



Journal of Internet Banking and Commerce

An open access Internet journal (<http://www.arraydev.com/commerce/jibc/>)

Journal of Internet Banking and Commerce, December 2013, vol. 18, no.3
(<http://www.arraydev.com/commerce/jibc/>)

Banking Innovation in Ghana: Insight of Students' Adoption and Diffusion

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Abstract

This study seeks to determine a set of attributes that influence the adoption mobile banking innovation among university students in Ghana since most banks have started reaching their customers directly via mobile phones. A quantitative approach was used to obtain data collect from cohort of 550 undergraduate students who are frequent users of mobile phone devices. Data was analysed with SPSS software which measured factors such as relative advantage, compatibility, observability, complexity, perceived risk, trialability and service satisfaction as critical factors influencing the adoption of mobile banking in Ghana. Further, the study revealed that mobile banking was compatible with their life styles. This research adds value to existing studies on mobile banking especially in Sub Saharan African where adoption of mobile phone innovation

has become the lifestyle of people hence commercial banks are using it to promote their services. Mobile banking projects Ghana as an emerging innovation adopter and a catalyst for Africa's socio- economic development. Finally, it provides opportunity for marketers at strategic positions in telecommunication and banking sectors to focus on student cohort as essential target market for rapid growth.

Keywords: Mobile Banking, adoption, mobile telecommunication, financial services, innovation, diffusion, Ghana.

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BACKGROUND

Technological advancements in the areas of telecommunications and information communication technology over the past few decades has transformed business operation systems in both developed and the developing world especially in financial services delivery. The advent of Information and Communications Technology has led to the proliferation of electronic-based banking products as an alternative channel for routing banking services to customers (Narteh, 2012). This has positively influenced banking operations globally by transforming banking operations from paper-based operation to computer and internet oriented operations (Al-Jabri and Sahail, 2012). In fact, the financial services sector worldwide has experienced enormous innovation describing the sector as innovative, turbulent, and competitive to benefit all stakeholders especially customers.

Banks are recognizing the potential of reaching millions of prospective customers, especially the rural population who account for more than 60% of Africa's total population and have no access to banking services. The rural commercial bank branch network is still underdeveloped with more than 50% of the adult population in Africa has access to mobile telephone, mobile banking could enable the rural population to have access to financial services as demonstrated by the case of Kenya and South Africa (Africa Economic Brief, 2010). Ghana today has experienced major transformation as most banks strive to serve Ghanaians in reasonable time compared to spending precious hours in most banking halls to access any form of financial service between 1980s and early 2000s. Further, critical factors like technological developments and keen competition have forced banks to respond to challenges faced by the banking public hence rapid adoption of innovative marketing strategies to satisfy customers with innovative products and services to clients while reducing operational costs (Sohail and Shanmugham, 2003). It is worth noting however, that customers of some banks in Ghana become frustrated when transacting business with banks especially if one was not privileged to be a customer of the few elite banks. Long winding queues within banking halls are common phenomenon still portraying Ghana's financial market as transactional or sellers' market instead of being customer oriented.

Ghana is described currently as leading adopter of mobile telecommunication service in Africa where cell phone subscribers are equal to total population (National Communication Authority, 2012). The adoption of mobile phones by Ghanaians over the

past decade has become part of their socio-economic life since it is emerging that some users of mobile phones are using the device for financial transactions beyond telephone calls and text messaging. It is on record that, latest mobile devices like cell phones, PDAs, smartphones not only provide for voice or text messaging, but also allow watching television, accessing the internet, conducting mobile banking and retail transactions, playing multimedia files and using browsing services (Cruz and Laukkanen, 2010). Mobile banking is about transacting financial service with the aid of mobile phone technology. The mobile device is currently used for payment of bills, insurance premiums, transfer of funds, purchase of goods etc. Mobile banking is emerging as a wireless service delivery channel providing increased value for customers' banking transaction (Pousttchi and Schurig, 2004; Al-Jabril and Sahail, 2012). Therefore, the provision of mobile banking services to Ghanaians is influenced by understanding of customer innovation adoption process (CIDP), with its implications for bankers and customers alike.

The objective of this study is to determine a set of technical attributes of technology adoption regarding mobile banking adoption in Ghana. The conceptual framework of the study is anchored on diffusion of innovation theory to investigate factors that may influence mobile banking adoption and use students who are savvy with the device. Further, the study examines the potential facilitators and inhibitors of mobile banking adoption in Ghana. Rogers (2003) identified five attributes of innovations regarding the diffusion of innovations. These attributes that are applicable to mobile banking and innovation targeted at consumers (Al-Jabril and Sohail, 2012). Adoption determines the rate of innovation adoption is its relative advantage, compatibility, complexity, trialability, and observability (Saini and Monga, 2008; Krame and Block, 2008; Al-Jabril and Sahail, 2012). These attributes, in addition to perceived risk, is worth investigating in relation to mobile banking adoption and use in Ghana. This study attempts to use diffusion of innovation theory, in mobile banking context, in a developing country like Ghana.

Telecommunication and Mobile Banking in Ghana

Ghana, middle income economy (Ghana Statistical Service 2010) has had its fair share of economic instability especially in the later 1970s and 1980s forcing the country to subscribe International Monetary Fund and the World Bank's structural adjustment programme (SAP). The aim was to diversify the economy by de-emphasizing state control of firms since most state owned enterprises were described as non-performing assets. The Central Bank then embarked upon financial sector structural adjustment programme (FINSSAP) to improve the performance of banks in the sector. Owusu-Frimpong (2008; Narteh and Owusu-Frimpong, 2011), argue that FINSSAP contributed to the survival of banks in the sector thereby strengthening them for growth. The policy improved the regulatory framework, and restructured financially distressed banks through capital investment and management expertise. Currently, Ghana's banking sector can be described as very vibrant with most banks now employing cutting edge technologies to roll out customer oriented products to the banking public. Such innovative acts are likely to have external focus, primarily market driven, and such intervention might result in differentiation of organization's output for its customers or clients (Walker, 2008; Damanpour et al., 2009).

Under the SAP, Government of Ghana separated the then Ghana Post and Telecommunication Corporation into two different entities namely Ghana Post for postal services and Ghana Telecom for telecommunication service.

The resultant effect was the advent of Vodafone formally Ghana Telecom. Ghana Telecom was partnered by a Malaysian Telecommunications Company in the early 1990s revived fixed telephone lines for homes and businesses which hitherto customers had to queue in front of post offices to access telephone service. To increase access to consumers, the regulator National Telecommunication Authority (NCA) licensed Milicom Ghana now Tigo and Spacefon now MTN to provide mobile telecommunication service. The above organizations including Vodafone pioneered rapid distribution of the new innovation (mobile phone) to Ghanaians between 2001 and 2007. These firms relied on creative integrative marketing communications, competitive pricing with market oriented distribution strategies to increase the adoption of mobile phones by Ghanaians. Currently, the sector can be described as very competitive with three additional players; Airtel, Expresso and Glo providing similar voice and data telecommunication services supported by heavy promotional budgets. Initially, the Telco's targeted high net-worth middle income individuals. However, it is obvious that mobile phone has become a necessity hence being used by most Ghanaians.

Total cellular/mobile voice subscriber base in Ghana as at December, 2012 stood at 25,618,427. MTN leads with a subscriber base of 11,734,500 representing 46% followed by Vodafone 5,259,487 representing 21 % and Tigo 3,698,409 representing 14%. Airtel, GLO and Expresso recorded 12%, 6% and 1% market share respectively. Four out of these operators are into mobile banking/money transfer service. Tigo Ghana's Tigo Cash mobile money/banking was adjudged the Best Mobile Money Product in West Africa at the 2013 Kalahari Awards in Lagos, Nigeria (myjoyonline.com 2012) confirming the strong adoption of mobile banking service by Ghanaians.

In Ghana, mobile banking service providers has brought together major utility services such as electricity, Water, paid television (DSTV). It facilitates efficient collection funds and reaching out to customers on a 24/7 hour basis. Some commercial banks, microfinance companies, insurance companies, Metropolitan and District Assemblies Assemblies have bought into the service. Further, some 'susu' operators, National Lottery Authority, property rental services and domestic airlines use the service to enhance revenue collection for growth in revenue because of its convenience to users and accountability. The latest to join the adoption process is Zoomlion a leading waste collection company in Ghana and beyond. The company has directed its clients to pay bills via electronic platform beginning January 2013.

In the financial services sector, mobile banking represents an additional service for certain occasions adding the element of true mobility to internet banking used over fixed networks. Thus, mobile banking which is an interaction in which a customer is connected to banks via a mobile device such as cell phone, smartphone or personal digital assistant (PDA) (Laukkanen and Kiviniemi, 2010). It ought to be noted that the interaction does not necessarily need to involve transactions like bill paying, money transfer between accounts or stock exchange. Mobile banking can, in its simplest form, be only an SMS request of an account balance.

However, from the perspective of banks that develop mobile banking, a great number of customers should use the services in order to produce a return on investment (Lee and Chung, 2009).

In Kenya, cellular operators are providing banking services in the country with M-PESA and MKESHO by Safaricom and ZAP by Zain. The number mobile telephony subscribers, which stood at 4.5 million in 2005, grew by 34.2% to 17.4 million in 2009 from 12.9 million in 2008 and it reached 20 million in 2010 (Kenya Economic Survey 2010). The M-PESA mobile money transfer service, in was launched in 2007 with 900,000 subscribers now has about 12 million customers (in 2010). The number of M-PESA clients grew by 61% from 7.38 million in July 2009 to 11.89 million in July 2010, which is about 30% of Kenya's population¹⁶. This compares favorably to the current 4.5 million customers of the existing financial institutions in Kenya Melida and Gates Foundation (2010). There were 19,500 M-PESA agents as at the end of July 2010 compared to 1,200 in 2007. South Africa is by far the country where mobile banking is most widely used on the continent. By end of March 2009, the total mobile customer base in South Africa increased by 3.8% from 2008 to over 51.9 million with the mobile penetration rate rising to 107% (South Africa Telecommunications Report 2009).

Mobile banking provides full access to details of transaction, personal bank details, as well as making credit instalment and transferring funds instantly. Customers intending to use the service ought to register with their telecom service provider or register with their bank with a valid identity as required by law after which the telecom firm installs the software on the applicant's device for use. Mobile banking allows customers to take full advantage of the latest technology where by helping them to check account details, view mini-statement, pay bills for government service and public utilities, transfer funds between bank accounts, pay credit and loan instalments and place remittances to beneficiaries in local banks or abroad. There is increasing number of mobile banking providers hence a fierce competition which has culminated in continuous improvement in quality of service.

LITERATURE REVIEW

Innovation and Financial Services Sector

In recent decades, banks were impelled to liberalized domestic regulation, intensified international competition, and increasing consumer sophistication to leverage trends in information technology to develop new innovative products and services (Tufano, 2003; Abor, 2005; Frame and White, 2004; Abir and Chokri, 2010; Baba, 2012). Competition, along with changes in information communication technology, fuels the need for banks to innovate in products, services, and delivery channels (Frei, 1998). Pushed by growing consumer demand and the fear of losing market share, banks are investing heavily into PC banking technology (Baba, 2012). Collaborating with hardware, software, telecommunications, and other companies, banks are introducing new ways for consumers to access their account balances, transfer funds, pay bills, and buy goods and services without using cash, mailing a check, or leaving home (Frei et al., 1998). Humphery et al., (2006) cite ATMs, telephone banking, internet banking, and e-money as being among the significant innovations affecting the banking distribution system that influence banking performance significantly. Goddard et al. (2007) similarly report that client relation management systems, bank management technologies, and various other technologies are among the major changes in internal banking systems that also have exercised a positive influence on banking performance and profitability. It can be emphasised that banks in Ghana are becoming more technologically oriented hence investing heavily into technological processes like ATMs, branch networking, electronic fund transfer at point of sale, and telephone banking (Abor, 2005).

The sociological system theory, according to Darmanpour et al., (2009), challenged the technological imperative and argued that changes in technical (operating) system of organization should be coupled with changes in the social (administrative) system in order to optimize organizational outcomes since society is dynamic and industry must respond timely to societal demands.

Innovation and Business Performance

Research in the area of electronic banking spanned over a gamut of delivery options, from measuring consumers' attitudes toward automated teller machines (Filotto et al., 1997; Moutinho and Smith, 2000) to issues on adoption and quality of services of internet banking (Barnes and Corbitt 2003; Black et al., 2002; Enders et al., 2006; Gerrard and Cunningham, 2003; Karjaluoto et al., 2002; Lichtenstein and Williamson 2006; Mattila et al., 2003; Polatoglu and Ekin, 2001; Sathye, 1999; Yu 2012

Electronic banking is one of the most successful business-to-consumer applications in electronic commerce (Pousttchi and Schurig, 2004). Mobile banking caters for financial transactions using a mobile device for viewing account balances, making transfers between accounts, or paying bills. Generally speaking, mobile banking operations can be categorized as mobile accounting, mobile brokerage and mobile financial information services (Cruz and Laukkanen, 2010). Most services in the categories designated as accounting and brokerage are transaction-based for domestic and international fund transfers. Others include commercial bill payment processes, cell phone recharging and micro-payment handling.

Rogers (1994) argues that defining performance is the prerequisite of measuring or managing it. Market share is deemed a powerful performance metric as it is also a strong predictor of cash flow and profitability (Ambler and Putoni, 2003). The logic being that firms benefiting from scale effects are able to lower costs and thereby earn higher profits than those competitors with lower market shares (Jacobson, 1988). Again market share is perhaps an even more appropriate and accurate measure as it reflects adaptation to a changing environment (Mavondo et al., 2005).

In these contexts, companies with the capacity to innovate will be able to respond to these challenges faster and to exploit new products and market opportunities better than non-innovative companies (Brown and Eisenhard, 1995; Miles and Snow, 1978).

Thus, it is commonly perceived that organizations should innovate to be effective and, in the long run, to survive (Damanpour and Schneider, 2006). In this regard, Calantone et al., (2002) saw an innovation capability as the most important determinant of firm performance. Calantone et al., (2002) suggest that in order to gain a competitive edge to survive in a dynamic business environment, firms must be innovative. The rationale behind this idea is that innovation often serves to deal with the turbulence of the external environment. Although its adoption may be risky, and its success is not guaranteed, innovation researchers have posited that it affects firm performance positively based on two theoretical arguments (Damanpour et al., 2009). Therefore, understanding users adoption of mobile banking mainly relies on considering mobile banking as a technological innovation.

The diffusion of innovation theory (DIT) could be considered as one of the most popular theories that have attempted to explore factors that affect an individual to adopt an innovation or a new technology. Recourse to deep theory, however, is at its early stage

of development and only isolated examples of research are identifiable. The conceptual framework draws on articles that have been applied to research applications, design and adoption, in the main approaches borrowed from information systems (IS) and innovation research and applied to m-finance. They include the technology acceptance model (TAM) (Davis et al., 1989); diffusion of innovation (Rogers, 1983); and the decomposed theory of planned behaviour (Taylor and Todd, 1995). The TAM has been used particularly to provide conceptual underpinning for studies of m-finance adoption such as Brown, et.al (2003) who define and test a range of factors (relative advantage, compatibility, complexity and trialability) in relation to a study of early adopters.

Rogers (2003) defined adoption as a decision to make full use of an innovation. While there are many studies that define adoption in terms of implementation, usage, utilization, or satisfaction; this study uses satisfaction as it is the most widely used single measure of adoption. Satisfaction has often been used as the dependent variable for IT success (DeLone and McLean, 1992, 2003; Montazemi, 1988; Raymond, 1990). The reason for selecting satisfaction as surrogate measure for adoption is twofold. First, "satisfaction" has a high degree of face validity. It is hard to deny the success of a system where users say that they like it. Second, the satisfaction is widely used as a success measure (DeLone and McLean, 1992 2003; Liu and Guo, 2008; Mahmood et al. 2000; Zviran & Ehrlich, 2003) and post-adoption measure of m-services Park et al. 2011).

CONCEPTUAL FRAMEWORK

Rogers (1994) defines diffusion as the adoption of an innovation over time by the given social system, as a consequence diffusion processes result in the acceptance or penetration of a new idea, behaviour, or physical innovation. Rogers identified several attributes of an innovation that are key influences on adoption behaviour. Attributes such as relative advantage, complexity, compatibility, trialability, and observability are critical in determining adoption and diffusion of innovation (Rogers, 2004). Information is crucial in any innovation diffusion process. It is related to the way information on innovation is disseminated through certain channels of communication for social system members (Rogers, 2003). Good or bad communication can be reflected in the success or failure of the innovation diffusion process, which is also valid in the internet banking context (Jun and Cai, 2001; Cruz et al., 2010). A number of previous studies examined identified factors like adoption and diffusion of Internet-based technologies and have consistently concluded these attributes, particularly those of relative advantage, ease of use, and compatibility, as the most frequently salient factors for adoption of Internet and mobile technologies (Koenig-Lewis et al., 2010; Liu & Li 2010; Papies & Clement, 2008; Park & Chen 2007; Vijayasarathy 2004). Rogers' five attributes and their relationship with innovation adoption are as follows.

Relative advantage

Relative advantage refers to the degree to which an innovation is perceived as providing more benefits than its predecessor (More and Benbasat, 1991). Relative advantage results in increased efficiency, economic benefits and enhanced status (Rogers, 2003). Past research has found that relative advantage of an innovation is positively related to the rate of adoption (Moore and Benbasat, 1991). It has been observed by researchers that when user perceives relative advantage or usefulness of a new technology over an old one, they tend to adopt it (McCloskey, 2006; Rogers, 2003).

Therefore mobile banking adoption, benefits such as immediacy, convenience and affordability to customers (Lin, 2011). It can be hypothesized that, when students perceive specific distinct advantages offered by mobile banking, they are more likely to adopt it.

H1. Relative advantage of mobile phone will have a positive effect on mobile banking adoption.

Complexity

Cheung et al., (2000) defines complexity as the extent to which an innovation can be considered relatively difficult to understand and use. They observed that complexity negatively influences the adoption of internet usage. Complexity is the opposite of ease of use or refers to the extent to which mobile banking is perceived as easy to understand and operate. Again, research suggests that there is a strong correlation between perceived ease of use of new technology on its adoption (Gu et al., 2009; Luarn and Lin, 2005; Venkatesh and Davis, 2000; Wang et al., 2006). As mobile banking services become user friendly interfaces, users see them as easy to use, and hence to form positive attitudes towards them (Lin, 2011). Further, complexity in use is a major factor in adoption of mobile banking where illiteracy may hinder its adoption. There is considerable amount of empirical research on the mobile technology to suggest that users' intention to adopt mobile banking is inhibited by the perceived complexity of the innovation (Au and Kauffman 2008; Mallat, 2007; Ondrus and Pigneur, 2006; Al-Jabril and Sahail, 2012). Much of the extant literature on barriers of mobile banking adoption is predominantly related to technical complexity. Complexity in use, technical infrastructure, and design of technology are reported as individual barriers in a number of studies (Vrechoupoulos et al., 2003). Users will be inhibited to use mobile banking if they find it requires more mental effort, is time-consuming or frustrating. Therefore, it is hypothesized that when students perceived complexity inhibits adoption of mobile banking.

H2. Complexity of mobile banking service will have a negative effect on mobile banking adoption.

Compatibility

Compatibility refers to the degree to which a service is perceived as consistent with users' existing values, beliefs, habits and present and previous experiences (Chen et al., 2004). Compatibility is a vital feature of innovation as conformance with user's lifestyle can propel a rapid rate of adoption (Rogers, 2003). Study on compatibility is a significant antecedent in determining consumers' attitude towards internet banking adoption in Malaysia (Ndubisi and Sinti, 2006). Compatibility has further been found influential in the adoption of virtual store (Chen et al., 2004), m-payment [Chen 2008], and mobile banking (Koenig-Lewis, 2010; Lin, 2011). Al-Gahtani, (2003) found that compatibility had significant correlation with computer adoption and use. Therefore, students can conclude that when there is a relationship between compatibility and adoption in the context of mobile banking.

H3. Compatibility with lifestyle will have a positive effect on mobile banking adoption.

Observability

Observability of an innovation describes the extent to which an innovation is visible to the members of a social system, and the benefits can be easily observed and communicated (Rogers, 2003). Moore and Benbasat (1991) simplified the original construct by redefining observability into two constructs: visibility and result demonstrability. In the context of mobile banking, observability is defined as the ability to access the banking services at any time and from any location without any delay or queue, and seeing the effect of mobile banking transactions immediately, and conveying the accessibility benefits to others. Through such exposure, customers gain knowledge about mobile banking and its benefits, thereby facilitating adoption. Students will adopt mobile banking when they perceive it to be innovative.

H4. Observability will have a positive effect on mobile banking adoption.

Trialability

Trialability refers to the capacity to experiment with new technology before adoption. Potential adopters who are allowed to experiment with an innovation will feel more comfortable with it and are more likely to adopt it (Agarwal and Prasad, 1998; Rogers, 2003). Further support is given by Tan and Teo, (2000) who argue that if customers are given a chance to try the innovation, it will minimize certain unknown fears, and lead to adoption. With banks providing assistance and demonstrations on mobile banking usage while in the trial period, fears about mobile banking can be minimized and it will also motivate students to adopt mobile banking. It allows customers to feel an innovation before adoption.

H5. Trialability will have a positive effect on mobile banking adoption.

Perceived risk

This attribute refers to the degree of risks in using an innovation (Ram and Sheth, 1989). Risk perception by customers usually arises due to the doubt related to the degree of inconsistency between customers' judgment and real behaviour, and technology failing to deliver its anticipated outcome and its consequent loss (Chen 2008; Koenig-Lewis 2010; Lee et al., 2007). In technology adoption, there is research evidence of the importance of the perception of risk in deploying new technology or services (Gewald et al., 2006; Ndubisi and Sinti, 2006). In the context of mobile banking, the perception of risk is even more important due to the threat of privacy and security concerns (Luarn and Lin, 2005). Secondly, fear of loss of PIN codes may also pose security threats (Kuisma et al., 2007). Thirdly, some users also fear that hackers may access their bank accounts via stolen PIN codes (Poon, 2008). Finally, some users may also have a fear of loss or theft of a mobile device with stored data (Coursaris et al., 2003). Therefore, perceived risk of mobile banking will negatively force students to not to mobile banking.

H6. Perceived risk mobile banking service will have a negative effect on mobile banking adoption.

RESEARCH METHODOLOGY

The Most studies on bank selection have treated the student population as a homogenous segment which could be reached with a single marketing strategy. Blankson et al., (2007, 2009) posit that "student cohort" studies have produced dissimilar results as basis for bank selection studies.

This study aims to investigate the adoption and diffusion on mobile banking technology among Ghanaian students and to identify a set of factors that influence the adoption process. Regarding most studies on banks, a quantitative approach was adopted to investigate the phenomenon (Owusu-Frimpong, 1999; Blankson et al., 2009) hence the population of this study comprised of students of Central University College and the sample was 550 second year business students at the main campus. Accidental sampling technique was used to obtain data from respondents because of its convenience. The main thrust of the data highlighted on theoretical framework namely relative advantage of mobile banking, compatibility of use of mobile banking and observability of the mobile banking device. Other factors include complexity, trialability, perceived risk of mobile banking and the degree of satisfaction of mobile banking (Roger, 2003; Al-Jabril and Sohail, 2012).

The survey instrument consists of three sections that elicited demographic information, factors influencing mobile banking adoption and service evaluation. A five-point Likert scale ranging from 1 for strongly agreed to 5 to strongly disagree was employed for the sake of validity. While some respondents immediately responded to data some spent over two weeks to return. After elimination of the missing data (incomplete and missing questionnaires) the collection rate was 90% collection. This relatively high response rate was achieved through the supportive roles of voluntary students who followed up to reduce non-response rate.

ANALYSIS

With aid of SPSS software, data was analysed using basic descriptive statistics to measure mean, standard deviation and critical component factor methods. Eighty-seven per cent of respondents were between the ages of 17 and 26 years whereas 16% of respondents were 27 years indicating a youthful age range with a 50% gender balance response. The findings revealed that 78% respondents were unemployed with ninety four per cent respondents being aware of mobile banking and had used mobile banking technology. Regarding overall satisfaction with mobile banking, 60% indicated they were satisfied however, 37% seem not to be sure of the innovation. When pushed further on the service quality, 60% were happy to recommend the service to friends and close relatives with 35% not sure of their views.

Testing correlation between adoption of mobile banking and adoption factors such as relative advantage, complexity, compatibility, observability, trialability and perceived risk as measured by testing various parameters as indicated on Table 1 below, it was observed that the p-value between parameters, adoption of mobile banking and convenience of mobile banking in managing finance as a measure of relative advantage was 0.134. Again, the p-value of adoption of mobile banking and compatibility of mobile banking with life style measured a compatibility of 0.271. Further, the p-value between adoption of mobile banking and information about transaction can be tampered measure of perceived risk of 0.806. The p-value of adoption of mobile banking and usage of mobile banking on a trial basis which is a measure of trialability revealed 0.235 which were all greater than the critical p-value of 0.05 (using 5% level of significance) failed to reject null hypothesis hence concluded that there exist no correlation between adoption of mobile banking by respondents and factors like relative advantage, compatibility, perceived risk as well as trialability.

The correlation coefficient between these parameters were -0.067, -0.049, -0.011 and -0.053 respectively which indicated a weak negative correlations as showed on Table 1.

It can also be observed that the p-value between the parameters, adoption of mobile banking and accessibility of mobile banking abroad which is a measure of observability was 0.008; the p-value between adoption of mobile banking and frustration of mobile banking which is a measure of complexity was 0.000 all less than the critical p-value of 0.05 (using 5% level of significance); therefore, the null hypothesis was rejected and concluded that there exist correlation between the parameters that measured adoption of mobile banking and observability as well as complexity. The correlation coefficient between these parameters was -0.118 and 0.175 respectively which indicated a weak negative correlation and weak positive correlation respectively.

Table 1: Correlations Analysis of Mobile Banking Adoption Factors

		Awareness and usage of mobile banking	Convenience of mobile banking in managing finances	Compatibility of mobile banking with my life style	Accessibility of mobile banking abroad	Frustration of mobile banking	Information about transactions can be tampered	Usage of mobile banking on a trial basis
Awareness and usage of mobile banking	Pearson Correlation	1	-.067	-.049	-.118**	.175**	-.011	-.053
	Sig. (2-tailed)		.134	.271	.008	.000	.806	.235
	N	500	500	500	500	500	500	500

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

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

Test of Regression (Probit Regression Model) between the Parameters that Affect the Adoption of Mobile Banking in Ghana

As stated earlier in our introduction, to test hypothesis of relative advantage, complexity, compatibility, observability, trialability and perceived risk caused the adoption of mobile banking in Ghana. In the probit regression analysis, a test for the significance of the regression model was made. The hypotheses of interest were as follows, where null hypothesis is H_0 and the alternative hypothesis is H_1 . H_0 : regression model is not significant H_1 : regression model is significant. Table 2 gives the p-value for testing the

significance of the overall probit regression model. The p-value is given as 1.000 which is greater than the critical p-value 0.05(using 5% level of significance); therefore it fail to reject the null hypothesis conclude that the overall probit regression model is not significant.

The coefficient of regression for the parameter, convenience of mobile banking in managing finance which was a measure of relative advantage was -2.491 which indicate that individuals who agreed that mobile banking was convenient in managing finances were less likely to adopt mobile banking as compared to their counterparts who disagreed that that mobile banking was convenient in managing finances. The regression coefficient for the parameter, compatibility of mobile banking with life style which is a measure of compatibility was -0.356. This means that individuals who agreed that mobile banking was compatible with their life styles were less likely to adopt mobile banking as compared to their colleagues who disagreed that mobile banking was compatible with their life styles.

The coefficient of regression for the parameter, accessibility of mobile banking abroad which is a measure of observability was -1.919 which imply that individuals who agreed that they could access mobile banking abroad were less likely to adopt mobile banking as compared to their counterparts who disagreed that they could access mobile banking abroad. The regression coefficient for the parameter, frustration of mobile banking which is a measure of complexity was 2.105 which mean that individuals who said that mobile banking was not frustrating were more likely to adopt mobile banking as compared to their colleagues who said that mobile banking was frustrating. The regression coefficient for the parameter, information about transaction can be tampered which is a measure of perceived risk was -0.342 which mean that individuals who said that information about their transactions could not be tampered by others were less likely to adopt mobile banking as compared to their colleagues who said information about their transactions could be tampered by others.

Finally, the regression coefficient for usage of mobile banking on a trial basis which is a measure of trialability was 2.690 which implies individuals who reported that they have tried mobile banking for at least one month were more likely to adopt mobile banking as compared to their counterparts who reported that they have not tried mobile banking for at least one month.

Table 2: Chi-Square Tests

			Chi-Square	df ^a	Sig.
PROBIT	Pearson	Goodness-of-Fit Test	250.527	493	1.000

a. Statistics based on individual cases differ from statistics based on aggregated cases.

Table 3: Parameter Estimates

Parameter	Estimate	Std. Error	Z	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
PROBIT ^a Convenience of mobile banking in managing finances	-2.491	8.510	-.293	.770	-19.170	14.188
Compatibility of mobile banking with my life style	-.356	3.297	-.108	.914	-6.819	6.107
Accessibility of mobile banking abroad	-1.919	1.185	-1.620	.105	-4.242	.403
Frustration of mobile banking	2.105	1.012	2.081	.037	.122	4.087
Information about transactions can be tampered	-.342	.221	-1.546	.122	-.775	.092
Usage of mobile banking on a trial basis	2.690	9.064	.297	.767	-15.075	20.456
Intercept	3.375	3.251	1.038	.299	.124	6.625

a. PROBIT model: $\text{PROBIT}(p) = \text{Intercept} + BX$

CONCLUSIONS AND RECOMMENDATIONS

This study examined mobile banking and its adoption and diffusion in Ghana and a guided case study of undergraduate students of Central Business School, Ghana. The survey confirmed that there existed some correlation between the parameters that measured adoption of mobile banking and observability as well as complexity and indicated a weak negative correlation and weak positive correlation respectively. More so, the survey further confirmed that there existed no correlation between the parameters that measured adoption of mobile banking and relative advantage, compatibility, perceived risk as well as trialability and this indicated weak negative correlations because of the respondents in question being students who frequently use mobile phones as part of their lifestyle hence trials and usage risks.

With regard to the hypotheses tested, respondents agreed that mobile banking was convenient in managing finances. They were less likely to adopt mobile banking as compared to their counterparts who disagreed that mobile banking was convenient in managing finances (Tan and Teo, 2000). This implied that inconveniences caused by mobile banking to customers do not significantly affect its adoption in Ghana.

However, individuals who agreed that mobile banking was compatible with their life styles were less likely to adopt mobile banking as compared to their colleagues who disagreed that mobile banking was compatible with their life styles (Lin 2011). This analysis further implied that incompatibility of mobile banking with customers does not significantly affect its adoption in Ghana. The findings in this study further proved that individuals who agreed that they could access mobile banking abroad were less likely to adopt mobile banking as compared to their counterparts who disagreed that they could access mobile banking abroad. Interestingly, this implied that non-observability of mobile banking with customers does not significantly affect its adoption in Ghana.

On the other hand, conclusion made from this survey indicated that individuals who said that mobile banking was not frustrating were more likely to adopt mobile banking as compared to their colleagues who said that mobile banking was frustrating (Tan and Teo 2000) which meant that complexity of mobile banking significantly affected its adoption in Ghana. However, individuals who said that information about their transactions could not be tampered with by others were less likely to adopt mobile banking as compared to their colleagues who said information about their transactions could be tampered by others which implied perceived risk of mobile banking (Ndubisi and Sinti 2006) by customers does not significantly affect its adoption in Ghana. Again, individuals who reported that they have tried mobile banking for at least one month were more likely to adopt mobile banking as compared to those who indicated they have not tried the service one month. This means that trialability of mobile banking as cited by (Tan and Teo 2000) that customers significantly influenced by adoption in Ghana. Finally, the survey confirmed that majority of respondents were generally satisfied with the adoption of mobile banking in Ghana (Lee and Chung 2009) hence were ready to recommend the service to friends and relations.

IMPLICATIONS

From the above, it is therefore recommended that marketing decision makers of telecommunication and financial services sectors at strategic and operational levels should focus on students as essential cohort for business growth since they are technologically savvy. Further, they should precisely target students with special products with the aim of retaining them after school since appropriate use of a richly segmented customer base may result in higher retention and growth. Mobile banking has come to stay for quick adoption by all especially the literate consumers in Ghana and beyond. Mobile banking will enhance quick transfer of funds to boost business confidence and trust and ultimately reduce cost of printing currency. However, the above can be achieved through total integrity of mobile banking systems.

LIMITATIONS AND FUTURE RESEARCH

Some limitations are evident in this study. The study focussed solely on second year students to generalize and data was gathered within a week and response bias could be

considered considering the fact some respondents could have a personal propensity to use new technologies. Future work should explore the barriers to the adoption of mobile banking services in Ghana by taking into account the fact Ghana is cash society.

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