal banking needs, provides location-free conveniences, and is cost effective. The primary factors associated with resistance which was discovered included concerns over system configuration security and basic fees for mobile banking web connections. The study however overlooked the influence of ease of use and perceived risk, which has been clearly identified by previous authors as key factors determining adoption of mobile banking.

Using a modified version of TAM, Khraim, Shoubaki and Khraim (2011) investigated the determinants of m-banking adoption in Jordan. Data were collected and analysed using a 22-items questionnaire to collect data from 450 respondents and Pearson Correlation. It was discovered that self efficacy, trialability, compatibility, complexity, risk and relative advantage significantly determine mobile banking adoption. However, the statistical tool in this study is simplistic in addition to the fact that previous study had shown that the relationship between these determinants and usage intention is mediated by user attitude to m-banking all of which are addressed in our study.

Govender and Sihlali (2014) studied the factors affecting the intention to use m-banking by university students in South Africa using a modified TAM as framework. Factors that were considered include: Perceived Ease of Use, Perceived Value, Trust, Perceived Ease of Adoption, Usage Behaviour and Intention to Use. Using multiple regression for data analyses, it was discovered that 42% of the listed variables determine intention to use m-banking by university students. We intend to improve on this study using Structural Equation Model while adding more variables which will be highlighted later.

In a study of user adoption factors in m-banking, Yao, Liu and Yuan (2013), grouped the determinants of mobile banking adoption into: Trust and Distrust. Using a literature survey approach, the authors drew their conclusion from the strengths and weaknesses from TAM, DOI and TBP. However, the study is devoid of any clear empirical evidence.

Iddris (2013) investigated the perceived barriers to m-banking among customers in Ghana. He also determined the effects of demographic characteristics such as age, income level and marital status on m-banking usage. Collecting data from 189 in the Ashanti area of the country and adopting descriptive statistics and Chi-square test to analyse same, he discovered that majority of the respondents to not use m-banking. Reasons mostly advanced by respondents include: poor telecommunication facilities, perceived high transaction cost, perceived user unfriendliness, and preference for traditional means of banking.

Dzoghbenuku (2013) studied the diffusion of m-banking in Ghana using the DOI theory as framework. Data was collected from 550 undergraduate students that are mobile phone users and analysed using correlation and regression analysis to determine the effect of relative advantage, complexity, compatibility, perceived risk, observability, trialability and service satisfaction on adoption of m-banking. Results show a significant relationship between the independent and dependent variables. The gap in this study is the downplaying of attitude as a mediator in the relationship

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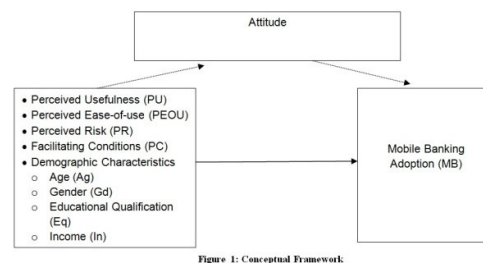
Lee, Lee and Kim (2007) investigated the adoption of M-banking using a modified version of TAM which incorporates perceived risk, trust. Structured questionnaire was distributed to 306 respondents in South Korea to collect data of the key variables. Using Principal Factor Analysis to analyse data and Structural Equation Modelling, perceived risk was found not to significantly determine m-banking adoption. However, perceived risk significantly determine trust; which in turn determines m-banking adoption. Perceived usefulness and ease of use were also found to significantly determine m-banking adoption.

Thulani, Kosmas, Collins and Lloyds (2011) studied the adoption of Mobile/SMS banking adoption in Zimbabwe from the perspective of banking services providers; banks. Data was collected from a sample of 15 banks and analysed using descriptive statistics. The study discovered that affordability and accessibility are the key drivers of mobile/sms banking in the country.

Crabbe, Standing, Standing & Karjaluo (2009) investigated the impact of social and cultural factors on m-banking adoption by examining the reasons for the adoption and non-adoption of mobile banking in Ghana. From a data obtained from 271 respondents in Ghana analysed using Principal Factor Analysis and SEM, it was discovered that social and cultural factors in the form of perceived credibility, facilitating conditions, perceived elitisation and demographic factors do play a significant role in adoption decisions. It has been found that elitisation of technology and services can be a positive influence for adopters whilst being a negative influence for non-adopters. In addition, perceived credibility and facilitating conditions also influence attitudes towards the technology. When these factors are added to a range of demographic factors, the impact of the social and cultural features of the context of studies can be seen as significant.

3.3 Conceptual Framework and Hypotheses

The table below depicts the conceptual framework for the study



The study adopts a modified version of TAM. TAM has some advantages over DOI and TPB in that it is arguably the most widely accepted of the three and it seeks to consciously explain intended behaviour across a wide range of end-user technology and user population (Srite & Karahaura, 2006; Chuttur, 2009). DOI theory on the other hand is more relevant in explaining adoption decisions at individual level (Crabbe et al, 2009).

The conceptual frame work adds key factors that are empirically proven in literature to affect mobile banking adoption to the determinants provided by Davis in TAM (Chuttur, 2009). This hopefully will improve the predictive power of the TAM model.

- Perceived Usefulness (PU) (Ki et al, 2007; Kamakodi & Khan, 2008; Chuttur, 2009; Yang, 2009; Crabbe et al, 2009)
- Perceived Ease-Of-Use (PEOU) (Ki et al, 2007; Chuttur, 2009; Yang, 2009; Crabbe et al, 2009)
- Perceived Risk; (Ki et al, 2007; Kim, Shin & Lee, 2009; Yao et al, 2013)
- Facilitating Conditions (Crabbe et al, 2009; Yao et al, 2013)
- Demographic Characteristics (Gefen & Straub, 1997; Iddris, 2013)
- Attitude (Ki et al, 2007; Chuttur, 2009)

3.31 Perceived Usefulness (PU)

Previous research has shown that PU significantly determines usage of a new technology (Ki et al, 2007; Crabbe et al, 2007; Chuttur, 2009; etc). PU is the extent to which a person believes that using a particular technology will enhance hi/her job performance (Chuttur, 2009). In the context of mobile banking, items that measure PU includes benefits derived from using m-banking such as comfort and convenience, relatively low transaction cost to the customer and elitisation.

H1: Perceived Usefulness does not significantly determine mobile banking adoption

3.32 Perceived Ease-of-Use (PEOU)

It has also been established in literature that PEOU determines adoption of any new technology (Vankatesh, 1999; Ki et al 2007; Chuttur, 2009; Crabbe, et al 2009). PEOU refers to the extent to which a new technology will be free of effort (Ki et al, 2007). Items included in this construct include: ease of download of m-banking applications, ease of usage, duration of effecting transactions using m-banking and the extent to which training and experience is required to use m-banking apps. However, studies have shown that as technologies become more user friendly and handy, the influence of PEOU reduces (Vankatesh, 1999; Crabbe, 2009)

H2: Perceived Ease-of-Use do not significantly affect mobile banking adoption

3.33 Perceived Risk (PR)

This describes the feeling of consumers about what they believe they stand to lose if they adopt mobile banking. Key items in this construct include Technical Risk, Privacy Disclosure Risk, Legal Remedies Risk and Reputational Risk. Technical risk takes care of the perception of customers as to whether m-banking platforms and apps cannot be manipulated or hacked by fraudsters or infected by viruses. Privacy disclosure risk accounts for the perception of bank customers on whether their personal information such as password, personal identification number, account number, account balances etc is secured while effecting transaction with m-banking. Legal remedied risk deals with the availability of legal protection in the event of suspected fraud or disagreement between users, banks and other third parties. Reputational risk considers risk that customers' bear as a result of the reputation of banks, mobile phone service providers, switch service providers etc.

H3: Perceived Risk do not significantly affect mobile banking adoption

3.34 Facilitating Conditions (FC)

This construct takes care of the perception of bank customers as to whether organisational and technical infrastructure exists to support the effectiveness and efficiency of m-banking services. Ki et al (2007) believe that that FC will help service delivery of m-banking. Items in this construct include perception of bank customers' organisational and technical capability of their banks and mobile telephone service providers to render effective and efficient mobile banking services.

H4: Facilitating Conditions do not significantly affect mobile banking adoption

3.35 Demographic Characteristics (DC)

The effect of key demographic characteristics such as Age, Educational Background, Gender and Income on the adoption of a new technology is well documented in literature (Gefen & Straub, 1997; Vankatesh, 1999; Putrevu, 2002; Suoranta, 2003; Tiwari & Buse, 2006; Kennickell & Kwast, 2008; Ki et al, 2007; Crabbe et al, 2009; Yao et al, 2013 etc). To enhance the predictive power of the modified TAM model proposed in this study, we include DC.

H5a: Age does not significantly affect the adoption of mobile banking

H5b: Gender does not significantly affect the adoption of mobile banking

H5c: Educational Qualification does not significantly affect mobile banking adoption

H5d: Income does not significantly affect mobile banking adoption

3.36 Attitude (At)

Attitude towards an object is an objective assessment of the characteristics of the innovation which lead to intention formation and usage (Ki et al, 2007). We propose that attitude to mobile banking plays a mediator role in the modified TAM – mobile banking adoption relationship (Kennickell & Kwast, 2008)

H6: Attitude do not mediate the relationship between variables and mobile banking adoption

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3.37 Mobile Banking Adoption (MB)

This is defined as the usage of mobile banking services on a regular basis.

4.0 Model Specification

This study adopts the Baron and Kenny (1986) approach to testing the existence of mediation between dependent and independent variables. Thus from the hypotheses above, the parameters of the following models will be estimated:

$$MB = \alpha_{11} + \beta_{11}PU + \beta_{12}PEOU + \beta_{13}PR + \beta_{14}FC + \beta_{15}Ag + \beta_{16}Gd + \beta_{17}Eq + \beta_{18}In \dots\dots\dots(1)$$

$$At = \alpha_{21} + \beta_{21}PU + \beta_{22}PEOU + \beta_{23}PR + \beta_{24}FC + \beta_{25}Ag + \beta_{26}Gd + \beta_{27}Eq + \beta_{28}In \dots\dots\dots(2)$$

$$MB = \alpha_{31} + \beta_{31}PU + \beta_{32}PEOU + \beta_{33}PR + \beta_{34}FC + \beta_{35}Ag + \beta_{36}Gd + \beta_{37}Eq + \beta_{38}In + \beta_{39}At \dots\dots\dots(3)$$

Equations (1), (2) and (3) represents each step in the Baron and Kenny (1986) steps of test of mediation as adopted in this study.

5.0 Methodology

A cross sectional survey research design was adopted in this study. Out of the over 25 million bank customers in Nigeria, 400 respondents were selected using convenience sampling method from the Lagos area. A structured questionnaire was designed and copies distributed to selected respondents to elicit data on the constructs highlighted in the conceptual framework and model specification. Constructs with only 2 possible responses; gender were measured using a two point scale. Age and Income on the other hand were measured using a 5-point scale with each point attached to each range. Other constructs were measured using a 6-point Likert scale with polar anchors: 1 standing for strongly disagree, 2 for disagree, 3 for partially disagree, 4 for partially agree, 5 for agree and 6 for strongly agree. Copies of questionnaire were distributed between June and September 2014. Cronbach Coefficient Alpha was used to test for consistency and reliability of measuring instruments. Data was analysed using multiple regression analysis and computed using SPSS 20.0 computer software.

6.0 Results and Discussion

Out of a total of 400 copies of questionnaire that was distributed, 295 were found to be useful representing 74% success rate. The table below shows a summary of demographic features of respondents.

Table 1: Demographic Features of Respondents

		Rank	Frequency	%	% of Adopters of M-banking
Age	20 – 30 Years	1	64	22	12.9
	31 – 40 Years	2	90	31	10.4
	41 – 50 Years	3	78	26	8.1
	51 – 60 Years	4	39	13	1.0
	Above 60 Years	5	24	8	1.1
Income (Per Month in Naira)	0 – 9,999	1	22	7	0.0
	10,000 – 49,999	2	82	28	3.1
	50,000 – 99,999	3	124	42	10.3
	100,000 – 499,999	4	41	14	12.7
	500,000 and above	5	26	9	7.4
Education	WASC/SSCE	1	46	17	0.0
	OND/A levels	2	71	24	2.4
	BSC/BA/HND	3	96	31	12.7
	Masters/Professional	4	59	20	13.6
	Doctorate	5	23	8	4.9
Gender	Male	1	156	53	20.3
	Female	2	139	47	13.3

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From the table above, the rate of adoption among respondent is at 33.6%. Also, m-banking usage is more common among young adults between ages 20 to 40 years with those above 60 years having the lowest adoption rate. The table also shows that m-banking adoption rate increase with age and education. Also, adoption rate is shown to be higher in men than women.

Table 2: Cronbach Alpha Test Results

Construct	Cronbach's Alpha	No. Of Items
Perceived Usefulness	0.81	5
Perceived Ease-of-Use	0.83	5
Perceived Risk	0.8	6
Facilitating Conditions	0.86	5
Attitude Towards Mobile Banking	0.73	4

From table 2 below, the Cronbach Alpha results are above 0.7, thus showing consistency and reliability of test instruments.

6.1 Test of Mediation Results

6.11 Step 1

Table 3: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.601(a)	.36	.19	.342

Predictors: (Constant), Perceived Usefulness, Perceived Ease-of-Use, Perceived Risk, Facilitating Conditions, Age, Gender, Educational Qualification, Income. Dependent Variable: Mobile Banking Adoption

Table 3 shows an R^2 of 0.36 showing that 36% of mobile banking adoption is determined by Perceived usefulness, Perceived Ease-of-Use, perceived Risk, Facilitating Condition and demographic characteristics.

Table 4: Coefficients (a)

Model		Unstandardised Coefficients	Standardised Coefficients	Sig.
		B	Beta	
1	(Constant)	2.31		.00
	Perceived Usefulness.	0.85	0.65	.00
	Perceived Ease-of-use	0.79	-0.49	.00
	Perceived Risk	-0.67	-0.41	.00
	Facilitating Conditions	1.1	0.91	.04
	Age	-0.73	-0.58	.01
	Gender	2.03	1.55	.37
	Educational Qualification	1.03	0.99	0.03
	Income	2.4	1.61	0.01

- Dependent Variable: Mobile Banking Adoption
- Independent Variables: Perceived Usefulness, Perceived Ease-of-Use, Perceived Risk, Facilitating Conditions, Age, Gender, Educational Qualification, Income

Table 4 above shows that all 5 independent variables except Gender significantly determine mobile banking adoption at $p < 0.05$. Thus equation (1) becomes

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$$MB = 2.31 + 0.85PU + 0.79PEOU - 0.67PR + 1.1FC - 0.73Ag + 2.3Gd + 1.03Eq + 2.4I$$

6.12 Step 2

This step tests the relationship between the mediator variable (Attitude) on the independent variables.

Table 5: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.596(a)	.36	.21	.353

Predictors: (Constant), Perceived Usefulness, Perceived Ease-of-Use, Perceived Risk, Facilitating Conditions, Age, Gender, Educational Qualification, Income. Dependent Variable: Attitude to Mobile Banking

From Table 5 above, 36% of attitude to mobile banking is determined by the independent variable.

Table 6: Coefficients

Model		Unstandardised Coefficients	Standardised Coefficients	Sig.
		B	Beta	
1	(Constant)	1.7		.00
	Perceived Usefulness.	0.56	0.32	.00
	Perceived Ease-of-use	0.39	-0.24	.00
	Perceived Risk	-0.21	-0.15	.00
	Facilitating Conditions	0.81	0.52	.03
	Age	-0.41	-0.22	.04
	Gender	1.05	0.82	.56
	Educational Qualification	0.86	0.43	0.0
	Income	0.97	0.48	0.03

- a. Dependent Variable: Attitude Towards Mobile Banking
- b. Independent Variables: Perceived Usefulness, Perceived Ease-of-Use, Perceived Risk, Facilitating Conditions, Age, Gender, Educational Qualification, Income

The second step shows that all variables except gender significantly determines attitude towards mobile banking. However, the relationship between the independent variable is relatively lower than their relationship with mobile banking adoption. Equation (2) therefore becomes:

$$At = 1.7 + 0.56PU - 0.39PEOU + 0.21PR + 0.81PC - 0.41Ag + 1.05Gd + 0.86Eq + 0.97In$$

This confirms the fact that Attitude acts as a mediator between the independent variables and mobile banking adoption. However, the strength of mediation is determined by the 3rd step.

6.13 Step 3

Table 7: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.356(a)	.13	.08	.452

Predictors: (Constant), Perceived Usefulness, Perceived Ease-of-Use, Perceived Risk, Facilitating Conditions, Age, Gender, Educational Qualification, Income, Attitude. Dependent Variable: Mobile Banking Adoption

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From the above, 13% of the mobile banking adoption is determined by all independent variable when attitude to mobile banking is included as an independent variable.

Table 8: Coefficients

Model		Unstandardised Coefficients	Standardised Coefficients	Sig.
		B	Beta	
1	(Constant)	0.56		.00
	Perceived Usefulness.	0.31	0.2	.00
	Perceived Ease-of-use	0.26	-0.11	.00
	Perceived Risk	-0.10	-0.08	.04
	Facilitating Conditions	0.32	0.17	.04
	Age	-0.17	-0.06	.04
	Gender	0.55	0.18	.23
	Educational Qualification	0.17	0.12	0.0
	Income	0.59	0.2	0.0
	Attitude	0.12	0.07	0.1

- a. Dependent Variable: Mobile Banking Adoption
- b. Independent Variables: Perceived Usefulness, Perceived Ease-of-Use, Perceived Risk, Facilitating Conditions, Age, Gender, Educational Qualification, Income, Attitude to Mobile Banking

The above tests the relationship between the dependent variable and the moderator while using the independent variables as control. From it is clear that Attitude significantly determines Mobile Banking Adoption (at $p < 0.05$) despite introducing control variables (independent variables). Equation (3) becomes:

$$MB = 0.56 + 0.31PU + 0.26PEOU - 0.1PR + \beta_{34}PC + 0.32Ag - 0.17Gd + 0.55Eq + 0.59In + 0.12At$$

The statistical analysis confirms that Perceived Usefulness, Perceived Ease-of-Use, Perceived Risk, Facilitating Conditions, Age, Educational Qualification and Income significantly determine Mobile Banking Adoption. This confirms the position of several researchers (Gefen & Straub, 1997; Vankatesh, 1999; Putrevu, 2002; Suoranta, 2003; Tiwari & Buse, 2006; Kennickell & Kwast, 2008; Ki et al, 2007; Crabbe et al, 2009; Yao et al, 2013 etc). However, contrary to the position of Gefen & Straub (1997), the impact of gender on mobile banking adoption is not significant. The table below shows a summary of hypotheses test result. Also, the relationship between PU, FC, EQ and IN and MB are positive while PEOU, PR and AG affect MB in the negative direction.

Table 9: Hypotheses Test Results

Hypotheses	β Value	p Value	Results
Perceived Usefulness does not significantly determine mobile banking adoption	0.31	.00	Reject
Perceived Ease-of-Use do not significantly affect mobile banking adoption	0.26	.00	Reject
Perceived Risk do not significantly affect mobile banking adoption	-0.10	.04	Reject
Facilitating Conditions do not significantly affect mobile banking adoption	0.32	.04	Reject
Age do not significantly affect the adoption of mobile banking	-0.17	.04	Reject
Gender does not significantly affect the adoption of mobile banking	0.55	0.23	Accept
Educational Qualification does not significantly affect mobile banking adoption	0.17	0.0	Reject
Income does not significantly affect mobile banking adoption	0.59	0.0	Reject
Attitude do not mediate the relationship between Independent Variables and mobile banking adoption	0.12	0.1	Reject

7.0 Limitations

An obvious limitation of this study is its sample selection method. A more scientific sampling procedure may give different outcomes. Also, even though more of the results show a p value less than 5%, the presence of Common Methods Bias (CMB) cannot be overruled. In addition to this, larger samples or equal number of samples taken from other locations in Nigeria may yield different

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results. This is because as the commercial capital of Nigeria, the level of awareness about current trend in information technology is likely to be higher in Lagos than in any other part of Nigeria.

8.0 Conclusion and Recommendation

This study concludes that adoption rate of mobile banking increases with perception about its usefulness, Perceived Ease-of-Use and availability of facilitating condition. It also showed clearly that mobile banking adoption rate drops with when perceived risk increases. It also show that adoption rate of mobile banking reduces with age but increases with educational qualification and income of adopters. The implication of this is that the low rate of mobile banking adoption in Nigeria can only be addressed when relevant stakeholders focus attention on influencing the perception of bank customers on the usefulness, ease of use, recklessness and facilitating conditions for mobile banking in the right direction. Also, efforts should be made to promote the use of mobile banking among older bank customers in ways that they will understand, highlighting its numerous benefits while providing easy to use apps that run on all mobile communication networks without necessarily using the internet

References

1. Ajzen, I (1985). From intentions to actions: A theory of planned behaviour. In J. Kuhl & J. Beckmann (Eds.), *Action control: From cognition to behaviour*. Berlin, Heidelberg, New York: Springer-Verlag. pp. 11-39
2. Baron, R. M. & Kenny, D. A. (1986). The moderator-mediator variable distinction in social psychological research – conceptual, strategic and statistical considerations. *Journal of Personality and Social Psychology*. 51(6), 1173–1182
3. CBN (2011) Further Clarification on Cashless Lagos Project. Retrieved <http://www.cenbank.org/cashless/>
4. Cellular News (2011) *Mobile Banking Surge as Emerging Markets Embrace Mobile Banking*. Retrieved <http://www.cellular-news.com/story/49148.php>
5. Chuttur M.Y. (2009). Overview of the Technology Acceptance Model: Origins, developments and future directions. Indiana University, USA . *Sprouts: Working Papers on Information Systems*, 9(37). <http://sprouts.aisnet.org/9-37>
6. Crabbe, M., Standing, C., Standing, S. & Karjaluo, H (2009). An adoption model for mobile banking in Ghana. *International Journal of Mobile Communications*. 7(5), 515–54
7. Daily Times Ng (2011) *Mobile banking revolution; Ghana and Nigeria Poised to Leap Ahead*. Retrieved <http://dailytimes.com.ng/article/mobile-banking-revolution-ghana-and-nigeria-poised-leap-ahead>
8. Dzoghbenuku, R (2013). Banking innovation in Ghana: Insight of students' adoption and diffusion. *Journal of Internet Banking and Commerce*. 18(3), 1 – 20
9. Friedman, T.L (2010). Do believe the hype. *New York Times*. Retrieved http://www.nytimes.com/2010/11/03/opinion/03friedman.html?_r=0
10. Gefen, D and Straub, D. W (1997). Gender differences in the perception and use of e-mail: an extension to the technology acceptance model. *MIS Quarterly*. 389–399.
11. Govender, I & Sihlali, W (2014). A Study of Mobile Banking Adoption among University Students Using an Extended TAM. *Mediterranean Journal of Social Sciences*. 5(7), 451 – 459
12. Hogarth, J. M, Kolodinsky, J & Gabor, T (2008). Consumer payment choices: paper, plastics or electrons. *International Journal of Electronic Banking*. 1(1), 16
13. Iddris, F (2013). Barriers to adoption of mobile banking: Evidence from Ghana. *International Journal of Academic Research in Business and Social Sciences*. 3(7), 356 – 370
14. Kamakodi, N. & Khan, B. A. (2008). Looking beyond technology: a study of e-banking channel acceptance by Indian customers. *International Journal of Electronic Banking*. 1(1), 73–94
15. Kennickell, A. B. & Kwast, M. L. (2008). *Who uses electronic banking? Results from the 1995 survey of consumer finances*. Paper presented at the Annual Meeting of the Western Economic Association. Seattle: Washington. Retrieved <http://www.federalreserve.gov/pubs/feds/1997/199735/199735pap.pdf>
16. Khraim, H, Shoubaki, Y & Khraim, A. (2011). Factors affecting Jordanian customers' adoption of mobile banking services. *International Journal of Business and Social Science*. 2(20), 96 – 105
17. Kiesnoski, K (2000). Wireless banking: momentum; build with banks but slowly. *Bank Systems + Technology*. 37(2), 40-44
18. Kim, G., Shin, B. and Lee, H (2009). Understanding dynamics between initial trust and usage intentions of mobile banking. *Information Systems Journal* 19, 283–311. DOI: 10.1111/j.1365-2575.2007.00269.x
19. Korea Times, (2006). *Mobile Banking More Than Double*, Retrieved <http://times.hankooki.com/lpage/biz/200602/kt2006020122165711910.htm>,
20. Lee, E., Lee, J. (2000). Haven't adopted electronic financial services yet? The acceptance and diffusion of electronic banking technologies. *Financial Counselling and Planning*. 11(1), 49–60.
21. Lee, k, Luu, Y & Kim, S (2007). Factors affecting the adoption behaviour of mobile banking: A South Korean perspective. *Journal of Internet Banking and Commerce*. 12(2), 1 – 9
22. Mobile Marketing Association (2009). *Mobile Banking Overview*. Retrieved www.mmaglobal.com
23. Odumeru, J.A (2013). Going cashless: prospects of the mobile banking option. *Nigerian Chapter of Arabian Journal of Business and Management Review: Babcock University, Ilisan-Remo*. 1(2). 9 – 17

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24. Putrevu, S (2002). Exploring the origins and information processing differences between men and women: implications for advertisers. *Academy of Marketing Science Review*. 6. Retrieved www.amsreview.org/articles/putrevu10-2001.pdf
25. Rogers, Everett (2003). *Diffusion of Innovation*. 5th Edn. London: Simon and Schuster.
26. Srite, M. and Karahanna, E. (2006). The role of espoused national cultural values in technology acceptance. *MIS Quarterly*. 30(3), 679–704
27. Suoranta, M (2003). Adoption of mobile banking in Finland. *Jyväskylä: University of Jyväskylä Studies in Business and Economics*. Retrieved <https://jyx.jyu.fi/dspace/bitstream/handle/123456789/13203/9513916545.pdf?sequence=1>
28. Thulani, D, Kosmas, N, Collins, M & Lloyd, C (2011). Adoption and use of SMS/mobile banking in Zimbabwe: An exploratory study. *Journal of Internet Banking and Commerce*. 16(2), pp. 1 – 15
29. Tiwari R. and Buse S (2006). *The Mobile Banking Prospects: A Strategic Analysis of Mobile Commerce Opportunities in the Banking Sector*. Hamburg: Hamburg University Press
30. UNCTAD (2012). *Africa Research Bulletin: Economic, Financial and Technical Series*, 48: 19345A–19346B. DOI: 10.1111/j.1467-6346.2011.04259.x
31. Vaidya, S.R (2011). Emerging trends on functional utilization of mobile banking in developed markets in next 3-4 Years. *International Review of Business Research Papers*. 7(1), 301 – 312
32. Vankatesh, V & Davis, F. (2000). A theoretical extension of the technology acceptance model: four longitudinal field studies. *Management Sciences* 46(2), 186 – 204
33. Yang, A. S. (2009). Exploring adoption difficulties in mobile banking services. *Canadian Journal of Administrative Sciences*. 26: 136–149. DOI: 10.1002/cjas.102
34. Yao, H, Liu, S & Yuan, Y (2013). A study of user adoption factors on mobile banking services based on trust and distrust perspective. *International Business and Management*. 6(2), 9 – 14