Middle-East Journal of Scientific Research 25 (5): 1153-1165, 2017
ISSN 1990-9233

DOI: 10.5829/idosi.mejsr.2017.1153.1165

Determinants of Mobile Banking Acceptance: A Study of Bank Customers from Developing Economy

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Abstract: This study experientially explores the relationship between the determinant factors that manipulate the acceptability of mobile banking (MB) in Nigerian developing economy. A quantitative survey data breed from 517 experienced bank customers formed the final database of the study. While employing exploratory factor analysis, the research findings reveal that perceived ease of use, perceived usefulness, perceived security(risk), perceived trust, level of awareness and self-efficiency exhibit positive significant influence and relationship with bank customers' acceptance of mobile banking in Nigeria. Perceived trust demonstrates the strongest relationship among the seven latent constructs and 28 reflective indicators employed in the study. In contrary, no significant relationship was found between perceived financial cost and acceptance of MB model. To magnetize the bank customers to the accelerating level of MB acceptance, banking practitioners should emphasize on trust, banking education and security aspect of MB in Nigeria. This can be done through provision of sophisticated encryption illegal intrusion detection and firewall programmes to reassure the bank customers.

Key words: Mobile Banking · Bank customer · Information Technology · Nigerian Economy

INTRODUCTION

In banking and financial service industries, mobile banking (MB) is considered as one of the most recent innovations globally. Mobile banking is an "act of performing online financial and banking transactions with the help of mobile telecommunication devices such as mobile phones or tablets" [1]. MB has gained popularity through mobile technology development and the internet. The information and telecommunication are predicted to have revolutionized the hitherto traditional banking model [2]. MB has swiftly inserted some components of pure mobility to service delivery such that consumers in both developing and developed countries have gained convenient access to value-added banking services. The growing attractiveness of MB has warranted prediction that more than one billion people are expected to use mobile banking globally by 2017 [3].

The reason for the rapid growth of MB is not farfetched. First, MB improves the approach in which personal financial services are delivered from the design stage to the completion stage [4]. Mobile banking can no longer be separated from the present day business transactions; because it has integrated societal interactions with bank customers and other service consumers. Second, MB draws greater potentials customers to the banking industry especially the middle age class and the youth. This is made possible through the emergence and widespread of the second generation (2G) and third generation (3G) mobile communication technologies. Third, the additional raisen d'etre for growing status of MB is largely attributable to the unique experience of easy way of banking on the part of bank customers and the practitioners. The time saving factor and the place independence which MB services provide to customers is second to none, coupled with its overall effort-saving qualities. Essentially, the wonderful experience and constant sense of control over financial assets increases the customers' level of satisfaction and loyalty. For instance, additional cost on the part of bank customers is constantly minimized and error reduction potentials on the part of the banks have also decreased.

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Unarguably, mobile banking has necessitated banks massive investment in information technology (IT), because banks have realized that apart from the growing concern of confidentiality and security, e-based banking is a major fulcrum for cost-cutting and client retention [5].

Although MB has become the most mobile technological wonders in the banking and financial services industries, it still suffers from inevitable challenges which have dragged its acceptance and adoption to low ebb. For example; the usage of mobile banking is still nasty and in its infancy stage in Nigeria and as such it has apparently failed to earn general trust and confident on the part of the potential customers. Additionally, customers' reluctance in mobile banking acceptance in Nigeria as a developing country is a worrisome reality. An interesting question that has remained unanswered is – why is MB acceptance rate very low in Nigeria? In this light [6] argued extensively that the acceptance of MB has declined bellow expectation visa-vis the benefit associated with the MB innovations.

In the extant literature, several calls have been made for continuous pedagogical investigation on the factors that hinder the acceptance and adoption mobile banking (see for example see [7], [8], [9]. Prior studies have combined a hand full of theories into meaningful research consideration, but the subject matter of MB need to be further explored because of the following reasons: first, the concept of MB, the driving factors and the barriers of MB acceptance need to be investigated from the customers point of view in the context of developing country like Nigeria (especially in the eastern region of the country which the highest business inclination), since MB is gradually taking leading role in bringing financial services to the business class.

Second, the developed aforementioned theories and models require deeper research considerations to be tested in various world geographical settings. Interestingly, it is strongly argue that testing concept in different economics, political, cultural and institutional setting creates the contextual meaning for evaluating the robustness of the prevailing theories. As much as can be established from the apparent literature, no study on MB has given research attention to the eastern part of Nigeria. Therefore, this present study fills the lacuna in literature and providing deeper insight into the determinant factors influencing the acceptance of MB in Nigeria.

Review of Literature

The Concept Mobile Banking: Mobile banking is often referred to M-banking (MB). The digital Journey of MB historical started in 1999 in Germany when the Paybox Company deployed the first mobile banking and payment initiative. By way of conceptualization, several meanings of mobile banking with inherent similarities cutting across most of the definitions have been offered. For instance MB is defines as the "act of performing online financial and banking transactions with the help of mobile telecommunication devices such as mobile phones or tablets" [10]. Additionally, [11] is of the view that mobile banking is a subset of mobile commerce and is defined as any form of banking transaction that is carried out through a mobile device such as mobile phone or personnel digital assistance". Supporting the above definition, it is opined that emerging popularity of MB is a function of the advancement in mobile technological devices and as such, mobile banking has also emerged as a major component of the entire banking and financial services.

Further, MB is also defined as a "natural evolution of electronic banking which empowers consumers to complete financial transactions via mobile or handheld devices" [12]. While emphasizing on the functionalities of the mobile devices associated with MB, they argue that the devices often allow the numerous users to gain access to a server, thereafter perform authentication, confirm authentication, enable payment and finally affirm the transaction completion with convincing platform. Along this line of argument, [13] maintains that MB brought the possibilities of accessing financial business services by consumers because MB integrates mobile communication technologies and equipment for greater access of banking and financial services and flexibility; and financial services of banks can be fully exploited without delay in time, place and space. Mobile banking is described as "banking transactions using mobile devices such as cell phone, PDAs (Personal Digital Assistants), smart phones and other devices (except for laptops)" [14]. From the various definitions of MB above, it can be deduced that two major factors are not only common and indispensible in the concept. These two factors are transactions and mobile/technological devices. It is also understandable that MB perhaps originated from internet banking. As matter of fact, both the internet banking and the MB offer a rewarding opportunity for both the bank and the customers. Suffice it to say therefore, that the development of MB is induced by the bankers' willingness to cut cost and as well as the customers' desire for efficient and improved banking services. However, it is argued that the case of Nigerian banks is an inducement than desire [15].

For the purpose of this current study, we conceptualize MB as an electronic banking practice characterized by the application of combined mobile technologies to enhance potential solution to convenience and accessibility of financial and banking services. For a smart or cell phone to be used in the implementation of mobile banking practice, the banking application called bank 'APP' must be installed in users' SIM. Upon installation of an APP and subsequent sign up, an electronic account is usually created. This electronic account basically enables the users to perform banking transactions such as fund transfers, withdrawals, check account balance, account inquires and other interaction by the customers. Therefore, mobile phone and PDA are the only effective general channels for MB practice globally.

The MB is actually, an extension of an already existing banking service to also an existing bank customer. In other words, the mobile phones are used as an electronic mobile gateway to an existing bank account of existing bank customers. From the banking literature, there are two forms of MB model namely – "additive" model and "transformational" model. Transformational mobile banking services is described as "those in which the financial product linked to the use of the phone is targeted at the unbanked." Banking services "becomes transformational when it causes a shift in the access frontier". On the other hand, additive model denotes complementary services offered to bank customers by the banks; for example smart cards, point-of-sale networks, check books, voicemail/land line interfaces, internet resources among others. Additive model does not require new bank account, transformational model does.

Theoretical Review and Hypotheses Development: The theory upon which this present study is anchored is Technology Acceptance Model (TAM). Etymologically, TAM as one of the most widely used and most influential theory in information system research was developed by Fred Davis and Richard Bagozzi in 1989. The TAM theory addresses various factors that affect individual's acceptance and use of new technology. The model suggest that as users are presented with new technology, a number of natural and artificial factors influence their decision about how and when they will accept and use it. TAM theory is firmly established on two premises as fundamental determinants of new technology and new system adoption and use [16]. These premises are perceived ease of use (PEOU) and perceive usefulness (PU). PEOU is summarily described as "the degree to which a person believes that using a particular system would be free of effort, PU is the degree to which a person believes that using a particular system would enhance his job performance". The popularity of TAM theory has made it to be continuously studied and applied in banking, marketing and literature. TAM theory has advanced to TAM3. What is more; TAM, TAM2 and TAM3 assumes that potential consumers are free to act and choose without limitations.

Overall, the substance of TAM model that qualifies it as the theoretical base of this study and warrants its application and replication in this study geographical setting is the TAM power of prediction of use of "information system". Again, TAM has proven beyond doubt that it is a useful theoretical model in understanding and explaining user behavior in information system implementation and mobile banking adoption.

Hypotheses Development

Perceived Ease of Use (PEOU): From the empirical literature, prior studies (see for example [17] and [18] have shown an existence of positive relationship between perceived ease of use and intention to adopt mobile banking. Theoretically, perceived ease of use is defined as "the degree to which a person believes that using a particular system would be free of effort" [19]. Essentially, it is recently affirm the same positive relationship between TAM PEOU and consumers' attitude toward adoption of mobile banking in Iran [20].

Perceived Usefulness – TAM (PU): This is defined as perceived usefulness as "the degree to which a person believes that using a particular system would enhance his or her performance"[21], agree that the acceptance and adoption of mobile banking is mostly encouraged by the perceived speed of transactions – which is an indicator of perceived usefulness. Based on this nexus between MB and TAM-perceived usefulness, a corresponding hypothesis is developed thus:

Perceived Security/ Risk: This has to do with the extent to which an individual agrees that using a new innovation will be free of security and privacy challenges. Security and privacy are two significant dimensions of credibility which play an important role in acceptance of modern banking technologies. Admittedly, mobile banking is relatively new compared to the traditional banking method. Technological development also come in a new form; therefore the mobile banking transactions produce new security challenges, such as post-transaction security risk, physical security and financial transaction

security. The security issue no doubt largely arises because of fraudsters and hackers who hack bank accounts and users account respectively. [22] noted that security is a leading future challenges on the whole system. Hence perceived risk is expected to be an inevitable influential factor in MB acceptance.

Perceived Financial Cost: [23] describe financial cost as "the extent to which a person believes that he or she has the financial resources needed to use a system". The justification for this definition stems from the fact that acquisition of new technology is cost effective. The new technology has to be bought and maintained; and all these involve money from the user. Examples of financial considerations that are given to the new mobile services are the purchase of phones, subscriptions, service charges and communications. Perhaps, these financial costs might influence the choice of MB acceptance and usage considering the economic situation and the poverty level in Nigeria; as such empirically, it is reported that mobile banking "adoption is encouraged by reduction in transactions; transaction services and transaction reply fees. On the other hand, it is hindered by high-system basic or setup fees. The hypothesis is developed thus:

H4: There is no significant relationship between financial and cost bank customers' acceptance of MB.

Trust: This is defined as the "subjective probability with which customers believe that a particular transaction occurs in a manner consistent with their confident expectations". Again, e-trust is "the degree of confidence customers has in an online exchange". The foundation of banking business is built upon trust and confident. Every customer believes that any amount of money given to the bank is absolutely safe and that the money will in turn generate interest capital. Thus, trust is said to be more needful and significant in MB than the traditional banking method because of customers' information and data sensitivity. Both institutional trust and the trust in the technology are key factor in gaining deeper acceptance and usage [24].

Level of Awareness: Awareness is operationally described as the 'degree to which a consumer is aware of electronic banking channels' [25]. Awareness has to do with the consumers' knowledge, belief, information, conformation and decision making about a particular product. The acceptance and adoption of mobile banking will be determined by the available information which the customers can access and the likely benefits therein. On the contrary, low level of awareness can as well hinder the adoption of MB services. Therefore, awareness remains an important factor that should be considered in acceptance of any new innovative product. According to [26], "the greater the awareness of MB, the more positive is the attitude towards it".

Perceived Self-Efficacy: Perceived self-efficiency implies customers' basic capacity and capabilities as it regards the usage of new innovation and new technology [27]. It follows that customers who are familiar with internet and issues relating to mobile payment will really find it easy to accept MB practice. Empirical evidence shows that when a user of a particular product has higher capacity towards an innovation, there is high tendency that such consumer will have positive attitude towards the products [28].

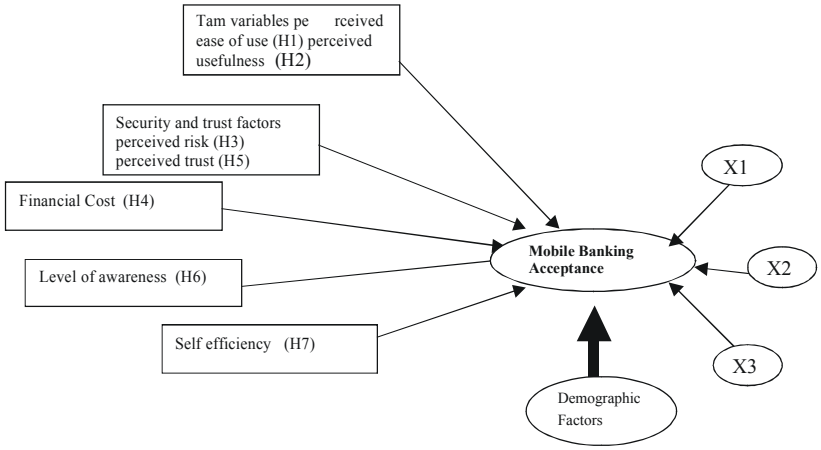

Fig. 1: Research Model and Hypothesis
Note: x1 - x3 = system design characteristics

The hypotheses of the study are summarized thus: there is no significant relationship between perceived ease of use, usefulness, trust, financial cost, security/risk, level of awareness, self efficiency and bank customer's acceptance of mobile banking. See the hypothetical model in Fig. 1.

Empirical Review: Empirical Review is summarized in Table 1.

Table 1: Empirical Review

S/N	Literature/ Author	Country	Method (sample size)	Constructs used	Major Findings
1	Tang *et al*., (2004)	Taiwan	Survey (267)	TAM	Computer self-efficacy influences perceived usefulness, ease of use and credibility. Together, they affect behavioural intention
2	Suoranta And Mattila (2004)	Finland	Survey (1, 253)	Bass diffusion model and IDT	Experienced customers and occasional users were more informed by interpersonal communication. Age is a strong indicator of innovativeness. Wealthier respondents were less willing to adopt new mobile banking services.
3	Laforet and Li (2005)	China	Survey (2003)	Attitude, motivation and behaviour	Awareness, confidentially, security, past experience with computer and new technology are salient factors in adopting mobile banking.
4	Luarn and Lin (2005)	Taiwan	Survey (180)	Extended TAM	Usefulness, ease of use, self-efficacy and financial cost were found to be significant antecedents of the behavioural intention to use mobile banking. A significant direct relationship exist between credibility and behavioural intention to use mobile banking.
5	Laukkanen	Finland	Interview	Mean-end theory	Perceived benefits, such as location free and efficiency, are main factors that enocourage people to adopt mobile banking
6	Laukkanen and Pasannen	Finland	Survey (1, 535)	Innovation adoption Categories	Only age and gender differentiate these two groups of customers, whereas education, income, occupation and size of the household were found to be insignificant in differentiating the groups
7	Amin *et al.,* (2007)	Malaysia	Survey (156)	TAM	Perceived usefulness, ease of use, credibility, amount of information and normative pressure significantly influence the adoption rate.
8	Gu *et al.,* (2009)	Korea	Survey (910)	TAM, trust	Self-efficiency has the strongest antecedent of perceived ease of use, which directly and indirectly affects behavioural intention through perceived usefulness in mobile banking.
9	Yang (2009)	Taiwan	Survey (178)	Rasch measurement Model and item Response theory	Mobile banking adoption is encouraged by the speed of transactions and reduction in service fees and is inhibited by configuration safety and system fees
10	Riqueleme and Rios (2010)	Singapore	Survey	TAM, TPB and IDT	Usefulness, social norms and risk affect the intentions to adopt mobile banking
11	Wessels and Drennan (2010)	Austrial	Survey (314)	TAM, IDT and SST	Perceived usefulness, perceived risk, cost and compatibility were found to affect consumer acceptance of mobile banking
12	Puschel *et al.,* (2010)	Brazil	Survey (666)	IDT and DTPB	Relative advantages, visibility and compatibility significantly influence attitude and attitudes, subjective norms and perceived behavioural control significantly affect intention to use
13	Koenig Lewis *et al.,* (2010)	Germany	Survey (263)	TAM and IDT	Compatibility, perceived usefulness and risk are significant indicators of the adoption of mobile banking. Trust and credibility are also crucial to reducing the overall perceived risk of mobile banking

Table 1: Continued

14	Laukkanen and Kiviniemi (2010)	Finland	Survey (1, 551)	Theory of resistance to innovation	Information and guidance offered by a bank has the most significant effect on decreasing the usage barrier, followed by image, value and risk barriers, respectively. Information and guidance show no effect on the tradition barrier
15	Cheah *et al*. (2010)	Malaysia	Survey (175)	TAM, TPB and IDT	Personal innovativeness, perception of usefulness, ease of use and relative advantage positively influence the intention to adopt mobile banking, whereas perceived risk negatively affects the intention to adopt mobile banking.
16	Daud *et al*, (2010)	Malaysia	Survey (300)	TAM, perceived Credibility, customer Awareness and Perceived risk.	Perceived usefulness, perceived credibility and customer awareness have significant effects on the intention to adopt mobile banking.
17	Akturan and Tezcan (2012)	Turkey	Survey (435)	TAM, perceived benefits and risks	Perceived usefulness, ease of use, social risk and benefits positively influence attitude towards mobile banking, which leads to intention to use mobile banking.
18	Yu (2012)	Taiwan	Survey (441)	UTAUT	Social influence, perceived financial cost, performance expectancy and perceived credibility affect intentions. Individual intentions and facilitating conditions influence actual behavior.
19	Rammile and Nel (2012)	South Africa	Survey (288)	TAM and usage barriers	The value barrier and the tradition barrier have the strongest negative impact on perceived usefulness. The information barrier and the usage barrier have the strongest negative effect on ease of use
20	Chemingui and Ben Lallouna (2013)	Tunisia	Survey (300)	IDT and theory of resistance to innovation	The tradition barrier negatively influences intention to use. Compatibility , trialability, perceived enjoyment and system quality positively influence intention to use mobile banking
21	Witeepanich *et al*. (2013)	Thailand	Survey (437)	UTAUT	The most important factor influencing mobile banking adoption is trust
22	Balabanof (2014)	South Africa (RSA)	Survey (373)	DTPB	Attitude, perceived behavioural control and subjective norms have a significant influence on the intention to adopt
23	Hanafizadeh *et al*. (2014)	Iran	Survey (403)	TAM, SST, trust, credibility, perceived risk and perceived cost of use	Perceived usefulness, ease of use, compatibility, trust and credibility positively influence mobile bank adoption. In contrast, perceived risk, cost and the need for interaction negatively affect mobile bank adoption
24	AlSoufi and Ali (2014)	Bahrain	Survey (372)	Extended TAM	Perceived usefulness is affected by customer service and efficient transactions, whereas perceived ease of use is influenced by compatibility and self-efficacy. Moreover, perceived and ease of use directly and strongly influence the intention to use mobile banking
25	Talukder *et al*. (2014)	Australia	Survey (242)	Extended TAM	Perceived usefulness, ease of use and social influence are most important determinants of the intention to use mobile banking services. Intention to use is also a precondition to adopt mobile banking.

Source: Compiled by the Authors

MATERIALS AND METHODS

Research Setting and Sample Frame: The study setting is Abakaliki metropolis- the capital city of Ebonyi State in the south eastern part of Nigeria. The population that made up the sample frame is dominantly Nigerian, resident in the city. The choice of the city as the study setting is justified by the fact that all the twenty one (21) deposit

money banks that have the legitimate banking business license by the Central Bank of Nigeria has at least a branch office in the city; and majority of business transactions among merchants take place in the city on daily basis. Thus, these bank customers formed the sample frame of this research, out of which a sample population was taken.

Data Collection: A structured questionnaire was formulated as in instrument of data collection. The use of questionnaire as an instrument of data collection is a conventional approach employed in various previous technology acceptance/adoption studies. All items captured in the questionnaire were in a 5-point Likert Scale anchored on "strongly agreed = 5 and strong disagree = 1 at both extremes of the questionnaire items.

Meanwhile, a sample of 615 was conveniently chosen with participants dominantly drawn from the undergraduate and post graduate students of Ebonyi State University located at the heart of study setting. These sets of participants were chosen due largely because of high level of understanding required on the part of the participants in supplying information to the researchers on sensitive subject matter such as banking information. Of the 615 questionnaires distributed, 544 completed surveys were retrieved. Out of this, 27 questionnaires were eliminated because outliers and inconsistency. Overall, 517 valid responses formed the actual database utilized by the researchers. The valid responses of 517 represent 84.06% of the total number of questionnaire distributed and far above 30% response rate acceptable in survey research involving questionnaire. Based on the valid responses, the gender distribution of the sample frame is comparatively even because the percentage of male and female respondents are 57.8% and 42.2% respectively. Age distribution shows that younger age were represented more than the adults as the respondents age cluster around 26-45 years. These were expected by the researchers because the sample frame was targeted to the youth (Nigerian youths often have more potential to adopt or accept new technology than the adults).

In the marital status, 73.7% of the respondents are skewed toward unmarried. This was also expected because most undergraduates in Nigeria tend complete their university education before getting married. The summary of the demographic profile is shown in the Table 2.

Table 2: Respondents' Demographic Profile

Factotor	Options	Count	%
Gender	Male		
	Female		
Age bracket	Less than or equal 25 years	370	71.6
	26-35	124	24.0
	36-45	13	2.5
	46-55	10	1.9
	56-65	0	0.0
	66 and above	0	0.0
Marital status	Single	378	73.1
	Married	139	26.9
Educational qualification	FSLC	45	8.7
	SSCE/NECO/WAEC	298	57.6
	Diploma	21	4.1
	HND/BSc	135	26.1
	MSc/MBA	15	2.9
	PhD	3	0.6
Income level	Less than N50, 000	323	62.5
	N50, 000-N100, 000	120	23.2
	N100, 001-N150, 000	31	6.0
	150, 001-N200, 000	26	5.0
	N200, 000 and above	17	3.3

Source: Extraction by the researchers from SPSS.20.0

Data Analysis

Validity and Reliability Assessment: While validity applies to the "extent to which an instrument measures what it is purported to measure", reliability on the other hand is the ability of an instrument to prove consistency in repeated application. In this study, the Cronbach's alpha is used due to its conservativeness. The minimum threshold that must be accomplished to establish reliability with Cronbach's alpha is 50%. The reliability assessments of our 28 reflective indicators of the latent constructs were simultaneously factor-analyzed with the aid of SPSS software. The output of the factor-analysis shows that one reflective indicator of the main latent constructs exhibit high cross loadings. Thus, one item (PSR 4) was eliminated. Table 3 shows that the Cronbach's alpha of the latent constructs ranges from 0.505 to 0.844; confirming internal consistency with all the reflective indicators. For validity measurement, we applied content validity to validate the data because most of our scale were adopted from prior studies and tested theories with minor modifications.

Descriptive Statistics: The outcome of the descriptive statistics indicates that all the various measures fall within the minimum mean score of 3.6738, except perceived usefulness (PU) that has the mean core of 4.5817. What this means is that Nigerian banks are yet to secure their teeming customers to massively embrace the new

Table 3: Reliability and internal consistency

Construct	No of item (After)	Sources	Variable	Cronbach's α	Corrected if item deleted	Cronbach's α if items deleted
Perceived eases of use	4	Davis *et al*., (1989)	PEOU 1	0.664	0.476	0.581
			PEOU 2		0.496	0.560
			PEOU 3		0.456	0.590
			PEOU 4		0.361	0.649
Perceived usefulness	4	Kim & Mirusmonov (2010)	PEOU 1	0.673	0.378	0.655
			PEOU 2		0.570	0.554
			PEOU 3		0.555	0.554
			PEOU 4		0.385	0.680
Perceived security/risk	3	Cheng *et al*., (2006)	PSR1	0.844	0.712	0.781
			PSR2		0.725	0.769
			PSR3		0.693	0.799
Perceived financial cost	4	Luarn & Lin (2005)	PFC1	0.505	0.331	0.401
			PFC2		0.462	0.278
			PFC3		0.181	0.523
			PFC4		0.234	0.496
Perceived Trust	4	Mcknight *et al*., (2002)	PT1	0.615	0.503	0.463
			PT2		0.523	0.440
			PT3		0.508	0.459
			PT4		0.102	0.744
Level of awareness	3	Al-Somachi *et al*., (2009)	LA1	0.628	0.447	0.656
			LA2		0.562	0.598
			LA3		0.317	0.718
Self-Efficiency	3	Compeau & Higgins (1995)	SE1	0.620	0.178	0.516
			SE2		0.365	0.341
			SE3		0.356	0.690
Acceptance level	3	The authors	AL1	0.665	0.412	0.649
			AL2		0.634	0.359
			AL3		0.410	0.675

Source: Extraction by the researchers from SPSS.20.0

Table 4: Descriptive Statistics

	Mean	Std. Deviation	N
Sum_Acceptance	3.7653	1.04751	517
Sum_PEOU	3.9115	.90836	517
Sum_PU	4.5817	.62372	517
Sum_PSR	3.7956	1.18258	517
Sum_PFC	3.9618	.82218	517
Sum_PT	3.8240	1.09052	517
Sum_LoA	3.6757	1.10706	517
Sum_SE	3.6738	1.02999	517

Source: SPSS.20.0

trends of mobile banking model. The low-mean scores of the majority of the variable measures of the main latent constructs, points to concrete fact that the level of acceptance is not impressive. Additionally, the standard deviation values ranges from 0.6% to 1.1% in all the variables. This means that there is a significant chance for Nigerian banks to increase level of adoption and acceptance of the mobile banking technology. See table IV for instance.

Hypotheses Testing and Correlation Analysis: Consistent with the extant literature, the hypothesized relationship was tested with Pearson correlation statistical tools. Seven factors were found to have significant correlation; though the correlation is weak. For instance, according to [29], correlation coefficients should not exceed 0.8 if the result is free from multi-collinearity problems. Hence, seven out of eight latent construct met this criteria. All the correlations except one (PFC) are all significant at 1% (0.000). The value of *r* ranges from 0.380 (highest value) to 0.024 (lowest value). Therefore, there is a positive significant correlation between perceived ease of use, perceived usefulness, perceived security/risk, perceived trust and level of awareness, self-efficiency and bank customers' acceptance of mobile banking technology in Nigeria. The exploratory factor analysis was done with the principal component and varimax method. The KMO values ranges from 0.902 to 0.837. The minimum acceptable benchmark is 0.8. Thus, our test meets the criteria, which shows that our sample adequacy is acceptable. Again the Bartlett test of sphericity is significant in all the latent constructs. The factor loading are all considerable on its factors. The output of the factor analysis is not presented here because space, but can be provided on request. See table V on Correlation.

Table 5: Correlation Matrix

		Sum_PEOU	Sum_PU	Sum_PSR	Sum_PFC	Sum_PT	Sum_LoA	Sum_SE
Sum_PEOU	Pearson Correlation	1						
	Sig. (2-tailed)							
	N	517						
Sum_PU	Pearson Correlation	.325**	1					
	Sig. (2-tailed)	.000						
	N	517	517					
Sum_PSR	Pearson Correlation	.232**	.255**	1				
	Sig. (2-tailed)	.000	.000					
	N	517	517	517				
Sum_PFC	Pearson Correlation	.024	.056	.103*	1			
	Sig. (2-tailed)	.591	.206	.019				
	N	517	517	517	517			
Sum_PT	Pearson Correlation	.380**	.318**	.436**	.052	1		
	Sig. (2-tailed)	.000	.000	.000	.237			
	N	517	517	517	517	517		
Sum_LoA	Pearson Correlation	.292**	.218**	.253**	.024	.322**	1	
	Sig. (2-tailed)	.000	.000	.000	.592	.000		
	N	517	517	517	517	517	517	
Sum_SE	Pearson Correlation	.249**	.142**	.245**	.114**	.310**	.276**	1
	Sig. (2-tailed)	.000	.001	.000	.009	.000	.000	
	N	517	517	517	517	517	517	517
Sum_Acceptance	Pearson Correlation	.209**	.284**	.198**	.063	.282**	.220**	.285**
	Sig. (2-tailed)	.000	.000	.000	.153	.000	.000	.000
	N	517	517	517	517	517	517	517

Source: SPSS.20

Robustness Check: To further confirm our results, robustness check were carried out to ensure that there is no existence multi-collinearity problem given that our research variables are somewhat related. This was done with collinearity diagnostics tests. For instance, [30], strongly argue that the non existence of the problem of multi-collinearity is statistically established when the tolerance value is substantially above 0.10 and the corresponding values of variance of inflation factor (VIF) must be bellow 5. Results shows that the tolerance value of the seven variables ranges from 0.673 to 0.9.79; whereas, VIF values also ranges from 1.021 to 1.486 respectively. Again, Durbin Waston value of 1.835 was confirmed as part of the diagnostic test to ensure that there is no problem of autocorrelation among the variables. Additionally, normality assumption was also ascertained through scatter plot and the P.P plot. Although the normality test shows that there are some outliers, the P.P plot shows good fit with minor deviation from normality.

RESULTS AND DISCUSSION

Both perceived ease of use and perceive usefulness affect users of any new technology. The findings of this current study shows that perceived ease of use and perceived usefulness have strong positive significant influence/relationship with MB acceptance in Nigeria. Meanwhile these findings confirm what other authors have found [31].

Further, perceived trust is identified to have the strongest relationship between MB and bank customers acceptance in Nigeria. The implication is that an increase in the level of trust build around bank customers in Nigeria will lead to a greater acceptance of mobile banking model and vis-va-sa. This finding is intadem with the concept confidentiality and trust inherent in banking business and transactions all over the world. The foundation of banking is build on customers trust, thus, the cardinal principle of modern banking is confidentiality and trust. As such, bank customers need to be assured by the stakeholders in the Nigerian bank, that financial transactions with mobile devices is well confide. This is most expedient because financial transaction with mobile banking does not permit the bank customers to see bank physically while making any transaction. What is more, our current findings is absolutely in line with the finding of [32] and [33] who empirically confirmed that as customers gain confidence in computer usage they will consequently be more willing to adopt new technology.

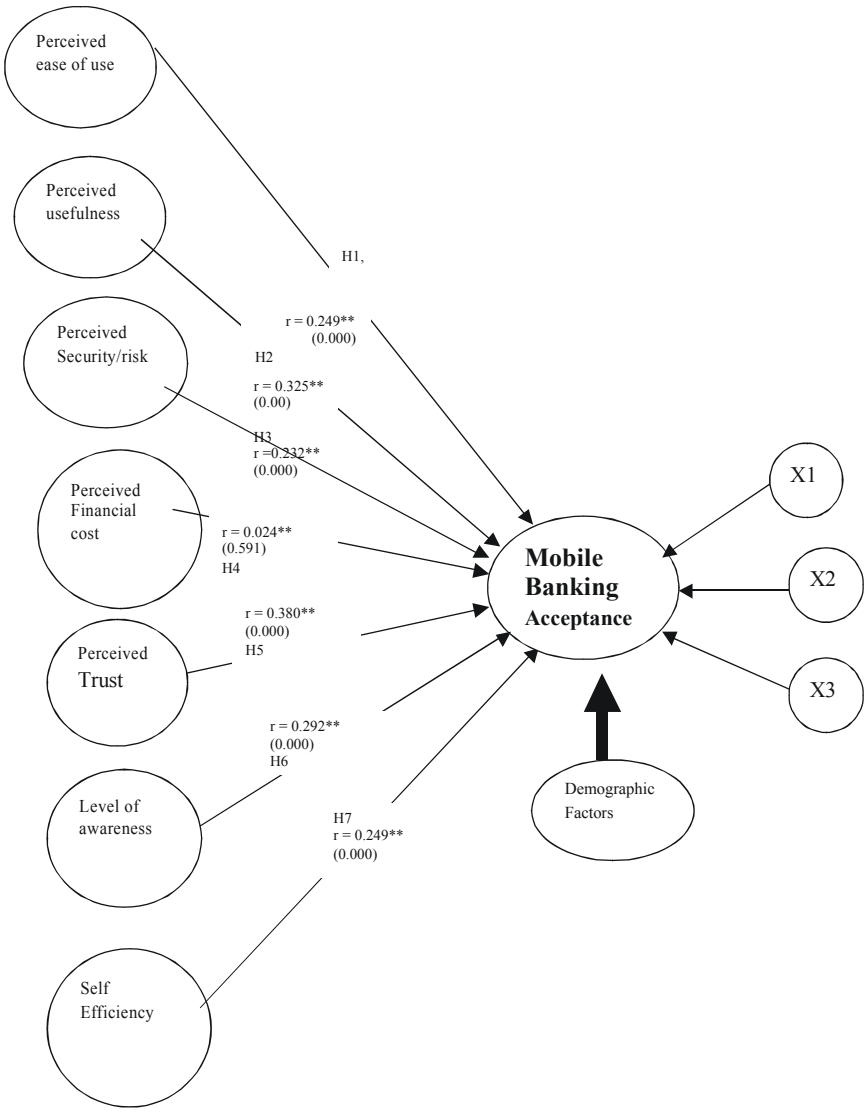

Fig. 2: Research model, Hypothesis and significant level
Note: x1, x2, x3, = system design characteristics

Perceived security (risk) have positive significant relationship with MB acceptance in Nigeria; which implies that the higher the bank customer feels secured while making financial transaction using mobile banking apps, the higher the rate of acceptance. In reality, the prevalent of ICT fraudsters who hack customers account and gain access to secret codes of the customer is actually a horrible trend in the banking industry. This induces fear on the part the bank customers; with the negative impression that banking transaction that is non-virtual is unsafe and unsecured. Additionally, our present finding is not standing alone since it has the support of [34] who document that security risk has positive significant relationship with MB. Being that security is a leading potential challenge in MB, its impact on the acceptance of MB in Nigeria was expected.

It is also interesting to note that the level of awareness and self-efficiency were found to positively correlate with bank customer's acceptance of MB in Nigeria. Therefore, it follows, that the more Nigerian banks can create awareness about the new MB model, the more bank customers will be better informed. Any bank in Nigeria that leverages in aggressive awareness creation will gain and retain the interest of potential younger customers who are self-efficient in the new technologies.

Finally, financial cost was found to have no significant relationship with mobile banking acceptance in Nigeria. This finding is contrary to existing empirical evidence such as [35] and [36]. However, the outcome of the result was completely outside the researchers' expectation regarding the level of poverty and the present economic veracity in Nigeria, in which additional switching cost to MB would be an influential factor. Fig. 2.

CONCLUSION

This study provides deeper understanding via the investigation of the relationship between various determinant factors and bank customers' acceptance of mobile banking in Nigerian milieu. The MB model is relatively a new banking model warranted by the advancement in the information and telecommunication technology. In order to advance an understanding of this new technology, the conventional latent constructs of technology acceptance model (TAM PEOU and TAM PU) as well as other determinant factors were tested using exploratory factor analysis and correlation analysis.

The overall empirical findings reveal that out of the seven variables tested, six variables proved to have significant positive relationship with bank customers' acceptance of MB in Nigeria. As a matter of fact, we therefore conclude that perceived ease of use, perceived usefulness, perceived security risk, perceived trust, level of awareness and self-efficiency exhibit positive significant relationship with bank customers' acceptance of MB in Nigeria. The study did not found significant relationship between financial cost and bank customers' acceptance of mobile banking in Nigeria.

It is recommended that Nigerian banks should increase customer awareness on MB through increased banking education and online instructions. Again, banking practitioners and professional should emphasize on trust and security aspect of MB in Nigeria. This can be done through provision of sophisticated encryption illegal intrusion detection and firewall programmes to reassure the customers on security risk and trust

Research Limitations and Recommendation for Further Research: First, the study is based on some selected constructs. It did not cover other factors such as normative pressure, compatibility factor, subjective norms and risk factors (eg performance risk, time risk, privacy risk, psychological risk and financial risk). Further research need to cover these factors.

Second, this present study tested only TAM model in Nigeria. However, there are other theories that is linked with behavioural intentions such the Theory of Planned Behaviour and Perceived Behavioural Control Theory (PBC). Further research should be extended to cover these aspects with respect to the Nigerian developing economy.

ACKNOWLEDGEMENTS

The researchers acknowledge Nigerian TETFund (Tertiary Education Trust Fund) for partly funding of this research through Ebonyi State University Directorate of Research, Innovation and Commercialization.

REFERENCES

1. Lebylav, E.T.J., 2016. Behavioural intention to adopt mobile banking among the millennial generation, Young Consumers, 17: 20-40.
2. Mohammadi, H., 2014. A Study of mobile banking usage in Iran, International Journal of Bank Marketing, 33(6): 733-759.
3. Jennifer, 2013
4. Lee, K. and N. Chung, 2009. Understanding factors affecting trust in and satisfaction with mobile banking in Korea: a modified Delone and McLean's model perspective, Interaction with Computers, 2(5/6): 385-92.
5. Upadhyay, P., 2014. Analysing user perspective on the factors affecting use intention of mobile based transfer payment, Internet Research, 20(1): 38-56.
6. Mallert, *et al*., 2004. Exploring consumer adoption of mobile payment – a qualitative study Journal of Strategic Information System, 16(4): 413-432.
7. Lin, H., 2011. An empirical investigation of mobile banking adoption: The effect of innovation attributes and knowledge based-Trust, Int. J. Inf. Mgt, 31(3): 252-260.
8. Mas, I. and k. Kumar, 2009. Banking on mobiles: Why, How, for Whom? CGAP, Washington, D.C.
9. Laukkanen, T., 2010. The role of information in mobile banking resistance, International Journal of Bank Marketing, 28(5): 372-388.
10. Etim, A.S., 2014. Mobile banking and mobile money adoption for financial inclusion, Research in Business and Economic Journal, 9: 1-13.
11. Koksal, M.H., 2015. The intentions of Lebanese consumers to adopt mobile banking, International Journal of Bank marketing, 34(3): 327-346.

12. Amin, H., 2008. Factors affecting the intentions of customers in Malaysia to use mobile phone credit cards, Management Research News, 3(7): 493-503.
13. Chen, C., 2013. Perceived risk usage frequency of mobile banking services, Managing Service Quality: An International Journal 23(5): 410-436.
14. Chen, C.S., 2013. Perceived risk, usage frequency of mobile banking services, Managing Service Quality, 23(5): 410-436.
15. Ezeoha, A.E., 2011. Internet Banking Strategy in a Highly Volatile Business Environment: The Nigerian Case; E-Banking and Emerging Multidisciplinary Processes: Social, Economical and Organizational Models.
16. Davis, F.D., 1989. Perceived usefulness, Perceived ease of use and user acceptance of information technology, MIS Quarterly, 3(3): 319-340.
17. Safeena, R., H. Date, A. Kammani and N. Hundewale, 2012. Technology adoption and Indian consumers: Study on mobile banking, International Journal of Comput Theory Engineering, 4(6): 1020-1024.
18. Wang, J., H. Lin and P. Luarn, 2006. Predicting consumer intention to use mobile service, Information System Journal, 16(2): 157-79.
19. Chauhan, S., 2015. Acceptance of mobile money by poor citizens of India: Integrating trust into the Technology Acceptance Model, 17(3): 58-68.
20. Mohammadi, H., 2014. A Study of mobile banking usage in Iran, International Journal of Bank Marketing, 33(6): 733-759.
21. Chauhan, S., 2015. Acceptance of mobile money by poor citizens of India: Integrating trust into the Technology Acceptance Model, 17(3): 58-68.
22. Aladwani, A.M., 2001. Online banking: a field study of drivers, development challenges and expectations. International Journal of Information Management, 21(3): 213-225.
23. Wang, J., H. Lin and P. Luarn, 2006., Predicting consumer intention to use mobile service, Information System Journal, 16(2): 157-79.
24. Karjaluoto, H., M. Mattila and T. Pento, 2002. Factors underlying attitude formation towards online banking in Finland,*International Journal of Bank Marketing*, 20(6): 1-72.
25. Lee, K. and N. Chung, 2009. Understanding factors affecting trust in and satisfaction with mobile banking in Korea: a modified Delone and McLean's model perspective, Interaction with Computers, 2(5/6): 385-92.
26. Mohammadi, H., 2014. A Study of mobile banking usage in Iran, International Journal of Bank Marketing, 33(6): 733-759.
27. Luarn, P. and H. Lin, 2005. Towards an understanding of the behavoural intention to use mobile banking, Computer in Human Behaviour, 49(2): 1-13.
28. Zhou, T., 2011. An empirical examination of Initial trust in mobile banking; Internet Research, 21(5): 527-540.
29. Li, T. and R.J. Calantone, 1998. The impact of market knowledge competence on new product advantage: conceptualization and empirical examination, Journal of Marketing, 62(4): 13-29.
30. Hair, J.F. Jr., W.C. Black, B.J. Babin and R.E. Anderson, 2010. Multivariate Date Analysis, Global perspective 7th Ed. Pearson Prentice.
31. Bagozzi, R.P., F.D. Danis and P.R. Warshaw, 1992. Development and test of a theory of technological learning and usage, Human Relations, 45(7): 660-686.
32. Shaik, A.A. and H. Karjaluto, 2015. Mobile banking adoption: a literature Review, Telematic and Informatics, 32(1): 129-142.
33. Akturan, U. and N. Tezcan, 2012. Mobile banking adoption of the Youth Market perceptions and intentions, Market Intelligence and Planning, 30(4): 444-459.
34. Luarn, P. and H. Lin, 2005. Towards an understanding of the behavoural intention to use mobile banking, Computer in Human Behaviour, 49(2): 1-13.
35. Wang, J., H. Lin and P. Luarn, 2006. Predicting consumer intention to use mobile service, Information System Journal, 16(2): 157-79.
36. Koksal, M.H., 2015. The intentions of Lebanese consumers to adopt mobile banking, International Journal of Bank marketing, 34(3): 327-346.

Further Readings

1. Adjzen, I., 1985. From intentions to Action, theory of planned behavior, in Kuhi, J. and Beckmann J. Eds Achon-control, from cognition to bebaviour, Springer, Heidelberg, pp: 11-39.
2. Al Ashban, A.A. and M.A. Burney, 2001. Customer adoption of tele-banking technology, the case of Saudi-Arabia, International Journal of Bank Marketing, 19(15): 191-200.
3. Ani, O.E., C. Uchendu and E.U. Atseye, 2007. Literary Management, 28(617): 355-365.

4. Filotto, U., P.M. Tanzi and F. Saita, 1997. Customer needs and front-office technology adoption, International Journal of Bank Marketing, 15(1): 13-21.
5. Gu, J., S. Lee and J. Suh, 2009. Determinants of behavioural intention to mobile banking, Export Systems with Applications, 36: 11605-16.
6. Hartwick, J. and H. Barki, 1994. Explaining the role of user participation in formation system use, Management Science, 40(4): 440-65.
7. Hove, L.V. and M.V. Bossuyt, 2007. Mobile payment models and their implications for next Gen. MSPs, Info, 15(55): 1-43.
8. Iziogo, E.E. and I.E. Ogba, 2014. Correlates of the determinants of relationship marketing in the retail sector: The Nigerian case, African Journal of Economic and Management Studies, 7(1): 30-53.
9. Park, S.Y., 2009. An analysis of technology acceptance model in understanding university students behavioural intention to use e-learning, Educational Technology and Society 12(3): 150-162.
10. Sathye, M., 1999. Adoption of internet banking by Australian consumers: an empirical investigation, International Journal of Bank Marketing, 17(7): 324-34.
11. Tobbin, P., 2012. Towards a model of adoption in mobile banking by the unbanked: A qualitative study, Info, 14(5): 74-88.
12. Venkatesh, V., M.G. Morris and F.D. Davis, 2006. User acceptance of information technology: Towards a unifies view, MIS Quarterly, 27(3): 425-478.