Association for Information Systems
AIS Electronic Library (AISeL)

AMCIS 2012 Proceedings | Proceedings

Cell Phone Banking: Revisiting Predictors of Adoption in South Africa

Felix Bankole
Information Systems, University of Cape Town, Cape Town, Western Cape, South Africa., felix.bankole@uct.ac.za

Omolola Bankole
Infromation Systems, University of Cape Town, Cape Town, Western Cape, South Africa., omolola.ola@uct.ac.za

Irwin Brown
Infromation Systems, University of Cape Town, Cape Town, Western Cape, South Africa., olu.bankole@gmail.com

Eric Cloete
Infromation Systems, University of Cape Town, Cape Town, Western Cape, South Africa., eric.cloete@uct.ac.za

Cell Phone Banking: Revisiting Predictors of Adoption in South Africa

Omolola Bankole
Information Systems Department
University of Cape Town
Omolola.Bankole@uct.ac.za

Felix Bankole
Information Systems Department
University of Cape Town
Felix.Bankole@uct.ac.za

Eric Cloete
Information Systems Department
University of Cape Town
Eric.Cloete@uct.ac.za

Irwin Brown
Information Systems Department
University of Cape Town
Irwin.Brown@uct.ac.za

ABSTRACT

South African cell phone users are increasingly turning their cell phones into platform for financial transactions. The penetration of cell phone banking has reportedly more than doubled in the past few years. This study provides an update to an earlier study conducted by Brown, Cajee, Davies and Stroebel (2003) on the predictors of cell phone banking adoption in South Africa. A cross-sectional survey was conducted among cell phone banking users that consisted of students, and workers from various fields of employment. A total of 220 responses were gathered from the sampled population of cell phone banking customers. The data were analysed through partial least squares with structural equation modeling, as well as regression splines. This article identifies the most important predictors influencing cell phone banking adoption in South Africa. The results show that utility expectancy and user satisfaction play a key determinant role in the adoption behaviour of users in South Africa.

Keywords

Cell phone Banking, South Africa, Adoption, Structural Equation Modeling (SEM).

INTRODUCTION

The past few years have witnessed tremendous growth in the number of cell phone subscribers in Africa, and especially South Africa which has one of the most sophisticated telecommunication infrastructures on the continent (Brown, Collins, Maleka, Morrison, Muganda, and Speight, 2007). This has led to growth in cell phone banking usage in South Africa where several financial institutions (e.g. Standard Bank, First National Bank, Ned Bank and ABSA) have since seized this opportunity by providing value added applications and services to users (banked and unbanked) through cell phone banking (Brown et al. 2003). Cell phone banking is an application of mobile commerce which enables cell phone users to perform financial operations (e.g. savings, funds transfer, and stock markets etc.) on cell phones at any convenient time and place (Gupta, 2005; Amin, 2008).

One of the earliest academic studies on cell phone banking in South Africa was conducted by Brown et al. (2003) in 2002. We extend the work of Brown et al. (2003) in several ways. Firstly we draw from more recent research to develop an updated theoretical model concerning cell phone banking adoption. In order to analyze data we employ more sophisticated techniques beyond the ordinary linear regression method used by Brown et al. (2003). This study employs a two-phased approach. Data is analyzed utilizing partial least square (PLS) with structural equation modeling, then the factor scores computed through PLS analysis are used to develop a regression splines (RS) model.

The rest of the article is organized as follows: Section two discusses the conceptual model. Section three outlines the data collection procedures. In section four, the research methodology and data analysis are presented while section five provides the discussion. Section six presents conclusion, limitations and possible future research.

CONCEPTUAL MODEL

The conceptual model utilized in this article was derived from various studies on technology adoption, namely Brown et al. (2003), Zhou, Lu, and Wang (2010), Min, Ji and Qu (2008), Srite and Karahanna (2006), Carlsson, Carlsson, Hyvönen, Puhakainen and Walden (2006), Veiga, Floyd and Dechant. (2001), Brown and Jayakody (2008); Gu, Lee and Suh (2009), Luo, Li, Zhang and Shim (2010), Cody-Allen and Kishore (2006), and Brown, Licker and Kashora (2010). Factors identified as possible influences on cell phone banking adoption include trust and privacy, convenience and cost, user satisfaction, utility expectancy and effort expectancy. A conceptual model was formulated and hypotheses were developed.

Description of the Concepts

Trust and Privacy: Trust is an important factor in adoption and usage of cell phone banking. It plays a role in determining the outcomes of m-commerce use (Li and Yeh, 2010). Trust guarantees that users have confidence in m-commerce services (Gu et al., 2009; Li and Yeh, 2010).

Convenience and Cost: The cost of technology is relevant to the level of usage and adoption in developing countries (Musa, Meso and Mbarika, 2005). This is most significant when the technology is for use by individuals. A cell phone is a personal device in which the cost of its maintenance is an important factor for its usage (Min et al., 2008).

User Satisfaction: User satisfaction is an essential factor for determining usage behaviour in Information Systems (IS) (Delone and McLean, 2003). It reflects the user's attitude towards the IS and the convenience of and/or enjoyment obtained from using a technology (Min et al., 2008). The user satisfaction construct is often included in mobile commerce and electronic commerce research (Brown et al. 2010).

Social Factors: Social Factors reflect the degree to which a user feels significant others believe a technology should be used. These influences may arise from friends, family or superiors and may affect the final adoption of a technology (Venkatesh, Morris, Davis and Davis, 2003; Agarwal, Rastogi and Mehrotra, 2009). Social factors have been found to be significant in influencing intentions to adopt a technology (Teo and Pok, 2003, Srite and Karahanna, 2006).

Effort Expectancy (Ease of Use): Effort expectancy is the perceived effortlessness of using a technology (Agarwal et al., 2009). Effort expectancy is related to concepts such as ease of use, complexity and perceived ease of use (Wu, Tao and Yang, 2008).

Utility Expectancy (Usefulness): Utility expectancy is related to concepts such as performance expectancy and perceived usefulness in technology adoption. Utility expectancy reflects the benefits derived from the use of an m-commerce application such as cell phone banking (Min et al., 2008).

Hypotheses Development

Trust and Behavioural Intention

There is a significant relationship between trust and privacy, and adoption of mobile commerce applications (Bhattacherjee, 2002 cited by Min et al., 2008). Where there is a lack of trust in a technology it will not be adopted. The ensuing hypothesis is:

H_1: Trust and privacy positively influence behavioural intention to use cell phone banking services.

Trust and Utility Expectancy

Trust contributes to the utility expectancy of an IT system (Brown and Jayakody, 2008; Gu et al., 2009; Luo et al., 2010).

H_2: Trust positively influences utility expectancy of cell phone banking.

Trust and User Satisfaction

Trust enhances satisfaction with a system (Brown and Jayakody, 2008). Thus the following hypotheses:

H_3: Trust positively influences user satisfaction with cell phone banking.

Effort Expectancy and Utility Expectancy

In circumstances when users feel that cell phone banking is easy to use and does not require much effort they will have high expectations of acquiring the expected performance (Zhou et al., 2010). Therefore we hypothesize that:

H_4: Effort expectancy positively influences utility expectancy for cell phone banking.

Effort Expectancy and User Satisfaction

It is believed the higher the user's perception of the technology's ease of use, the higher the user satisfaction, towards a technology, (Min et al., 2008). Therefore, the hypothesis supported is:

H_5: Effort expectancy positively influences user satisfaction towards cell phone banking.

Effort Expectancy and Behavioural Intention

Cell phone banking allows users to make convenient payments and reduces the time and effort invested in banking. Effort expectancy significantly affects user adoption of cell phone banking (Carlsson et al., 2006; Zhou et al., 2010). Hence the hypothesis:

H_6: Effort expectancy (perceive ease of use) positively influences behavioural intention to use cell phone banking.

Utility Expectancy and User Satisfaction

The higher the user's perceptions of utility expectancy, the higher the user satisfaction derived from the use of technology (Min et al., 2008). Thus, the hypothesis:

H_7: Utility expectancy positively influences user satisfaction towards cell phone banking.

Utility Expectancy and Behavioural Intention

When a user perceives that mobile banking provides fast, convenient, anytime and anywhere transactions, it improves derived satisfaction and performance. Therefore the user adopts mobile banking services (Carlsson et al., 2006; Zhou et al., 2010). Thus, the hypothesis:

H_8: Utility expectancy positively influences behavioural intention to use cell phone banking.

User Satisfaction and Behavioural Intention

User satisfaction is a determinant of the intention to use e-commerce systems (Bhattacherjee, 2001). Therefore the influence of the satisfaction derived will affect the behavioural intention to use cell phone banking. Hence, the hypothesis:

H_9: User satisfaction positively influences behavioural intention to use cell phone banking.

Social Factors and Behavioural Intention

The influence of social factors such as the opinions of friends, relatives and superiors will affect a user's intention to adopt and use mobile banking services (Carlsson et al., 2006; Lopez-Nicolas et al., 2008; Hong et al., 2008 cited by Zhou et al. 2010). This hypothesis follows:

H_{10}: Social factors positively influence behavioural intention to use cell phone banking.

Cost and Behavioural Intention

Cost directly affects adoption of mobile commerce applications. Where the costs are low, it will encourage greater usage of the service (Min et al., 2008). Thus we hypothesize:

H_{11}: Lower cost positively influence the intention to use cell phone banking.

Behavioural Intention and User Behaviour

Behavioural intention has a positive direct effect on usage of mobile devices (Carlsson et al., 2006). Thus the hypothesis is:

H_{12}: Behavioural intention positively influence usage of cell phone banking.

RESEARCH METHODOLOGY

A cross-sectional survey through a judgmental sampling procedure was conducted for cell phone banking customers in South Africa. A deductive approach was used, as implied by the formulation of hypotheses in the previous section.

Data Collection

A survey questionnaire was used to collect data. Measurement items were modified from relevant studies such as Venkatesh et al. (2003), Marchewka, Liu and Kostiwa. (2007), Brown & Jayakody (2008) and Gu et al. (2009). Some of the constructs adapted from the Min et al. (2008) study were not operationalised and validated. Therefore, measurement items were formulated for such constructs from other similar test items in the literature. For instance, utility expectancy was related to performance expectancy and perceived usefulness. A four-item instrument was used to assess the dependent variable of usage. The survey instrument was validated through a pilot study. Questionnaire details can be found in Appendix A.

The questionnaires were sent to targeted groups by post and e-mail. Data were gathered in 2010 from 220 participants consisting of students and workers from varied fields in South Africa. The formulated research model incorporated from widely accepted studies was tested through structural equation modeling (PLS) and regression splines.

Sample Demographics

The gender distribution of the responses showed 40% were from female participants while 60% were male. The largest age group in the data sample was 21-25 year –olds, who made up 48% of the sample. Participants younger than 20 years of age were few, as a result of the condition on the questionnaire which specified that participants must have a functional bank account, monthly income and be subscribed to cell phone banking services. The demographic profile is displayed in Table 1. The distribution by occupation consisted of 56% students and 44% workers from diverse fields of employment.

Cell Phone Services Usage

Cell phone banking services available in South Africa include accounting services, financial information display, and other services such as purchase of SMS bundles and air ticket payments. Accounting services consist of money transfers, insurance policy transactions, third party payments, and cheque book ordering, etc. while financial information services are items such as bank statement requests, SMS transactions, and balance enquiries among others.

The usage of these services was widely distributed. Of the sample gathered, 37.7% used money transfer, 42.8% used third party payments, 5.5% used insurance policy services, 5.5% used order cheque book transactions and 7.3 % ordering new PIN. SMS alert services for account transactions were used by 94.5% of the sample and SMS alerts of entry into online banking by a total of 86.8%. Balance enquiries were used by 69.2% of respondents, and statement requests by 83.2%. 38% of the sample used exchange and interest rate services, while 72% used product information facilities. Cell phone banking services such as cell phone airtime top-up were widely used (65.9%). Also frequently used, were services such as purchasing

SMS and data bundles (81.8% and 85.9% of respondents respectively). Other cell phone banking services mentioned by respondents included purchase of MXit (a free instant messaging application popular amongst the youth and young adults) products/services (e.g., 58.2 % of participants indicated they purchased "Moola" – a MXit virtual currency). The cell phone banking usage profile is shown in Table 2. The level and diversity of usage in 2010 shows a big increase over the status in South Africa in 2002 – Brown et al. (2003) reported that less than 6% of respondents in their study claimed to have used cell phone banking (Brown et al., 2003).

	Frequency	Percent
Gender		
Male	132	60.0
Female	88	40.0
Age		
Under 20	2	1.0
21-25	106	48.0
26-30	49	22.0
31-35	33	15.0
36-40	15	7.0
41-45	8	4.0
46-50	3	1.0
51+	4	2.0
Monthly net income		
<R5000	93	42.0
R5001-R10000	39	18.0
R10001-R15000	27	12.0
R15001-R20000	29	13.0
R20001-R25000	20	9.0
>R25000	12	6.0
Occupation		
Student	123	56.0
Employed	97	44.0

Table 1. Demographic Profile

	Percent
Accounting Usage	
Money transfer	37.7
Third party payment	42.8
Order new PIN	7.3
Order cheque book	7.3
Insurance Policies	5.5
Financial Information	
Balance enquiries	69.2
Statement request	83.2
SMS (Account transactions)	82.2
SMS(Online entry)	86.8
Exchange and Interest Rates	38.0
Product Information	72.0
Other Cell phone Banking Services	
SMS bundles	81.8
Data bundles	85.9
Cell Phone top up	65.9
MXit (e.g. Moola purchase)	58.2

Table 2. Cell Phone Banking Services Usage Profile

MODEL DEVELOPMENT

Firstly we identified the reflective and formative constructs in our model to prevent misspecification in the construct development as described by Ronald and Robyn (2007). Second, the structural equation with partial least square was computed with data using Warp PLS (Version 3.0) and the model fit was assessed. It is recommended that the p values for both the average path coefficient (APC) and average R-squared (ARS) ARS be lower than 0.05, while average variance inflation factor (AVIF) be lower than 5 (Kock, 2010). The p values were, for APC <0.001, ARS < 0.001 and AVIF <5.

Reliability and construct validity were analysed to determine the consistency and regularity of the survey questions. For construct validity, confirmatory factor analysis was employed. Items that loaded as expected on their respective factors with no cross-loading were retained, others were dropped. All refined factors showed a clean loading. The Cronbach alpha was used to test for reliability. The reliability test was applied to each of the validated multiple-item constructs. Alpha coefficients greater than 0.7 indicated solid reliability. The internal consistency of the constructs was confirmed to be satisfactory. Factor scores for all the constructs were used to compute the regression splines analysis. The results of PLS analysis are presented in Figure 1.

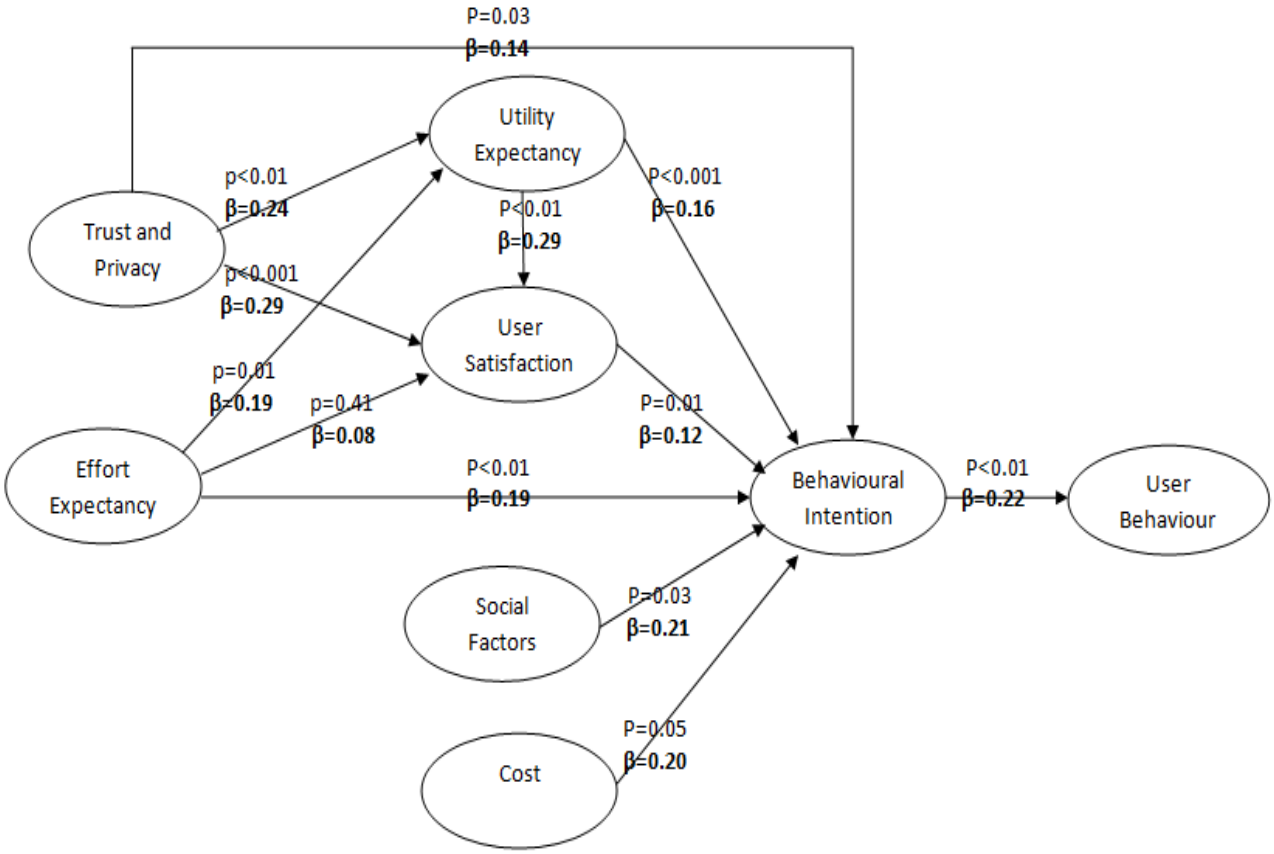

Figure 1. Conceptual Model (PLS Path Coefficients)

FINDINGS

From PLS results in Figure 1 above, the hypotheses are returned as significant at $p<0.05$ and highly significant at $p<0.01$ There was support for eleven out of the twelve hypotheses formulated as follows:

Supported Hypotheses

H_1: Trust and Privacy positively influence behavioural intention to use cell phone banking. Trust and privacy were found to have a coefficient of 0.14 with behavioural intention at $p<0.05$. This supports the positive relationship that was hypothesised between these two factors.

H_2: Trust and Privacy positively influence Utility Expectancy of cell phone banking. Trust and Privacy (TP) had a positive relationship with Utility Expectancy at 0.24, $p<0.01$.

H_3: Trust and Privacy positively influence User Satisfaction derived from cell phone banking. Trust and Privacy have a positive relationship with User Satisfaction, at 0.29 $p<0.001$.

H_4: Effort Expectancy positively influences Utility Expectancy. Effort expectancy shows a positive relationship with Utility Expectancy at 0.19, $p<0.01$.

H_6: Effort Expectancy positively influences Behavioural Intention to use cell phone banking. Effort Expectancy shows a positive correlation with Behavioural Intention at 0.19, $p<0.01$.

H_7: Utility Expectancy positively influences User Satisfaction derived from using cell phone banking. Utility Expectancy shows a statistically significant relationship with User Satisfaction at 0.29, $p< 0.01$.

H_8: Utility Expectancy positively influences Behavioural Intention to use cell phone banking. Utility Expectancy shows a positive relationship with Behavioural Intention at 0.16, $p<0.001$.

H_9: User Satisfaction positively influences Behavioural Intention to use cell phone banking. User Satisfaction shows a positively significant relationship with Behavioural Intention at 0.12, $p<0.01$.

H_{10}: Social Factors positively influence Behavioural Intention to use cell phone banking. Social Factors have a positive and significant relationship with Behavioural Intention at 0.21, $p<0.05$.

H_{11}: Low Cost positively influences Behavioural Intention to use cell phone banking. Cost has a positive and significant relationship with Behavioural Intention at 0.20, $p<0.05$.

H_{12}: Behavioural Intention positively influences Usage of cell phone banking services. Behavioural Intention has a positive and significant relationship with Usage at 0.22, $p<0.01$.

Rejected Hypotheses

H_5: Effort expectancy (perceived ease of use positively influences User Satisfaction towards cell phone banking services.

Relative Importance of Factors

To identify which of the factors is the most important predictor of cell phone banking usage, we used factors scores generated from PLS to compute a regression splines (RS) model (utilizing Salford System's MARS software 6.6). Since there are mediators and independent variables in the PLS model, we generate multiple MARS models, one for each mediator and independent variable. RS provide the means for determining the order of importance of the constructs in the generated predictive model. This is represented in the form of a construct importance vector (See Table 3) whereby the most important construct in the model is assigned a relative score of 100%, and each construct that was not established to be a predictor is assigned a score of 0% (See Appendix B).

Constructs	Impact of TP and EE on UE	Impact of TP, EE and UE on US	Impact of TP, EE, UE, US, SF, CC on BI	Impact of BI on UB
Trust and Privacy (TP)	**100.00**	94.57	15.15	
Effort Expectancy (EE)	**100.00**	**56.41**	43.82	
Utility Expectancy (UE)		**100.00**	**100.00**	
User Satisfaction (US)			72.43	
Social Factor (SF)			59.02	
Cost/ Convenience (CC)			47.70	
Behavioural Intention (BI)				**100.00**

Table 3. Relative Importance of Constructs

Table 3 shows the relative importance of constructs. With regards to predictors of UE, *TP* and *EE* are the most important predictors while for US; it is *UE* that is the most important predictor. However, *TP* also weights heavily at 94.57%. An examination of the results in this table suggests that *UE* is the most important predictor (with 100%) of user intention (BI) to

adopt cell phone banking, followed by *US* with 72.43% importance. SF, CC, EE and TP weigh in at 59.02%, 47.70%, 43.82% and 15.15% respectively.

DISCUSION

This research is an update and extension of a previous study conducted by Brown et al. (2003). It explains user adoption of cell phone banking services by formulating a revised conceptual model. The model is used to explain cell phone banking adoption in South Africa. This study shows that the use of cell phone banking has been widely adopted in South Africa (See Table 2). Most of the hypothesized associations developed from the literature, were supported.

Trust and privacy and effort expectancy are majors factors influencing utility expectancy. These two constructs weigh in at 100% importance as predictors of utility expectancy. Trust and privacy, and utility expectancy had significant relationships with user satisfaction. The results shows utility expectancy (100% importance) is the most important predictor of user satisfaction with cell phone banking, followed by trust and privacy (94.5%). No significant relationship was found between effort expectancy and user satisfaction. It may be that, as experience with cell phone banking grows, effort expectancy reduces in importance to such an extent that it is no longer an important consideration in determining levels of satisfaction with cell phone banking.

Trust and privacy, effort expectancy, utility expectancy, user satisfaction, social factors, cost and convenience were found to have significant relationships with behavioural intention to use cell phone banking. These findings are consistent with most of the previous research on cell phone banking. Careful examination of the relative importance constructs shows that utility expectancy (100%) is the most important predictor of user intention to adopt cell phone banking in South Africa. This shows that users consider the advantages of using cell phone banking use such as speed, convenience, anytime and anywhere transactions when deciding whether to use cell phone banking or not.

CONCLUSION

There has been a rapid increase in the growth of cell phone banking services in South Africa. In the Brown et al. (2003) study, less than 6% of respondents claimed to have used cell phone banking. In this study, for some services (e.g. SMS notification services, bank statement requests), more than 80% of respondents claimed to have used them. This research presents updated information on the factors that influence cell phone banking in South Africa. The results provide support for the conceptual model developed from literature. Several studies in this domain have employed ordinary regression analysis. This research used multiple analytical techniques which offer additional useful insights.

Eleven out of the twelve hypotheses tested provided statistically significant results. The results of regression splines analysis suggest that utility expectancy and user satisfaction are the most important predictors of intentions to use cell phone banking in South Africa. This is consistent with the Brown et al. (2003) study where relative advantage (similar utility expectancy in the current study) was one of the determinants of cell phone banking adoption.

The major limitation of this study is that the selected participants represent only a fraction of cell phone banking users. Furthermore the profile of respondents was skewed towards persons with income less than R 5,000, and younger than 25 years. Possible future research could address these shortcomings. Comparative studies between several countries could also be conducted.

REFERENCES

1. Agarwal, R., Rastogi, S. and Mehrotra, A. (2009). Customers' Perspectives Regarding E-banking in an Emerging Economy, *Journal of Retailing and Consumer Services*, 16, 5, 340-351.
2. Amin, H. (2008). Factors Affecting the Intentions of Customers in Malaysia to use Mobile Phone Credit Cards. *Management Research News*. 31, 7, 493-503.
3. Bhattacherjee, A. (2001). An Empirical Analysis of the Antecedents of Electronic Ecommerce Service Continuance. *Decision Support Systems*, 32, 2, 201-214.
4. Brown, I., & Jayakody, R. (2008). B2C E-Commerce Success: A Test and Validation of a Revised Conceptual Model. *Electronic Journal Information Systems Evaluation*, 11, 3, 167-184.

5. Brown, I., Cajee, Z., Davies, D., & Stroebel, S. (2003). Cell Phone Banking Predictors of Adoption in South Africa – An Exploratory Study, *International Journal of Information Management*, 23, 3, 381-393.
6. Brown, I., Collins, T., Maleka, B., Morrison, D., Muganda, N., & Speight, H. (2007). Global Diffusion of the Internet X: Internet Diffusion and Its Determinants in South Africa: The First Decade of Democracy (1994-2004) and Beyond. *Communications of the Association Information Systems*, 19, 17, 142-182.
7. Brown, I., Licker, P., & Kashora, K. (2010). Customer Satisfaction with Cell Phone Banking in South Africa, *Americas Conference on Information Systems (AMCIS), 2010 Proceedings*. Paper 444. http://aisel.aisnet.org/amcis2010/444
8. Carlsson, C., Carlsson, J., Hyvönen, K., Puhakainen, J., & Walden, P. (2006). *Adoption of Mobile Devices/Services – Searching for Answers with the UTAUT.* Paper Presented at the 39th Hawaii International Conference on System Sciences, Hawaii, USA, January 3-6.
9. Cody-Allen, E., & Kishore, R. (2006). An Extension of the UTAUT Model with E-Quality, Trust, and Satisfaction Constructs. *Paper Presented at the 2006 ACM SIGMIS CPR Conference on Computer Personnel Research*, Claremont, California, USA. Retrieved June 26, 2009, from The ACM Digital Library.
10. Delone W.H. & McLean, E.R. (2003). The DeLone and McLean Model of Information Systems Success: A Ten-Year Update, *Journal of Management Information Systems*, 19, 4, 9-30.
11. Gu, J., Lee, S., & Suh, Y. (2009) Determinants of Behavioural Intention to Use Mobile Banking, *Expert Systems with Applications*, 36, 1, 11605-11616.
12. Gupta, P. (2005) Web Services: An Enabler for Mobile Banking. *An Intellect White Paper*. http://www.prdomain.com/upload/100/10032034.pdf
13. Kock, N. (2010). *Warp PLS 1.0 User Manual*. ScriptWarp Systems, Laredo, Texas. USA.
14. Li, Y., & Yeh, Y. (2010). Increasing Trust in Mobile Commerce through Design Aesthetics, *Computers in Human Behaviour*, 26, 4, 673-684.
15. Luo, X., Li., H., Zhang., J & Shim, J.P (2010). Examining Multi-dimensional Trust and Multi-faceted Risk in Initial Acceptance of Emerging Technologies: An Empirical Study of Mobile Banking Services, *Decision Support Systems*, 49, 2, 222-234.
16. Marchewka, J. T., Liu, C., & Kostiwa, K. (2007). An Application of the UTAUT Model for Understanding Student Perceptions Using Course Management Software. *Communications of the IIMA*, 7, 2, 93-103.
17. Min, Q., Ji, S., & Qu, G. (2008). Mobile Commerce User Acceptance Study in China: A Revised UTAUT Model, *Tsinghua Science and Technology*, 13, 3, 257-264.
18. Musa, P., Meso, P. and Mbarika, V. (2005). Toward Sustainable Adoption of Technologies for Human Development in Sub-Saharan Africa: Precursors, Diagnostics, and Prescription, *Communications of the AIS*, 15, 33.
19. Ronald, F., & Robyn, L. (2007). An assessment of Formative and Reflective Constructs in IS Research. *ECIS Proceedings*. Paper 171 http://aisel.aisnet.org/ecis2007/171.
20. Srite, M., & Karahanna, E. (2006). The Role of Espoused National Cultural Values in Technology Acceptance. *MIS Quarterly*, 30, 3, 670-704.
21. Teo, T.S.H., & Pok, S.H. (2003) Adoption of WAP-Enabled Mobile Phones among Internet Users, *Omega: the International Journal of Management Science*, 31,6, 483– 498.
22. Veiga, J. F., Floyd, S., & Dechant, K. (2001). Towards Modelling the Effects of National Culture on It Implementation and Acceptance. *Journal of Information Technology*, 16, 1, 145-158.
23. Venkatesh, V., Morris, M.G., Davis G.B., & Davis, F.D. (2003) User Acceptance of Information Technology: Toward a unified view, *MIS Quarterly*, 27, 3, 425-478.
24. Wu, Y. L., Tao, Y. H., & Yang, P. C. (2008). The Use of Unified Theory of Acceptance and Use of Technology to confer the Behavioural Model of 3G Mobile Telecommunication Users. *Journal of Statistics & Management Systems*, 11, 5, 919–949.
25. Zhou, T., Lu, Y., & Wang, B. (2010) Integrating TTF and UTAUT to Explain Mobile Banking User Adoption, *Computers in Human Behaviour*, 26, 4, 760-767.

APPENDIX A – TECHNOLOGY ACCEPTANCE ITEMS

1 = Strongly agree; 2 = Agree; 3 = Somewhat agree; 4 = Not applicable; 5 = Somewhat disagree; 6 = Disagree; 7 = Strongly disagree	
1	[US1] Mobile banking services are very reliable and easy to use
2	[US2] I derive pleasure from using mobile banking services because I can use it anytime and anywhere
3	[US3] I like using mobile banking because it provides me with accurate and timely information on my account
4	[US4] I am content with using mobile banking services
5	[TP1] I believe my mobile service provider adheres to a set of rules which protects my bank details
6	[TP2] I believe my mobile service provider is competent and trustworthy
7	[TP3] I believe my personal and bank information are well protected by my mobile service provider
8	[TP4] I believe privacy is assured with my mobile service provider
9	[UE1] I find using mobile banking to be very flexible and comfortable to use
10	[UE2] Mobile banking helps me in attaining personal satisfaction
11	[UE3] I derive utmost enjoyment in using mobile banking services
12	[EE1] It is easy for me to develop the skill I need to use mobile banking services
13	[EE2] I find mobile banking easy to use
14	[SF1] My bank provides mobile banking applications
21	[SF2] My bank has been very supportive of mobile banking
22	[SF3] My bank encourages me to use mobile banking services
23	[CC1] I consider mobile banking services to be expensive
24	[CC2] I am willing to pay more for my mobile banking services
25	[BI1] I intend to use mobile banking in the next 7 days
26	[BI2] I predict I will use mobile banking in the next 7 days
27	[BI3] I plan to use mobile banking in the next 7 days
28	[UB1] I use mobile banking to manage my account
29	[UB2] I use mobile banking in my everyday life
30	[UB3] I use some of the mobile banking services because I have need for them
31	[UB4] I strongly recommend others to use mobile banking

APPENDIX B - RELATIVE IMPORTANCE CONSTRUCTS

Relative Variable Importance

Variable	Importance	-gcv
UE	100.00000	1.01034
US	72.43664	0.97319
SF	59.02351	0.95940
CC	47.70202	0.94996
EE	43.82017	0.94718
IP	15.15569	0.93397

Final Model (After Backward Stepwise Elimination)

Basis Fun	Coefficient	Variable	Parent	Knot
0	-0.31467			
1	0.22081	BI		-1.42500

Piecewise Linear GCV = 1.00384, #efprms = 6.33333

ANOVA Decomposition on 1 Basis Functions

fun	std. dev.	-gcv	#bsfns	#efprms	variable
1	0.22029	1.00451	1	5.33333	BI

Piecewise Cubic Fit on 1 Basis Functions, GCV = 1.00384

Relative Variable Importance

Variable	Importance	-gcv
BI	100.00000	1.00451

****
*** General SEM analysis results ***
****

Model fit indices and P values

APC=0.188, P=<0.001
ARS=0.161, P=<0.001
AVIF=1.078, Good if < 5
General model elements

Algorithm used in the analysis: Warp3 PLS regression
Resampling method used in the analysis: Bootstrapping
Number of data resamples used: 100
Number of cases (rows) in model data: 220
Number of latent variables in model: 8
Number of indicators used in model: 8
Number of iterations to obtain estimates: 2