

Factors Influencing the Short Message Service (SMS) Mobile Banking Adoption: A Users' Perspective in the West Nile Region in Uganda

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Abstract

The purpose of the study was to investigate empirically which factors contribute to the adoption of Short Message Service (SMS) banking in the West Nile region in Uganda based on student mobile users who own bank accounts. Respondents were drawn from 3 University Campuses in the West Nile region in Uganda where students and mobile users who own bank accounts were identified. Through purposeful sampling, a self-administered questionnaire was administered to a sample of 90 graduate students from the three selected University Campuses with 60 questionnaires returned hence a response rate of 70%. Quantitative statistics that includes means, frequencies and percentages were used to analyze the data. The results reveal that there is strong positive relationship between financial cost, quality of Internet connectivity, complexity and trialability as far as SMS banking adoption is concerned. Age and gender also played a significant influence in SMS banking at different categories of students. Whereas perceived ease of use, security and trust influence were not significant for SMS banking adoption. Consequently, the study conclude that in order to increase adoptability of SMS banking, banks in liaison with telecom service providers, are advised to improve on the Internet connectivity and affordability to support usage of mobile money platform.

Keywords: Short Message Service (SMS) mobile Banking, Adoption factors, Users Perspective, and West Nile Region

1. Introduction

The purpose of this research is to investigate empirically which factors contribute to the adoption of Short Message Service (SMS) banking in the West Nile region of Uganda based on student mobile users who also own bank accounts. Akhund (2013), Archana (2012), Howcroft, Hamilton and Hewer (2002), Karnouskos (2004), Mallat (2007), Al-shaban and Burney (2001) among others cited that over the years, banking has transcended from a traditional brick and mortar model of customers queuing for services in the banks to modern day banking where banks can be reached at any point for services.

Now with the emerging rapid developments in network technology, banks are undergoing unprecedented and global changes. The technology report by USAID (2012) observe that today, the populaces who have never before been able to access basic financial services can now use Short Message Service (SMS) banking to store value directly on their cell phone, and use this electronic value to receive and send money to their friends and family, pay bills, and even purchase products. Consequently the usage of mobile phones as a means of accessing SMS banking services has been driven by the growing number of low income earners who own cellular phones, the pre-paid billing system sensitive to users' incomes and improving technology. SMS banking, also in some instances referred to as Online Banking, Mobile Banking or M-Banking is the delivery of banking and financial services ranging from stock market transactions, management of bank accounts and accessing customized information via telecom devices (Tiwari and Buse, 2007).

Ondiege (2012) argues that the high growth and penetration rates of mobile telephony in Africa is providing opportunities for countries on the continent to increase affordable and cost effective means of bringing on board the large numbers of the population that has been excluded from formal financial services for decades. Whereas Sentosa *et al.*, (2012) asserted that the growing phenomenon in financial services is as a result of the usage of the SMS banking as a new marketing channel for financial services the traditional banking business has also been significantly, and inevitably, impacted by the rapid technological development (Nor *et al.*, 2012).

2.0 SMS Banking in Uganda and Mobile Phone Usage

The growth rate of mobile telephony in Uganda is exceptional given that it started in 1996 while commercial banking operations date back to the 1950's. In fact, over the past decade, more people in Uganda have gained access to mobile phones than to banking services (Ssonko, 2010). The low financial services penetration compared with the exponential growth of mobile telephony in Uganda is creating a unique niche for SMS banking to develop on the continent (Ondiege, 2008).

The Uganda Bureau of Statistics (UBOS) 2012 statistical results reveal that information and communications

technology (ICT) innovations have revolutionized the financial sector in Uganda resulting in novel delivery channels for financial products and services such as automated teller machines (ATMs), cell phone banking, personal computer (PC) banking and Internet banking. These developments are at par with the traditional banking services in other countries especially in the use of SMS Banking and Mobile Banking services to the extent that the SMS banking service is being used by all the commercial banks in Uganda.

The business models in Uganda follow the Smart Money of Smart Communications of the Philippines where a telecommunication company collaborates with a commercial bank to offer mobile money services (MMS) (Ndiwalana and Popov, 2008). In Uganda, this business model is dominated by the mobile operators, regulated by the Uganda Communications Commission (UCC) that do most of the marketing as well as opening up and maintaining accounts for the subscribers who choose to register for the MMS. Currently, there are five major mobile network operators (MNOs) in Uganda: MTN Uganda, Orange Uganda, Uganda Telecom (UTL), Warid Telecom and Airtel Uganda. By the end 2012, MTN Uganda alone had 7.7 million subscribers across all five MNOs; and the subscriber base has been steadily increasing to MNOs who offer m-money services with over 15 million mobile users by end of 2011 (UCC Report) representing a 26% coverage given Uganda's population of 32 million people (Mulira, 2009). Intermediate report (2012) indicated that there appears to be a great deal of potential for reaching bottom-of-the-pyramid (BOP) populations in Uganda because the majority of surveyed households even those below the poverty line and the unbanked have access to at least one mobile phone and own at least one active SIM card. SMS usage grew by 28% in first quarter 2010 to about 176 million messages (compared to 138 million in fourth quarter 2009) as MNOs encourage use through campaigns and innovative services. To comply with financial services regulation, the MNOs have partnered with commercial banks in Uganda supervised by Bank of Uganda (Uganda Government, 2009). On the other hand, as at December 2009, the number of bank accounts in the country was estimated at slightly over 5 million representing a 16 percent penetration.

2.1 Benefits of SMS mobile banking

SMS banking has been regarded by recent researchers and scholars alike as a powerful weapon to deliver savings services to the billions of people worldwide who have a cell or mobile phone without bank account (s). The phone device and wireless connectivity bring the Internet terminal into the hands of unbanked customers (Ondiege, 2013 and UCC, 2013). Consequently, SMS banking brought banks and mobile phone service providers together introducing resourceful methods of bringing the unserved populations into the formal economy using mobile phones (Ondiege, 2010). Mobile phones have a number of uses over traditional banking methods because it breaks down geographical constraints, immediacy, security and reducing the costs of financial transactions in service delivery; serves as a virtual bank card where customer and bank information can be securely stored, point of sale (POS) terminal, and Internet bank terminal, thereby avoiding the cost of distributing cards to customers (Lassaad *et al.*, 2012). SMS banking can also support banks to retain their existing customers, improve customer satisfaction, increase banks' market share, reduce administrative and operational cost and more importantly improve banks' competitive positions (Khalfan *et al.*, 2006; Almogbil, 2005).

2.2 Research objectives and question

Despite all the uses of SMS banking, it is yet to gain acceptance on a wide scale, especially in the developing world and adoption level is marginally insignificant (Amin, 2007; Luarn and Lin, 2005), hence, the need to understand the factors influencing the adoption of SMS banking services. More so, the level of acceptance and adoption of SMS banking usage intention by the customers is unknown and there are also limited publications exploring the factors that capture the acceptance and adoption of SMS mobile banking from the perspectives of prospective customers in the context of a developing country like Uganda and West Nile in particular. This paper focuses on West Nile region with a diverse immigrant population and nationalities especially from Eastern Democratic Republic of Congo (DRC) and South Sudan which makes it a fascinating and unique study.

Samaneh and Maryam (2012) also pointed that in the contemporary world, in spite of the significant impacts of SMS banking on customer's behavior, there are limited researches in customer relationship management of SMS banking. Recent research that studies SMS and Mobile Banking have focused on investigating the adoption factors of Mobile Banking in Malaysia (Abdulkadir *et al.*, 2013); the application of Technology Acceptance Model (TAM) in Mobile Banking adoption in Kenya, Lule I, Omwansa T, and Waaema, (2012) and SMS Based Secure Mobile Banking in India Manoj V, Bramhe, (2011) among others like (Suoranta and Mattial, 2004; Laforest and Li 2005; Riivari, 2005). Others include; Riquelme and Rios (2010); Koenig-Lewis *et al.*, (2010); and Puschel *et al.*, (2010) who integrated the TAM, TPB, and IDT to investigate main factors influencing mobile banking adoption.

However, the main objective of this paper is to investigate the factors that contribute the adoption of SMS Banking in the West Nile region of Uganda by answering the question: what are the contributing factors that affect the adoption of SMS Banking? It is hoped that the findings of the study will add to the body of knowledge in the technology adoption literature, particularly SMS banking and provide practical guidance to commercials

banks in how to tailor technology-related products to the young population.

The remainder of this paper is organized into five sections. In the following section “theoretical background / conceptual foundations and hypotheses”, earlier research relevant to the research question is assessed and hypotheses are formulated. The third section “research methodology” describes the detailed research approach, the collection of data via a quantitative survey, as well as the analysis approach taken. The fourth section “results discussion” presents the descriptive statistics and non-parametric employed for analysis, as well as discussing findings and interpretations. The fifth and last section "conclusions and suggestions for further research" relates these findings to the overall research question and suggests next research steps.

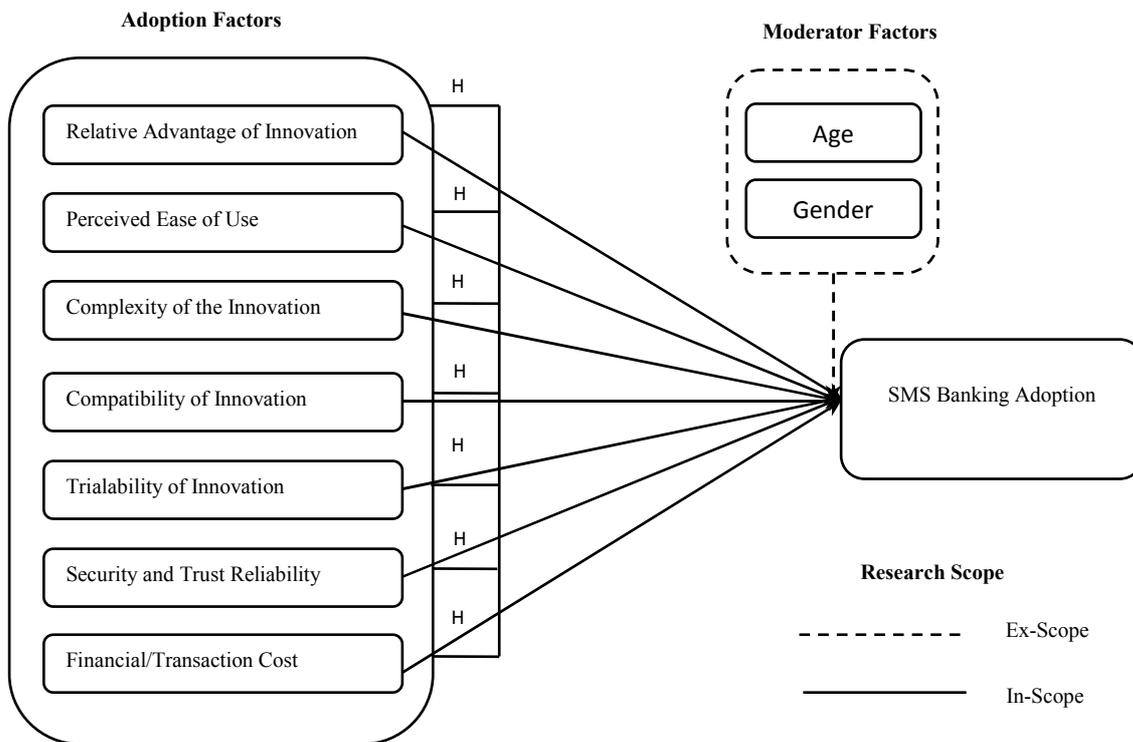
3.0 Review of Literature

Theoretical background / Conceptual Foundations and Hypotheses Development

3.1. Theoretical background / Conceptual Foundations

Congruent with Hoehle and Huff (2009); Hamza *et al.*, (2011) agreed that the considerable amount of research on mobile finance services has emerged with the majority of these studies, applying research models and frameworks traditionally used within the literature. Among the different models that have been proposed, in the field of IT adoption and usage, the frameworks dominating literature are such as the Technology Acceptance Model (TAM) by (Davies, 1989) adapted from the Theory of Reasoned Action (TRA) (Ajzen and Fishbein, 1980), appears to be the most widely accepted among information systems researchers.

Others include the Technology-Organizational-Environment (TOE) framework, Innovation Diffusion Theory (IDT), and the Unified Theory of Acceptance and Use of Technology (UTAUT) model.



Adapted from TAM (Davis, 1989) and Diffusion of Innovation theory (Rogers, 1983). Other constructs also included.

The present study employs a model based on constructs from Diffusion of Innovation (DOI) and Technology Acceptance Model (TAM) to investigate and validate the dominant factors influencing the adoption of SMS banking in University Campuses in the West Nile region in Uganda. Other variables applicable to this study were also included.

The Diffusion of Innovation (DOI) theory propagated by (Rogers, 1995) has been a popular theoretical basis for researchers investigating the adoption of IT in organizations (Rai, 1995; Grover, 1993; Grover and Goslar, 1993; Huff and Munro, 1985; Zmud, 1982, 1984). Perceptions about innovation characteristics have important influences on adoption decision (Agarwal and Prasad, 1997). According to this theory there are five technological characteristics that affect adoption including relative advantage, complexity, compatibility,

observability, and trialability. Furthermore, DOI seeks to explain how, why and at what rate new ideas proliferate through culture. According to Rogers (1995) diffusion is a process in which innovation is communicated through certain channels over time within a social system. As such, based on time, diffusion theory classifies organizations into five (5) groups of technology or innovation adopters relative to other organizations. Organizations can either be innovators, early majority, late majority or laggards (Rogers, 1995). On the other hand, Davis (1989) included two constructs, perceived usefulness and perceived ease of use. Usefulness and ease of use are both believed to be important factors in determining acceptance and use of information systems (Igbaria, 1993; Keil, Beranek and Konsynski, 1995; and Lu and Gustafson, 1994). Venkatesh and Davis (2000) introduced such social and organisational factors as subjective norms, impression, quality of output and work relevance into the TAM model and proposed the so-called extended TAM model (TAM2). Wu and Wang (2005) combined TAM2 and innovation diffusion theory (IDT) by Rogers (1995), in a study focused on investigating the drivers of mobile commerce. The PU and PEOU constructs from the TAM2 model were combined with perceived risk and cost constructs. From the IDT the compatibility constructs were added to the research model (Wu and Wang, 2005).

3.2. SMS Banking Hypotheses Development

3.2.1. Relative Advantage of Innovation

Relative advantage of the technology has been consistently identified as one of the most critical adoption factors (Iacovou *et al.*, 1995; Kuan and Chow, 2000). Low and Chen (2011) define relative advantage as a degree to which a technological factor is perceived as providing great benefit to an organization by serving its purpose. It's considered to be similar to what the Technology Acceptance Model (TAM) calls perceived usefulness. Comline (2008) refers to perceived usefulness as the benefits or the efficiencies that will be enabled through the use of the system. When perceived benefit or relative advantage of SMS banking is high, there are higher chances that the organization will allocate more managerial, financial and technological resources to implement the innovation. Agarwal and Prasad (1998) demonstrate that the advantage an innovation has relative to other innovations is positively related to its rate of adoption. It is therefore possible to suggest that the advantages that SMS banking offers over other banking methods would affect its rate of adoption. Among these advantages are anytime and anywhere banking that is convenient, since banking customers can access their accounts using cell phones and SMS banking. Thus, we hypothesized that:

- H1: Relative advantage or perceived usefulness of the innovation will have a positive significant influence on the adoption of SMS banking.

3.2.2. Perceived Ease of Use (PEOU) of Innovation

The degree to which an individual believes that using a particular system would be free from physical and mental efforts. Davis (1989) defines Perceived ease of use (PEOU) as the degree to which the person believes that using the system will be free of effort (Davis, 1989). TAM has been extensively tested and validated and is a widely accepted model, which can be modified or extended using other theories or constructs (Taylor & Todd, 1995; Davis & Venkatesh, 2000; Wu & Wang, 2005; Luarn & Lin, 2005; Zhang, Gou & Cheng, 2008; Yen, Wu, Cheng & Huang, 2010). The ease of use and accessibility has positive impact towards SMS banking services (Poon, 2008). Ease of use is the factor that contributed to the acceptance of the SMS banking services among customers and as well as with other factors such as enjoyment, information on SMS banking and quality of the Internet connection (Pikkarainen *et al.*, (2004); Wang *et al.*, (2003); Sathye (1999). According to Venkatesh (2000), the perception of use is an important determinant of user's intention to use something that related to the Internet applications. Based on Eriksson *et al.*, (2005) "ease of use" is one of the main determinants of factor that contribute to the popularity of usage. They reviewed the ease of use as one of the determinants variable one should not neglect its relationship with technology anxiety. Thus:

- H2: PEOU of the innovation will have a positive significant influence on the adoption of SMS banking.

3.2.3. Complexity of Innovation

Complexity refers to the degree of difficulty users' encounter in understanding or using an innovation (Rogers, 2003) and (Jianyuan and Zhaofang, 2009). With the surging importance of SMS banking though with a rather new experience in developing countries, customers might not have assurance in implementing it. Jianyuan and Zhaofang (2009), in their study on adoption of B2B E-Marketplace in China, indicate that the complexity of an IT system has a negative correlation with the final adoption of the system. Thus, the complexity of an IT system can be seen as having a negative impact in adopting innovation (Low and Cheng, 2011). The level of difficulty of using an innovation is inversely related to its adoption (Meuter *et al.*, 2005; Taylor & Todd, 1995). Consequently, the greater the perceived complexity of conducting banking through SMS banking, the less likely its adoption will be. Thus, we hypothesized that:

- H3: Complexity of the innovation will have a negative significant influence on the adoption of SMS banking.

3.2.4. Compatibility of Innovation

Rogers (1995) defines compatibility as the degree to which innovation is consistent with the adopter's current

culture, lifestyle, values, needs, processes and technological requirements. The lack of compatibility had led many organizations to doubt the potential of the innovation in relation to their current environment (Jianyuan and Zhaofang, 2009). As a result, those who feel banking through phones and SMS banking in particular is compatible with their lifestyle would more likely adopt SMS banking. Hence, the following hypothesis:

- H4: Compatibility of the innovation will have a positive significant influence on the SMS banking.

3.2.5. Trialability of Innovation

Potential adopters of a new technology who are allowed to experiment first will feel comfortable with the technology, and thus are more likely to adopt it (Agarwal & Prasad, 1998; Tan & Teo, 2000). Thus, the adoption of cell phone banking is more likely if the technology is demonstrated to the user or if it can be used on a trial basis first.

- H5: Trialability of the innovation will have a positive significant influence on the SMS banking.

3.2.6. Security and Trust Reliability

One of the major influencing factors around the establishment and use of new technologies for financial transactions is that of security and trust (Brown et al., 2003; Pienaar, 2010). The need for security of personal details and financial information is therefore critical to the success of SMS banking. According to Dixit (2010), the number of SMS banking users increased dramatically, but they still do not trust with the e-commerce security. Despite of effort and assurance provided by the government but still those involved such as business operators were still skeptical about the use of SMS banking as being part of their banking transaction (Norudin, Mansor and Ahmad Faisal Abidin, 2010). Ganesan and Vivekanandan (2009) described the challenges in terms of security and trusts become the main issue with using the public network to perform transactions. Based on Poon (2008), privacy and security are key issues in discontent with the use of SMS banking. Some of the risks associated with SMS banking in general, are the possibility of losing money to fraud. As a result, the lower the perception of risk involved in using cell phone banking, the more likely that it will be adopted.

- H6: The lower the perception of risk associated with an innovation, the more likely an innovation for this case SMS banking will be adopted.

3.2.7. Financial/Transaction Cost

Cost effectiveness is one construct discovered not addressed by many studies when considering technology adoption factor. All the studies such as Wu and Subramaniam (2009); Jianyuan and Zhaofang (2009); Oliveira and Martins (2011); (Low and Cheng, 2011) and (Chong and Ooi, 2008), do not include cost effectiveness as one of the constructs. However, only a study conducted by Ross (2010) has cost effectiveness as one of the constructs. King and Gribbins, (2002) stress that adoption of technology may require resources that are way beyond individual control and therefore it is of the utmost importance that researchers investigate the decisions made by those in a position to influence technology adoption. Therefore, we hypothesized that:

- H7: The financial or transaction cost of innovation will have a positive significant influence on the adoption of SMS banking.

3.2.8. Age as a Moderator

Various studies have looked at the effects of demographics on new technology and innovation adoption. Venkatesh *et al.*, (2003) with their UTAUT proposed four moderators of gender, age, experience, and voluntariness. However, in this study we consider only gender and age as our moderators since the majority of respondents are either already using SMS banking or potential customers with low/no income at all. Of the mobile banking adoption literature, some research indicated typical users of electronic banking were relatively young (Joshua and Koshy, 2011) or discovered that the elderly had more resistances to change and negative attitude toward using mobile banking services (Laukkanen *et al.*, 2007). However, certain studies found that respondents aged 50 or over were mostly eager to use mobile banking services (Suoranta and Mattila, 2004). Typical mobile banking users were aged between 30 and 49 (Laukkanen and Pasanen, 2008), and middle-aged or older customers were the main users of electronic banking (Laforet and Li, 2005; Dasgupta *et al.*, 2011). Cruz *et al.*, (2010) investigated 3585 respondents in Brazil and claimed that older people perceived mobile banking as more difficult to use than younger people did. Puschel *et al.*, (2010) observed that typical users of mobile banking were less than 30 years old having collecting 666 respondents in Brazil. Based on these inconsistent results, this study also ascertains the moderating effect of age and posits that:

- H8: The influence of relative advantage of SMS mobile banking services on individual intention will be moderated by age.
- H9: The influence of perceived ease of use (PEOU) of SMS mobile banking services on individual intention will be moderated by age.
- H10: The influence of perceived complexity of SMS mobile banking services on individual intention will be moderated by age.
- H11: The influence of perceived compatibility of SMS mobile banking services on individual intention will be moderated by age.

- H12: The influence of perceived trialability of SMS mobile banking services on individual behavior will be moderated by age.
- H13: The influence of perceived security and trust reliability of SMS mobile banking services on individual behavior will be moderated by age.
- H14: The influence of perceived financial/transaction cost of SMS mobile banking services on individual behavior will be moderated by age.

3.2.9. Gender as a Moderator

Prior studies reveal a stronger proportion of perceived usefulness of mobile services among men than among women (Nysveen *et al.*, 2005). The reason is men appear more task-oriented than women and electronic banking services are typically motivated by goal achievement (Cruz *et al.*, 2010). Additionally, many empirical studies have revealed the statistical difference between female and male respondents in the mobile service/banking setting. For example, women perceive more risk in an online purchase than men do (Garbarino and Strahilevitz, 2004), peer opinions have a higher effect on females in mobile services (Nysveen *et al.*, 2005), men are more likely to use mobile banking than women are (Laukkanen & Pasanen, 2008; Koenig-Lewis, 2010), and men are more concerned on the cost of Internet access and service fees than women are when using mobile banking services (Cruz *et al.*, 2010).

By using gender as a moderating variable in an extended TAM, Riquelme and Rios (2010) sampled 681 respondents in Singapore and found that the influence of social norm on intention to adopt and perceived ease-of-use on the perception of perceived usefulness were stronger among women than men. In contrast, Puschel *et al.*, (2010) collected 666 respondents in Brazil and discovered that mobile banking users were predominantly males. Likewise, through gathering 553 respondents in India, Joshua and Koshy (2011) observed that men might use electronic banking services more than women would. As a result of yet another contrasting and inconsistent result we hypothesize:

- H15: The influence of relative advantage of SMS mobile banking services on individual intention will be moderated by gender.
- H16: The influence of perceived ease of use (PEOU) of SMS mobile banking services on individual intention will be moderated by gender.
- H17: The influence of perceived complexity of SMS mobile banking services on individual intention will be moderated by gender.
- H18: The influence of perceived compatibility of SMS mobile banking services on individual intention will be moderated by gender.
- H19: The influence of perceived trialability of SMS mobile banking services on individual behavior will be moderated by gender.
- H20: The influence of perceived security and trust reliability of SMS mobile banking services on individual behavior will be moderated by gender.
- H21: The influence of perceived financial/transaction cost of SMS mobile banking services on individual behavior will be moderated by gender.

4.0 Research Methodology

4.1. Research Design

The study used cross-sectional survey research design derived from the school of thought for Social science research based on appropriate approach to draw inferences concerning causal relations among the variables under investigations depends on the phenomena. The researcher also employed descriptive research methods for statistical analysis and interpretation.

4.2. Study Population, Sampling Procedure and Sample Size

The study population consisted of post-graduate students, who are also SMS banking users in the West Nile region University campuses chosen for the study. Students were chosen because of their unique characters in acquiring skills and knowledge towards changing their attitudes to cope up with the modern world environment (Mugenda, 2008). Students tend to socialize and discover new trends in technological developments in pursuit of knowledge and skills via social events in the world of new era of technology to exploit it during their training in the universities. Purposive sampling was used to select 106 students; and close and open ended self-completion questionnaire was used for quantitative data. Adoption of SMS Banking was measured using the use of available services like payment, transfers, and mobile money. Customers' perspectives were measured using perceived usefulness, barriers, speed, security and privacy, ease of use and user acceptance and attitudes

4.3. Data Analysis

The data was coded and entered using SPSS (version 16) for inter-variable testing and data errors were corrected to ensure accuracy and consistency. Descriptive statistics were used to check for errors and missing values adjusted using regression. Factor analysis and correlational statistics were used to test for construct validity,

sample adequacy using Eigen Values. The regression model was used to determine the relationship of the tested hypothesis under the study to arrive at the predictions and assumptions. The researchers carried this in order to achieve consistency to the requirements of using analysis models for predictive testing and determine the causal relations using statistical data. After analysis of the variables, testing hypothesis and generating the correlation and regression coefficients. Finally, data interpretation was done to arrive at hypothetical analysis and causal relations of the variables.

5.0 Results and discussion

5.1 Introduction

This presents the descriptive statistics and non-parametric tests employed for analysis, as well as discussion on findings and interpretations.

Analysis of demographic characteristics

The analysis shows that age and educational level influence the SMS banking adoption factors while gender contributes less to the adoption factors of SMS banking in Uganda. The findings also indicate that the higher the level of education, the higher the adoption of SMS banking and the early age tend to adopt SMS banking than at the later age. Similarly, gender contributes less to SMS banking adoption in the West Nile region. The results agree with the studies of Lule *et al.*, (2012) on the application of technology model (TAM) and Riquelme and Rios (2010), Puschel *et al.*, (2010) on the age and gender as determinant factors.

Table 1: Descriptive analysis for Demographic Characteristics

Demographic Characteristics	N	Mean		Std. Deviation
	Statistic	Statistic	Std. Error	Statistic
Age	60	2.28	0.109	0.846
Gender of respondent	60	1.52	0.065	0.504
Education level of respondent	60	2.68	0.115	0.892

Analysis of factors influencing SMS banking adoption

The financial costs had more influence in SMS banking adoption followed by Internet connection/quality of Internet services, perceived ease to use of SMS banking, perceived usefulness of SMS banking and lastly security/trust. This implies that in order to have more people to adopt SMS banking, financial costs must be considered appropriately when introducing any new product and services to the customers. The results concurred with the studies of Davis (1989) and Ajzen and Fishbein (1980) on acceptance and usage of SMS banking in the modern literature.

Table 2: Descriptive Analysis for Factors influencing SMS Banking Adoption

Factors influencing SMS Banking Adoption	N	Mean		Std. Deviation
	Statistic	Statistic	Std. Error	Statistic
Perceived usefulness of SMS banking	60	1.46	0.047	0.3635
Perceived ease to use of SMS Banking	60	1.41	0.0575	0.4465
Security/Trust	60	1.16	0.044	0.3445
Internet connection/Quality of internet services	60	1.33	0.06	0.463
Financial costs	60	1.535	0.0645	0.4985

Analysis of SMS banking innovations

The study found that complexity and trailability play an important role in SMS banking innovations, followed by observability, compatibility and relative advantage. This implies that customers who consider complexity and trailability are more likely to adopt SMS banking than those who rely on relative advantage and compatibility. The results were also agreeable with Rogers (1995) who developed a popular theoretical basis of banking innovations and also Agarwal and Prasad (1997) who stated that the perceptions about innovation characteristics have important influences on adoption decisions.

Table 3: Descriptive analysis for SMS Banking Innovations

SMS Banking Innovation	N	Mean		Std. Deviation
	Statistic	Statistic	Std. Error	Statistic
Relative advantage	60	1.08	0.036	0.279
Compatibility	60	1.18	0.05	0.39
Complexity	60	1.28	0.059	0.454
Trialability	60	1.28	0.059	0.454
Observability	60	1.25	0.056	0.437

5.2 SMS Banking Adoption Factors

The findings of the study indicate that H1, H3, and H5 showed a weak negative relationship towards SMS banking adoption, implying that they were not influencing factors of the SMS banking. In line with the study, H7, H2 and H6 showed strong positive relationships in SMS banking adoption, implying that they were

considered to be the key drivers of SMS banking adoption by the customers who have enjoyed the products and services provided. Table 4 below shows positive figures (H7, H2, H6 and H4) suggesting that correlations are positive and significant at the 0.01 level between customers' attitude towards financial or transaction cost, perception of risk associated, compatibility, perceived ease of use (PEOU) and also table 4 shows negative figures (H1, H3, and H5) suggesting that correlations are negative and significant at the 0.01 level between customer attitudes towards relative advantage or perceived usefulness, complexity, trialability and intention to use SMS banking system. Poon (2008) concurred with the results that the ease of use and accessibility has positive impact towards SMS banking services among customers and as well as other factors. Jianyuan and Zhaofang (2009) and Low and Cheng (2011) also concurred with the result that complexity can have negative impact and correlation in adopting innovations. Dixit (2010) and Poon (2008) adds that customers' privacy and security were still key issues in discontent with the use of SMS banking.

Table 4: Correlation Analysis of Hypothesis (H1-H7)

	SMS Banking	H1	H2	H3	H4	H5	H6	H7
Pearson Correlation	1	-0.116	0.511**	-0.135	0.066	-0.002	0.495**	0.665**
Sig. (2-tailed)		0.377	0.000	0.302	0.614	0.989	0.000	0.000

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

5.3 Age

The findings of the study indicates that H8, H10, H11, H12, and H13 showed a relative positive relationships towards age, implying that age contributes to the adoption factors of the SMS banking in those hypotheses. In line with the study, H9 and H14 showed relative negative relationships in age, implying that age was not considered to be the key drivers of SMS banking adoption. Table 5 below shows positive figures (H8, H10, H11, and H13) suggesting that correlations are positive and significant at the 0.05 level and also table 4 shows negative figures (H9 and H14) suggesting that correlations are negative and significant at the 0.05 level. The studies of Joshua and Koshy (2011), Laukkanen *et al.*, (2007), Laforet and Li (2005), Dasgupta *et al.*, (2011), Cruz *et al.*, (2010), and Pushel *et al.*, (2010) concluded that the users of SMS banking were relatively young, elderly had more resistance to change and negative attitude toward using mobile banking services, middle aged or older customers were the main users of SMS banking. That mobile banking main users were not necessarily young highly educated and older people perceived mobile banking as more difficult to use than younger people did and also typical users of mobile banking were less than 30 years old.

Table 5: Correlation analysis of Age as a moderating factor with Hypothesis (H8-H14)

	Age	H8	H9	H10	H11	H12	H13	H14
Pearson Correlation	1	0.258*	-0.067	0.096	0.045	0.140	0.135	-0.258*
Sig. (2-tailed)		0.047	0.613	0.464	0.731	0.285	0.303	0.047

*. Correlation is significant at the 0.05 level (2-tailed)

5.4 Gender

The findings of the study indicates that H17, H18, H19, and H20 showed a weak and relative negative relationships towards gender, implying that gender did not play a significant role in influencing the adoption of the SMS banking. Similarly, H15, H16 and H21 showed relative positive relationships in gender, implying that gender affected SMS banking adoption. Table 4 below shows positive figures (H15, H16 and H21) suggesting that correlations are positive and significant at the 0.05 level and also table 4 shows negative figures (H17, H18, H19 and H20) suggesting that correlations are negative. The empirical studies of Nysveen *et al.*, (2005), Cruz *et al.*, (2010), Garbarino and strahilevitz (2004), Laukkanen and Pasanen (2008), Koenig-lewis (2010), Riquelme and Rios (2010), Puschel *et al.*, (2010) and Joshua and Koshy (2011) also found that usefulness of mobile services among men than women, and men also appear more task-oriented than women. The difference between male and female respondents in the mobile service/banking setting; that is, women perceive more risk in an online purchase than men do. In addition, men are more likely to use mobile banking than women, and are also more concerned on the cost of Internet access and service fees than women when using mobile banking services.

Table 6: Correlation analysis of gender as a moderating factor with Hypothesis (H15-H21)

	Gender	H15	H16	H17	H18	H19	H20	H21
Pearson Correlation	1	0.050	0.100	-0.058	-0.317*	-0.132	-0.302*	0.139
Sig. (2-tailed)		0.703	0.448	0.660	0.013	0.315	0.019	0.290

*. Correlation is significant at the 0.05 level (2-tailed).

5.5 Regression models

5.5.1 SMS banking adoption factors

The table 7 indicates that the factors of SMS banking adoption explain both a negative and positive variance of 5% and 13% indicating that not all factors were relevant to influence the adoption rate by the customers of SMS banking in West Nile region. On the contrary, it is also clear that the differing opinions of the respondent's exhibit low penetration of SMS banking based on their perceptions to use SMS banking.

Table 7: Regression analysis of factors of SMS banking adoption

	H1	H2	H3	H4	H5	H6	H7
Unstandardized Coefficients	-0.582	1.257	-0.416	0.237	-0.005	1.288	1.307
Standardized Coefficients	-0.116	0.511	-0.135	0.066	-0.002	0.495	0.665
T	-0.891	4.527	-1.041	0.507	-0.014	4.338	6.779
Sig.	0.377	0.000	0.302	0.614	0.989	0.000	0.000
R Square	0.013	0.261	0.018	0.004	0.000	0.245	0.442
Adjusted R square	-.004	.248	-.001	-.013	-.017	.232	.432

a. Dependent Variable: Factors influencing SMS Banking Adoption

5.5.2 Age

The results seem to suggest that age is one of the contributing factors that influence SMS banking adoption of customers. The model in the table 7 suggests that the variation in SMS banking adoption (dependent variable) that is explained by (independent variables) age is shown by the range of values of Adjusted R square (from $-0.008 \times 100 = -0.8\%$ to $0.050 \times 100 = 5\%$). Still in table 7 below the coefficient (standard coefficient beta) show that the independent variable examined in the study (age), appears to have contributed in explaining the variation in the dependent variable (factors influencing the SMS banking adoption) i.e. from -0.258 to 0.258 with varying significant levels. This finding clearly indicates that the innovators of SMS banking technology should pay attention to the age of the population due to changing needs of the young population.

Table 8: Regression analysis of age

	H8	H9	H10	H11	H12	H13	H14
Unstandardized Coefficients	0.085	-0.045	0.052	0.021	0.075	0.086	-0.217
Standardized Coefficients	0.258	-0.067	0.096	0.045	0.140	0.135	-0.258
T	2.031	-0.508	0.737	0.346	1.080	1.039	-2.033
Sig.	0.047	0.613	0.464	0.731	0.285	0.303	0.047
R Square	0.066	0.004	0.009	0.002	0.020	0.018	0.067
Adjusted R square	.050	-.013	-.008	-.015	.003	.001	.050

a. Age is the moderating factor

5.5.3 Gender

The results as shown in table 8 below, indicates therefore that there is a relative positive or negative relationship between gender and factors influencing SMS banking adoption. This seems to suggest that gender either contributes negatively or positively to influence SMS banking adoption of customers depending on the age bracket. The model in the table 8 suggests that the variation in SMS banking adoption (dependent variable) that is explained by (independent variables) gender is shown by the range of values of Adjusted R square (-0.015, -0.007, -0.014 i.e. relative advantage, perceived ease of use, and perceived complexity as compared to 0.085, 0.000, 0.076 and 0.002 i.e. perceived compatibility, perceived trialability, perceived security and trust and perceived financial costs). Further on the same table 7 below the coefficient (standard coefficient beta) show that of the independent variable examined in the study (gender), appears to have contributed in explaining the variation in the dependent variable (factors influencing the SMS banking adoption) i.e. from low -0.317 to high 0.100 with varying significant levels. This also shows that gender has different perceptions of the SMS banking due to men and women having different needs and taste preference because men tend to be risk averse in adopting the new technology than women do.

Table 9: Regression Analysis of Gender

	H15	H16	H17	H18	H19	H20	H21
Unstandardized Coefficients	0.028	0.112	-0.052	-0.246	-0.119	-0.321	0.196
Standardized Coefficients	0.050	0.100	-0.058	-0.317	-0.132	-0.302	0.139
T	0.383	0.764	-0.442	-2.550	-1.014	-2.412	1.069
Sig.	0.703	0.448	0.660	0.013	0.315	0.019	0.290
R Square	0.003	0.010	0.003	0.101	0.017	0.091	0.019
Adjusted R square	-.015	-.007	-.014	.085	.000	.076	.002

a. Gender is the moderating factor

6.0 Conclusion and Suggestions for Future Research

Future research will cater for the nationalities of respondents as it makes it even more interesting compared to the current study. Based on the study results, seven hypotheses were neither agreeable nor not agreeable which makes the analysis to be reliable since it gave positive and negative results. From a theoretical and academic view, the results gave contributions to the existing school of thought in various ways. In the first instance, this study makes a contribution to SMS banking literature by giving insights on the influential factors that seem to

encourage user acceptance of SMS banking service among university students. The result indicates that H2, H4, H6 and H7 are key driving factors that contribute the user acceptance and innovations of SMS banking. In clear analysis, this research has played a key role to all SMS banking scholars about the technology acceptance models of SMS banking of the university students currently. This research reveals that the positive or negative feeling and attitude of customers is very important for the SMS banking adoption level. However, the negative feeling such as H2 and H5 are related to innovations which fall on the variables trialability of innovations and PEOU. Apart from that, H1, H3 and H5 was found to have a relatively weak relationship with the adoption factors of SMS banking service and this was contrary to many SMS banking studies done by various authors. Furthermore, this study found that H2, H4, H6 and H7 have the same influential level in explaining TAM. Similarly, this study indicates to all SMS banking scholars that H2 is the most influential factor to determine the technology acceptance and innovations while agreeing with some authors on the same hypothesis. The researchers indicated that the results of the study also provide SMS banking sector information about the planning of SMS banking web sites and service selection for the future developers. In the planning and development of SMS banking services, software developers should pay attention in terms of the customer friendliness and favorable content since it will drive the customer perceptions, intentions and attitudes toward acceptance among university students. Lastly, this study can be treated as research evidence by all the users who are researching on e-commerce, e-learning, e-shopping and etc. to adopt various models and research framework to test other variables in their studies. The study has given an overview about the adoption factors that influence customers' attitudes to use SMS banking in Uganda for future and credibility on the use TAM model to ascertain the perceived and attitudes of the SMS banking users. Consequently, academicians should also consider age and gender in their studies since they contribute a lot to the adoption of TAM and diffusion of innovations approaches in the current IT evolution.

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