International Journal of Innovation and Scientific Research
ISSN 2351-8014 Vol. 23 No. 1 May 2016, pp. 113-123

http://www.ijisr.issr-journals.org/

FACTORS INFLUENCING THE ADOPTION OF ELECTRONIC BANKING: EXPANSION OF TECHNOLOGY ACCEPTANCE MODEL (TAM)

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ABSTRACT: For the past decades, many banks and financial institutions around the world have been motivated in implementing electronic banking due to the fast advances in information technology. Despite the significant growth of informatics in banking, electronic banking is still underutilized among banks and other financial institution in Ghana. This study, therefore, enriches the current knowledge on influential factors that affect individual behavioral intention on adopting e-banking. Thus, this study employs Technology Acceptance Model (TAM) in examining the factors that affect person's behavioral intention in adopting e-banking by expanding it with three other variables which are prior internet knowledge, Information on e-banking and perceived credibility. Survey questionnaire was randomly distributed to a total of 210 respondents who are customers of public and private banks located in Kumasi, Ghana. In all 193 were fully completed representing of 91 percentage.

On average, the results indicates that perceived usefulness, perceived ease of use, prior Internet Knowledge, Information on Electronic Banking and Perceived Credibility are significant determinants of customers intention in E-Banking using TAM. This outcome reflects both theoretical and practical consideration in promoting e-banking services in the current competitive industry in Ghana.

KEYWORDS: Electronic Banking, Technology Acceptance Model (TAM), Banks, Customers and Ghana.

1 INTRODUCTION

Several types of research have described electronic banking to be in the form of Internet banking or mobile banking [1][2][3] [Suoranta & Mattila 2004; Laforet & Li 2005; Laukkanen 2007). On the other hand, Internet banking and mobile banking are two different channels where services can be provided to clients as well as customers acquiring services by banks, [4]AbdElAziz et al., (2014). Customers who use Internet banking can receive services through wireless devices such as computers, mobiles, and other smart devices, [5] (Riquelme & Rios 2010). Flexibility and functionality are regarded as the most significant feature of e-banking by customers [3] (Suoranta & Mattila 2004). With the current rapid growth of Internet technology, e-banking has played vital roles with online transaction platform that has supported many e-business applications such as online shopping, online auction and Internet stock and so on through the use of e-payment. E-banking has enabled numerous banks and financial institutions in reducing costs related to serving customers physically, shorten processing time, enhanced the flexibility of business transactions as well as quality services [6](Shih and Fang, 2006). Some of the significance of e-banking are that it offers electronic services that help customers to check the balances of their accounts, money transfer, bill payments. Also, it enables deposit slips, apply for loans and credit cards, download accounts information, trading stocks or mutual funds, and look at images of their cheque [7](Turban et al., 2000).

The introduction of a new online banking products and services, it is highly recommended that banks should have a broad understanding of factors that influences consumers in adopting electronic banking. This study enriched the Technology Acceptance Model (TAM) with Prior Internet Knowledge (PIK), Information on E-banking (IEB) and Perceived Credibility (PC)

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to highly investigate the influential factors that affect individual's intention in the adoption of e-banking. The outcome of this study contributes to the theoretical contributions of TAM and practically enables banks to implement new service strategies in meeting their customers demand regarding e-banking services.

2 THEORETICAL REVIEW

Several studies have proven that information technology is still underutilized in many organizations, causing enormous economic loss to their businesses. This has led to the development of several technology acceptance theories and models which has been used to investigate information technology acceptance, [8](Lin, 2013). The technology acceptance models include, the Theory of Reasoned Action developed by [9] Fishbein et al., (1975), the Technology Acceptance Model developed by [10]Davis, (1989) and extended TAM developed by Venkatesh and [11]Davis, (2000). Also the Unified Theory of Acceptance and Use of Technology (UTAUT) by [12]Venkatesh et al., (2003), [13]Davis, et al., (1992), Motivational Model, the Theory of Planned Behavior by [14]Ajzen, (1991). Combining model of TAM and the Theory of Planned Behavior (C-TAM-TPB) proposed by [15] Taylor and Todd, (1995). Also, are the Model of PC Utilization, developed by [16] Thompson, et al., (1991), [17] Rogers, (2003) Innovation Diffusion Theory and the Social Cognitive Theory developed by [18]Bandura, (1986). Based on the theoretical review, only empirical and theory based electronic banking studies have been summarized in Table 1. Which indicates that TAM, TPB/DTPB, and IDT were frequently employed to investigate what influences electronic banking adoption.

Table 1: Empirical and theory-based empirical research in mobile banking adoption

Authors	Theories	Main Findings
[19]Luarn and Lin (2005)	Extension of TAM	Perceived self-efficacy, financial costs, credibility, easy - of-use, and usefulness had remarked influence on intention to adopt mobile banking
[5] Riquelme and Rios (2010)	TAM, TPB, and IDT	Usefulness, social norms, risk influences the intention to adopt mobile banking
[20]Brown et al., (2003)	IDT and DTPB	Relative advantage, trialability, number of banking services, and risk significantly influence mobile banking adoption
[21]Puschel et al., (2010)	IDT and DTPB	Relative advantages, visibility, compatibility, and perceived easy - of - use significantly affects attitude, and attitudes, subjective norm, and perceived behavioral control significantly affects intention.
[22]Cruz et al. ,(2010)	TAM and theory of resistance to innovation	The cost barrier and perceived risk are highest rejection motives, following are unsuitable device, complexity, and lack of information.
[23]Laukkanen and Pasanen [2008]	Innovation adoption categories	Demographics such as education, occupation, household income, and size of the household do not influence mobile banking adoption, while age and gender are main differentiating variables

3 RESEARCH DEVELOPMENT AND HYPOTHESIS

3.1 TECHNOLOGY ACCEPTANCE MODEL (TAM)

[10] Davis (1989) develops the Technology Acceptance Model based on the theory of reasoned action to investigate the factors that influence individual's intention in the adoption of information technology. Perceived usefulness and perceived ease-of-use are the two most vital individual attitudes about utilization of information technology, [10] Davis (1989). Perceived usefulness is the extent to which an individual beliefs that utilizing a particular system would improve his or her job performance". Perceived usefulness is grounded on the expectancy-value model from the Theory of Reasoned Action. Perceived ease-of-use is defined as "the degree to which an individual belief that utilizing a particular system would be free of effort. Perceived usefulness and perceived ease of use, lead to individual behavioral intention and actual usage behavior.

[10] Davis (1989) recommends that perceived usefulness is the strongest predictor of an individual's intention in the utilization of information technology.

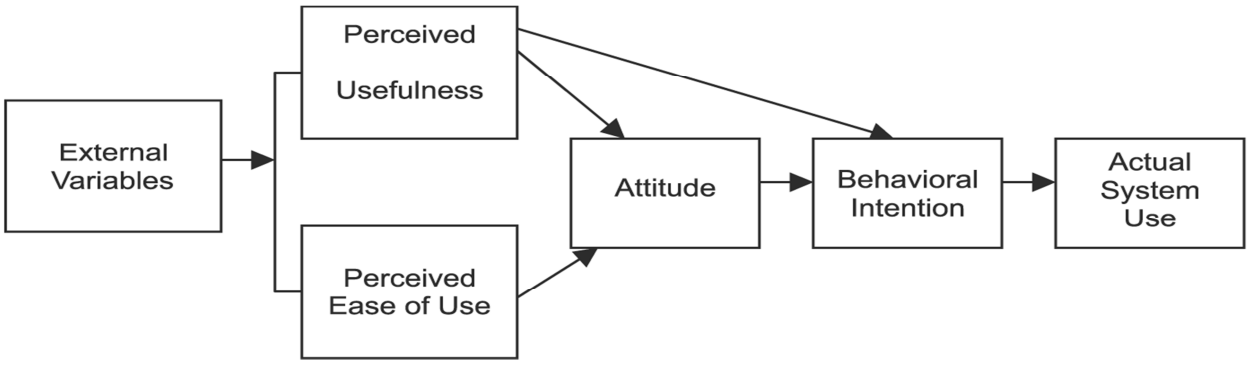

Fig. 1 Technology Acceptance Model (TAM)

Despite the significance of the TAM in studying individuals' intention to adopt a technology, from the literature review the model lacks enough data on technology adoption from the unique context of e- banking system, [24](Pan et al., 2010). The TAM in this research was, therefore, enriched with three additional constructs bringing the entire constructs to five. The constructs are Perceived usefulness (PU), Perceived Ease of Use (PEOU), Prior Internet Knowledge (PIK), Information on Electronic Banking (IEB) and Perceived Credibility (PC).

3.2 PERCEIVED USEFULNESS

Perceived usefulness is defined as the degree to which a person believes that using of a particular system would influence or enhance his/her job performance. From a theoretical standpoint, 10 Davis (1989) suggests that people intend to act before they actually act, and the perceived usefulness and attitudes towards the information technology are the main predictors of behavioral intention. Thus, we hypothesize that;

H1: *There is a positive relationship between perceived usefulness and behavioral intention in adopting e-banking.*

3.3 PERCEIVED EASE OF USE

[10] Davis (1989) defined perceived ease of use as the extent to which people believe that using certain system would be effortless. From a behavioral decision-making point of view, people usually try to minimize effort in their behavior [25](Igbaria and Iivari, 1995). [26]Venkatesh (2000) indicate that user would form early perceptions of perceived ease of use of a particular system based on their general beliefs about that system and its usages. [27]Porter and Donthu (2006) hypothesize that; users will avoid learning something new due to the perceived difficulty and risk associated with learning that thing. [28] Wang et al., (2003) and [29]Amin (2009) reported that perceived ease of use has a significant effect on behavioral and usage intention. Therefore, we hypothesize that;

H2: *There is a positive impact on perceived ease of use and behavioral intention to adopt electronic banking.*

3.4 PRIOR INTERNET KNOWLEDGE

Prior internet or computer knowledge is another determinant that influences customer's adoption of electronic banking. Therefore, customer's prior knowledge or understanding with technologies, in general, facilitates or change their attitude towards the adoption of e-banking. [30]Karjaluoto et al., (2002) showed that prior experience with computers and technologies and attitudes towards computers influence both attitudes towards online banking and actual behaviors. Consequently, the following hypothesis is proposed:

H3: *The prior internet knowledge has a positive effect on individual's behavioral intention on adoption of e-banking.*

3.5 INFORMATION ON ELECTRONIC BANKING

Bank customers usually require ample information before adapting to electronic banking or new services that are an important factor impacting e-banking adoption. An empirical study by [31]Sathye (1999), found that customers lacked information on the potentials, and disadvantages related to electronic banking. Information on the benefits of utilizing a product or service is as a key promotional strategy, [32](Peter, 1999). Therefore, in the adoption of electronic banking, it is important that banks and financial institutions offering e-banking provide adequate information to their customers on the advantages or potentials of the use of e-banking, [33] Hassan, (2011). Thus, we hypothesize that;

H4: *The appropriate information on electronic banking has an influence on customer's intention to adopt electronic banking.*

3.6 PERCEIVED CREDIBILITY

Several types of research on mobile banking have shown that most people are unwilling or not interested in utilizing mobile banking mostly because of perceived risk or perceived credibility [34] [35] [36] [37](Mahad & Mohtar 2015; Cheng et al. 2014; Wardhana, 2015; Lee, 2009). A study from [19] Luarn and Lin (2005) and Amin et al., (2008) empirically revealed that perceived credibility significantly affects individual's intention to use mobile banking. Perceived credibility has also been empirically supported and used in many Internet banking studies as discussed in [28] Wang et al., (2003), [29] Amin (2009), and [38]Yuen et al., (2011). This study uses perceived credibility to represent individual privacy, security, trust, and risk with regards to adoption of electronic banking. Hence, this study hypothesizes that;

H5: *There is a positive relationship between perceived credibility and individual's intention to adopt electronic banking*

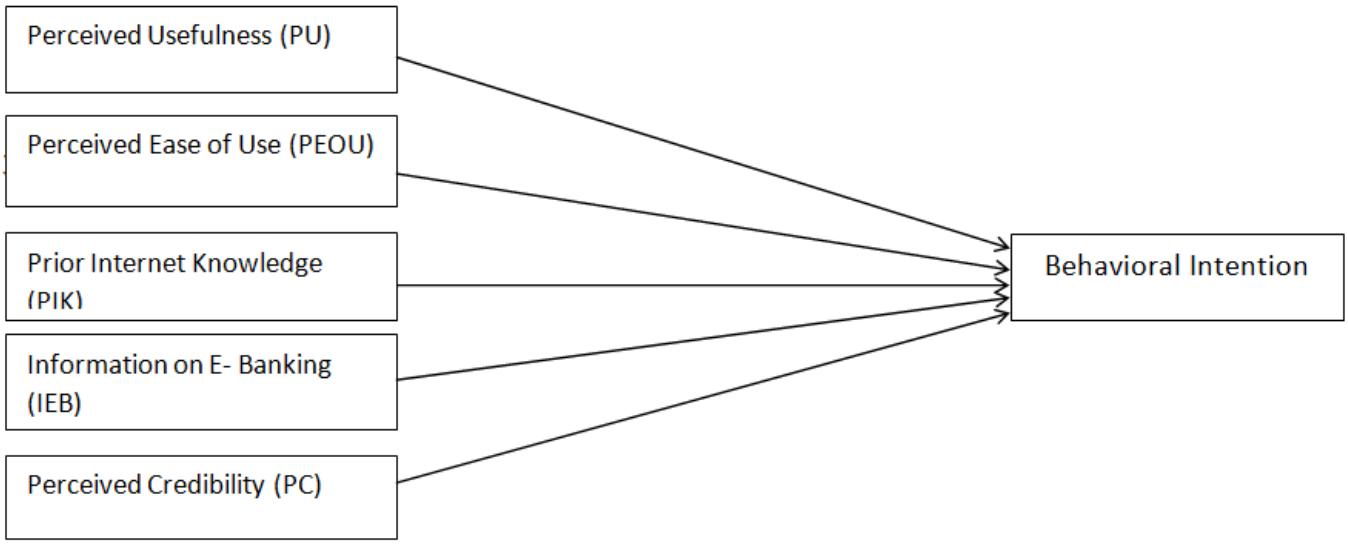

Fig. 2 Proposed Research Model

4 RESEARCH METHODOLOGY

Research questionnaire were randomly distributed among customers of various banks in Kumasi the second largest city of Ghana. Out of the 210 questionnaires distributed, 193 were fully completed representing a percentage of 91. An empirical examination was conducted with SPSS version [16] to statistically test the proposed research model and hypothesis with the use of data collected. Since the purpose of the study was to examine customers intention in adoption of e-banking, demographic characteristics were included in the questionnaire.

Table 2: Demographics of Respondents

Demographics	Frequency	%
Gender		
Male	108	56
Female	85	44
Age		
<29	53	28
30-39	60	31
40-49	41	21
>50	39	20
Occupation		
Public Servant	46	24
Civil Servant	72	37
Students	31	16
Self-Employed	40	21
Unemployed	4	2
Level of Education		
University Graduates	49	25
Professional Certificates	30	16
Higher National Diploma (HND)	41	21
Vocational &Technical Training	55	29
Senior High School and Below	18	9
Easy Access to Internet		
Yes	112	58
No	81	42
Computer Knowledge		
Yes	155	80
No	38	20
Awareness of Electronic Banking		
Yes	182	94
No	11	6

5 DATA ANALYSIS AND DISCUSSION

Demographics illustrates that male respondents were greater than female respondents with percentage of 56. More results were witnessed by the managers of age group 30-39. Civil servants dominated the respondents with 37 percent, 29 percent of the respondents were Vocational &Technical Training dominating the level of education. 58 percent of the respondents had easy access to internet whiles 80 percent had computer knowledge. 94 percent of the respondents were also aware of electronic banking.

5.1 DATA ANALYSIS TECHNIQUES

Statistical software: SPSS (statistical package for social sciences) was used for the analysis of the data collected for this study. Data analysis techniques used were Descriptive statistics, correlation and regression.

5.2 RELIABILITY AND VALIDITY

Reliability and validity were conducted to assess the internal consistency (Cronbach's alpha) and to test the reliability of each of the scales. All the measures included in the questionnaires showed the adequate reliability. The internal reliability of the measures ranged from 0.853 for the measure of perceived credibility (PC) to 0.774 for the measure of behavioral intention (BI). Table 3 reports the scales reliability statistics for the measures used, including mean, variance, standard deviation and Cronbach's alpha for each measure of the study. Overall the reliability of all question items is very good since Cronbach's Alpha values are above 0.70. This means that the higher the coefficient of reliability the higher internal consistency of the instruments.

Table 3: Reliability and Validity Statistics

	Mean	Variance	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha
PU	25.03	12.164	.600	.428	.814
PEOUS	25.96	12.137	.562	.356	.823
PIK	25.41	12.473	.650	.476	.804
IEB	25.48	12.454	.738	.605	.791
PC	25.58	13.351	.403	.232	.853
IB	25.35	11.270	.784	.649	.774

5.3 DESCRIPTIVE STATISTICS

Table 4 below illustrates some very significant descriptive statistics, including the mean, standard deviation, and confidence intervals for the dependent variables IB and its impact on the independent variables (PU, PEOU, PIK, IEB, and PC).

Table 4: Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
	Statistic	Statistic	Statistic	Statistic	Statistic
PU	193	4	7	5.53	.970
IEB	193	4	7	5.08	.786
PEOUS	193	2	7	4.60	1.019
PIK	193	4	7	5.15	.861
PC	193	2	7	4.98	.974
IB	193	4	7	5.21	.949
Valid N (listwise)	193				

5.4 CORRELATION

A correlation analysis was conducted on all the variables to test the relationship between them. This was tested by correlating five independent variables (PU, PEOU, PIK, IEB, and PC) with dependent variable (IB). Table 5 shows all positive figures suggesting that correlations are positive and significant at the 0.01 levels (2- tailed) between, perceived usefulness, perceived ease of use, prior internet knowledge, Information on electronic banking, perceived credibility, and behavioral intention to utilize electronic banking system.

Table 5: Correlations Analysis

		PU	PEOUS	PIK	IEB	PC	IB
PU	Pearson Correlation	1					
PEOUS	Pearson Correlation	.507**	1				
PIK	Pearson Correlation	.410**	.390**	1			
IEB	Pearson Correlation	.574**	.512**	.602**	1		
PC	Pearson Correlation	.218**	.228**	.446**	.320**	1	
IB	Pearson Correlation	.590**	.533**	.626**	.733**	.414**	1

***. Correlation is significant at the 0.01 level (2-tailed).*

5.5 REGRESSION

The regression is the intensity of relationships between the variables, to perform regression we add the means in the regression computation. Regression was done to test the hypothesis through the significant values of ANOVA and Coefficient Models. To accept the hypothesis, the values of significant level of ANOVA and Coefficient Model had to be $p < 0.05$ for each of the dependent and independent variables. Our value was 0.000; lying in the given range therefore our hypotheses were approved.

Table 6: Regression analysis; effect of independent variables on Behavioral Intention

Coefficients[a]						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-.548	.320		-1.714	.088
	PU	.183	.054	.187	3.360	.001
	PEOUS	.117	.050	.126	2.371	.019
	PIK	.226	.064	.205	3.533	.001
	IEB	.479	.075	.397	6.351	.000
	PC	.123	.047	.126	2.593	.010

a. Dependent Variable: IB

Table 7: Regression analysis (model summary)

Model Summary				
Model	R	R Square	Adjusted *R* Square	Std. Error of the Estimate
1	.806[a]	.649	.640	.569

a. Predictors: (Constant), PC, PU, PEOUS, PIK, IEB

Table 8: Regression analysis; variance caused by Market turbulence on firms performance (ANOVA)

ANOVA[b]						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	112.103	5	22.421	69.132	.000[a]
	Residual	60.647	187	.324		
	Total	172.750	192			

a. Predictors: (Constant), PC, PU, PEOUS, PIK, IEB

b. Dependent Variable: IB

In addition, to find the relationship of the dependent variable with five independent variables as well as hypothesis regression was run four times . Table 9 represents the estimates of the regression coefficients and values of variance (t) etc. As the values of *t* are above 2, and there is no negative sign, it shows that our hypotheses are accepted.

Table 9: Hypothesis Test for each independent variable

HYPOTHESES TESTING AND REMARKS							
Relationships/ Paths		R Square	Beta	t	Sig	Hypotheses	Remarks
PU--->BI	IV1 predicts DV	.348	.590	10.102	000	H1	Accepted
PEOU--->BI	IV2 predicts DV	.284	.533	8.700	000	H2	Accepted
PIK->BI	IV3 predicts DV	.392	.626	11.091	000	H3	Accepted
IEB-->BI	IV4 predicts DV	.537	.733	14.879	000	H4	Accepted
PC-BI	IV5 predicts DV	.171	.414	6.284	000	H5	Accepted

6 DISCUSSIONS

As mentioned earlier in this paper, the purpose of this study is to empirically investigate the influential determinants of customers' behavioral intention to adopt e-banking. Perceived usefulness, perceived ease of use and prior internet knowledge Information on electronic banking and perceived credibility were found to be statistically significant in predicting customer's intention to adopt electronic banking.

Among all the factors, Information on electronic banking was found to be the most significant with standardized coefficient β of .733 with a t value of 14.879, and a significant level of 000. These indicate that as Information of electronic banking increases by one unit, customers' behavioral intention to use e-banking is positively influenced by .733 units. In addition, prior internet knowledge was also accepted with standardized coefficient β of .626 with a t value of 11.091, and a significant level of 000. These indicate that as prior knowledge on internet increases by one unit, customers' behavioral intention to use e-banking is positively influenced by .626 units. Perceived usefulness was also accepted with standardized coefficient β of .590 with a *t* value of 10.102, at a significant level of 000. These indicate that as perceived usefulness of e-banking increases by one unit, customers' behavioral intention to use e-banking is positively influenced by .590 units. Furthermore, perceived eased of use was also accepted with standardized coefficient β of .533 with a *t* value of 8.700, at a significant level of 000. These indicate that as perceived ease of use on e-banking increases by one unit, behavioral intention of customers' to use e-banking is positively influenced by .533 units. Finally, perceived credibility was also accepted with standardized coefficient β of .414 with a *t* value of 6.284, and a significant level of 000. These indicate that as perceived credibility on internet increases by one unit, behavioral intention to use e-banking is positively influenced by .414 units. All these findings are in line with prior research which have been conducted in this area, [39] Luarn and Lin, 2005; [5] Riquelme and Rios, 2010; [40] Brown et al., 2003; [41] Cruz et al., 2010.

One of the interesting and different results in this study hinted the importance of availability of information on e-banking perceived as a critical factor influencing the acceptance. This calls for bankers to disseminate information of electronic banking services to its customers which is an important factor influencing the acceptance of electronic banking. Banks should therefore concentrate more on informative issues in their advertising rather than building only brands with less informative advertisements. Besides, increasing customer's awareness about e-banking usefulness and ease of use through advertizing can influence on enhancing the degree to which consumers use these services and how frequently they do it as well since there is highly level of prior knowledge of internet in the adoption of e-banking.

The results also indicated that despite e-banking system usefulness, convenient, and ease of use by customers, there is high level of perceived credibility in the security measures of e-banking technology and the capacity of e-banking systems in protecting customers' privacy. For that reason, advertising and personal promotion on e-banking should place much emphasizes on the trustworthiness and reliability of their websites, online banking and Automated Teller Machines (ATMs) in its messages as well as advertisement. It should point up the security features of the e-banking websites, and Automated Teller Machines (ATMs) that will enable customers to utilize it more securely.

7 CONCLUSION

This study was conducted to identify influential factors of customers' behavioral intention to adopt e-banking among banking customers in Kumasi, Ghana. The causal relationships among the variables that determine electronic banking services adoption were examined. The results indicated that the proposed model has good explanatory power and confirmed its robustness in predicting customers' behavioral intentions to use such services. The study demonstrated that online banking services adoption can be explained in terms of perceived usefulness, perceived ease of use, prior knowledge on the

use of internet, Information on e-banking and perceived credibility. The original framework used in this research is the Technology Acceptance Model, (TAM). The findings generally supported the hypotheses derived from the model as well as earlier empirical studies.

8 LIMITATION OF STUDY

In this research, there are some limitations which are foreseeable which are listed below;

Respondents were only selected from Kumasi, Ghana. They might not represent the entire Ghanaian banking customers. To get a more reliable representation, respondents should be gathered from all regional capitals in Ghana. This research managed responses from 193 banking customers. Their answers might not reflect the actual perceptions and opinions of Kumasi banking customers. A larger set of sample should be selected if more reliable results were to be obtained. Also, the views of the bankers were not taken into accounts in this study.

ACKNOWLEDGEMENT

Our foremost sincere gratitude goes to God Almighty for His guidance and protection throughout this study. Secondly, Prof. Yun-Fei Shao for her exemplary and constant guidelines in making this studies a success. Also, grateful for National Science Foundation of China under grant No. 71172095, with their research support. Deepest regards to the entire teaching and non-teaching bodies on University of Electronics Science and Technology of China for their immense academic support.

REFERENCES

[1] S. Laforet and X. Li, "Consumers' attitudes towards online and mobile banking in China", *Intl Jnl of Bank Marketing*, vol. 23, no. 5, pp. 362-380, 2005.

[2] T. Laukkanen, "Internet vs mobile banking: comparing customer value perceptions", *Business Process Mgmt Journal*, vol. 13, no. 6, pp. 788-797, 2007.

[3] M. Suoranta and M. Mattila, "Mobile banking and consumer behaviour: New insights into the diffusion pattern", *J Financ Serv Mark*, vol. 8, no. 4, pp. 354-366, 2004.

[4] R. AbdEl. Aziz, R. El Badrawy and M. Ismail Hussien, "ATM, Internet Banking and Mobile Banking Services in a Digital Environment: The Egyptian Banking Industry", *International Journal of Computer Applications*, vol. 90, no. 8, pp. 45-52, 2014.

[5] H. Riquelme and R. Rios, "The moderating effect of gender in the adoption of mobile banking", *Intl Jnl of Bank Marketing*, vol. 28, no. 5, pp. 328-341, 2010.

[6] Y. Shih and K. Fang, "Effects of network quality attributes on customer adoption intentions of Internet Banking", *Total Quality Management & Business Excellence*, vol. 17, no. 1, pp. 61-77, 2006.

[7] E. Turban, J. Lee, D. King and H.M. Chung, "Electronic Commerce: A Managerial Perspective", Prentice-Hall, Upper Saddle River, NJ, 2000.

[8] C. Lin, "Exploring the relationship between technology acceptance model and usability test", *Information Technology and Management*, vol. 14, no. 3, pp. 243-255, 2013.

[9] M. Fishbein, and I. Ajzen, "Belief, Attitudes, Intention and Behavior: An Introduction to Theory and Research", Reading MA: Addision-Wasely, 1975.

[10] F. Davis, "Perceived Usefulness, Perceived Ease of Use, and User Acceptance of Information Technology", *MIS Quarterly*, vol. 13, no. 3, p. 319, 1989.

[11] V. Venkatesh and F. Davis, "A Theoretical Extension of the Technology Acceptance Model: Four Longitudinal Field Studies", *Management Science*, vol. 46, no. 2, pp. 186-204, 2000.

[12] V. Venkatesh, M. G. Morris, G. B. Davis and F. D. Davis, "User acceptance of information technology: Toward a unified view," MIS Quarterly, Vol. 27, No. 3:425 478, 2003.

[13] F. D. Davis and P. R. Warshaw, "Extrinsic and Intrinsic Motivation to Use Computers in the Workplace," Journal of Applied Social Psychology (22:14), 1992, pp. 1111-1132.

[14] I. Ajzen, "The theory of planned behavior", *Organizational Behavior and Human Decision Processes*, vol. 50, no. 2, pp. 179-211, 1991.

[15] S. Taylor and P. A. Todd, "Understanding Information Technology Usage: A Test of Competing Models," Information Systems Research (6:4), 1995, pp. 144-176.

[16] R. L. Thompson, C. A. Higgins and J. M. Howell, "Personal Computing: Toward a Conceptual Model of Utilization," MIS Quarterly (15:1), 1991, pp. 125-143.

[17] E. M. Rogers, "Diffusion of Innovations (5th edition)", New York: Free Press, 2003.

[18] A. Bandura, "Social Foundations of Thought and Action: A Social Cognitive Theory", Prentice Hall, Englewood Cliffs, NJ, 1986.

[19] P. Luarn and H. Lin, "Toward an understanding of the behavioral intention to use mobile banking", *Computers in Human Behavior*, vol. 21, no. 6, pp. 873-891, 2005.

[20] I. Brown, Z. Cajee, D. Davies and S. Stroebel, "Cell phone banking: predictors of adoption in South Africa-an exploratory study", *International Journal of Information Management*, vol. 23, no. 5, pp. 381-394, 2003.

[21] J. Püschel, J. Afonso Mazzon and J. Mauro C. Hernandez, "Mobile banking: proposition of an integrated adoption intention framework", *Intl Jnl of Bank Marketing*, vol. 28, no. 5, pp. 389-409, 2010.

[22] P. Cruz, L. Barretto Filgueiras Neto, P. Muñoz-Gallego and T. Laukkanen, "Mobile banking rollout in emerging markets: evidence from Brazil", *Intl Jnl of Bank Marketing*, vol. 28, no. 5, pp. 342-371, 2010.

[23] T. Laukkanen and M. Pasanen, "Mobile banking innovators and early adopters: How they differ from other online users?", *J Financ Serv Mark*, vol. 13, no. 2, pp. 86-94, 2008.

[24] S. Pan and M. Jordan-Marsh, "Internet use intention and adoption among Chinese older adults: From the expanded technology acceptance model perspective", *Computers in Human Behavior*, vol. 26, no. 5, pp. 1111-1119, 2010.

[25] M. Igbaria, J. Iivari and H. Maragahh, "Why do individuals use computer technology? A Finnish case study", *Information & Management*, vol. 29, no. 5, pp. 227-238, 1995.
[26] V. Venkatesh, "Determinants of Perceived Ease of Use: Integrating Control, Intrinsic Motivation, and Emotion into the Technology Acceptance Model", *Information Systems Research*, vol. 11, no. 4, pp. 342-365, 2000.
[27] C. Porter and N. Donthu, "Using the technology acceptance model to explain how attitudes determine Internet usage: The role of perceived access barriers and demographics", *Journal of Business Research*, vol. 59, no. 9, pp. 999-1007, 2006.
[28] Y. S. Wang, Y. M. Wang, H. H. Lin and T. I. Tang, "Determinants of user acceptance of Internet banking: An empirical study", International Journal of Service Industry Management, 14,501–519, 2003.
[29] H. Amin, "An analysis of online banking usage intentions: an extension of the technology acceptance model", International Journal Business and Society,10(1), 27–40, 2009.
[30] H. Karjaluoto, M. Mattila and T. Pento, "Factors underlying attitude formation towards online banking in Finland", *Intl Jnl of Bank Marketing*, vol. 20, no. 6, pp. 261-272, 2002.
[31] M. Sathye, "Adoption of Internet banking by Australian consumers: an empirical investigation", *Intl Jnl of Bank Marketing*, vol. 17, no. 7, pp. 324-334, 1999.
[32] G. Peters, "Beyond strategy – benefits identification and management of specific IT investments", *J Inf Technol*, vol. 5, no. 4, pp. 205-214, 1990.
[33] H. Hassan Al-Tamimi, "The Use of Data Envelopment Analysis in Banking Institutions: Evidence from the UAE Commercial Banks", *SSRN Electronic Journal*, 2011.
[34] M. Mahad and S. Mohtar, "PERCEIVED RISK, INTENTION TO USE AND ACTUAL USE OF MOBILE BANKING IN MALAYSIA: AN EXTENDED DECOMPOSED THEORY OF PLANNED BEHAVIOR", *El Dinar*, vol. 3, no. 2, 2015.
[35] S. Cheng, S. Lee and K. Lee, "User Resistance of Mobile Banking in China: Focus on Perceived Risk", *IJSIA*, vol. 8, no. 2, pp. 167-172, 2014.
[36] M. Lee, "Factors influencing the adoption of internet banking: An integration of TAM and TPB with perceived risk and perceived benefit", *Electronic Commerce Research and Applications*, vol. 8, no. 3, pp. 130-141, 2009.
[37] A. Wardhana, "Pengaruh Kualitas Layanan Mobile Banking (M-Banking) Terhadap Kepuasan Nasabah di Indonesia", *DeReMa (Development Research of Management) Jurnal Manajemen*, vol. 10, no. 2, pp. 273-284, 2015.
[38] Y. Y. Yuen, P. H. P. Yeow, N. Lim, and N. Saylani, "Internet banking adoption: Comparing developed and developing countries," The Journal of Computer Information Systems, Vol. 51, No. 1:52-61, 2011.
[39] P. Luarn and H. Lin, "Toward an understanding of the behavioral intention to use mobile banking", *Computers in Human Behavior*, vol. 21, no. 6, pp. 873-891, 2005.
[40] I. Brown, Z. Cajee, D. Davies and S. Stroebel, "Cell phone banking: predictors of adoption in South Africa-an exploratory study", *International Journal of Information Management*, vol. 23, no. 5, pp. 381-394, 2003.
[41] P. Cruz, L. Barretto Filgueiras Neto, P. Muñoz-Gallego and T. Laukkanen, "Mobile banking rollout in emerging markets: evidence from Brazil", *Intl Jnl of Bank Marketing*, vol. 28, no. 5, pp. 342-371, 2010.