An adoption model for mobile banking in Ghana

Margaret Crabbe, Craig Standing* and Susan Standing

School of Management
Edith Cowan University
Joondalup, Western Australia, 6027, Australia
E-mail: m.crabbe@ecu.edu.au
E-mail: c.standing@ecu.edu.au
E-mail: s.standing@ecu.edu.au
*Corresponding author

Heikki Karjaluoto

School of Business and Economics
University of Jyväskylä
P.O. Box 35 (MaE)
FIN-40014, Finland
Fax: +358–14–260 3331
E-mail: heikki.karjaluoto@econ.jyu.fi

Abstract: The impact of social and cultural factors on the adoption of technology still requires much research. To investigate it more fully, we examine the reasons for the adoption and non-adoption of mobile banking in Ghana. Through a survey of 271 people in Ghana, it has been found that social and cultural factors in the form of perceived credibility, facilitating conditions, perceived elitisation and demographic factors do play a significant role in adoption decisions. It has been found that elitisation of technology and services can be a positive influence for adopters whilst being a negative influence for non-adopters. In addition, perceived credibility and facilitating conditions also influence attitudes towards the technology. When these factors are added to a range of demographic factors, the impact of the social and cultural features of the context of studies can be seen as significant.

Biographical notes: Margaret Crabbe completed her doctorate at Edith Cowan University in Western Australia. She has considerable experience at senior levels in the banking industry in Ghana. Her research interests are in mobile communication and organisational transformation.

Craig Standing is a Professor of Strategic Information Management in the School of Management at Edith Cowan University, Australia. His current research interests are in the areas of electronic markets, IS evaluation, and

mobile commerce and e-health. He has published in the *European Journal of Information Systems*, *IEEE Transactions on Engineering Management*, *Information & Management* and *European Journal of Operational Research*.

Susan Standing is a Research Fellow in the School of Management, Edith Cowan University, Western Australia. She holds a degree in Accounting and Information Management and has worked on a number of funded research projects. Her research interests include biotechnology management, e-health and electronic marketplaces.

Heikki Karjaluoto is a Professor of Marketing at the University of Jyväskylä, Finland. He received his DSc in Marketing from the University of Jyväskylä, Finland in 2002. His research interests concern electronic business in general and mobile business in particular. He has published extensively on electronic business in marketing and information system journals, and has collaborated with several researchers in Finland and abroad and with Finnish high-tech companies in research projects.

1   Introduction

Banks worldwide continue to invest heavily in Information Technology (IT) and over recent years have begun to employ the use of wireless internet access to support a range of innovative banking services with the aim of improving service relationships (Gartner, 2004; Scornavacca and Hoehle, 2007). Mobile banking services provide the ability to perform banking transactions online on portable mobile devices via Short Messaging Services (SMS) or Wireless Application Protocol (WAP).

The impact of cultural differences between countries on the effectiveness and efficiency of IT deployment has been recognised as a research issue worthy of investigation (Srite and Karahanna, 2006). There are concerns that behavioural models do not hold true across cultures (Hofstede, 1980; Straub *et al*., 1997; Suh *et al*., 1998). Some studies have investigated cultural differences in IT adoption by comparing data across countries (Straub *et al*., 1997). One of the problems in relation to assessing the relevance of culture is that culture is a macro-level phenomenon and often lacks precision in relation to explaining behaviour at the individual level (Srite and Karahanna, 2006). In addition, there can be differences between the values held by individuals and the values of the national culture they are part of (Srite and Karahanna, 2006). Moderators that include demographic factors such as age, gender and socio-economic status can be used to highlight cultural differences as well as culture specific factors (Venkatesh and Davis, 2000; Howell *et al.*, 2008).

In order to examine the impact of social and cultural factors on technology adoption we present a study of mobile banking adoption in Ghana. In Ghana, mobile banking has experienced considerable growth, albeit mainly confined to certain socio-economic groups within society (ITU, 2004). At first glance, this might seem an anomaly since mobile banking may be perceived as a type of high end service that would be most likely to gain penetration in wealthier, developed countries. Social and economic factors, if they are important in technology adoption, have the potential to be highlighted in contrasting social and cultural contexts such as developing countries. For these reasons Ghana was chosen for this study since it presents an interesting example of a country

where internet access by mobile technologies is much greater than from desktop computers. In addition, one of the authors was a Ghana citizen and could logistically manage the data gathering there.

Although technology adoption studies have been a consistent theme within information systems research there is still uncertainty as to whether the reasons for technology adoption at the individual level are different to the reasons for organisational adoption of technology (van der Heijden, 2004). In addition, some argue that the nature of an application can heavily influence the reasons for adoption and this has been recognised as a potential issue in the mobile commerce area. Specific characteristics such as personalisation, location specificity and ubiquity of mobile end-user services are suggested as important characteristics that make their adoption different from other ICT services (Agrawal and Prasad, 1998; Rask and Dholakia, 2001).

The motivations for this study stem from these issues. Socio-economic factors are likely to impact on the adoption of technology and services. Economic and cultural constraints can create an adoption barrier for groups in society and as mobile phones are generally perceived as personal devices then adoption decisions are made at an individual rather an organisational level. We aim to identify and analyse factors that influence mobile banking adoption behaviour in developing countries such as Ghana and so be able to contribute to the on-going research dialogue on technology adoption.

2   Conceptual framework and factors influencing the adoption of the mobile banking in Ghana

The conceptual framework for this study (Figure 1) is based on the combined principles of the Technology Adoption Model (TAM) (Davis, 1989). TAM seeks to explain consciously intended behaviours across a wide range of end-user technologies and user populations (Davis *et al.*, 1989). It is used because of the models used in information systems to study the acceptance of technology "TAM is arguably the most parsimonious and widely accepted" (Srite and Karahanna, 2006). Roger's theory of innovation and diffusion is more relevant for examining diffusion across a country or region than adoption decisions at an individual level.

In order to increase the predictive power of TAM in measuring adoption behaviour in Ghana, new constructs were added to the original perceived usefulness and perceived ease-of-use within TAM. The new factors included in our model that are regarded as potentially influential in adoption behaviours of Ghanaians are:

- perceived elitisation (Venkatesh and Davis, 2000; Moore and Benbasat, 1991)

- perceived credibility (Luarn and Lin, 2005)

- facilitating conditions (Taylor and Todd, 1995)

- sustained usefulness and sustained usage (Chau, 1996).

The first three factors have social and cultural implications. Perceived elitisation incorporates social influences which include superior influence, peer influence and image building (Venkatesh and Davis, 2000). Trust in the banks and technology infrastructure are also shaped by social factors. Hence, elitisation is used as the primary factor that

elucidates the impact of social and cultural issues but also the demographic factors of age, gender and economic status are used to highlight social and cultural factors (Wixom and Todd, 2005).

3   Development of the research hypotheses

The relevance of each construct in Figure 1 is now explained along with the hypotheses.

Figure 1   Conceptual framework: adoption of mobile banking in Ghana (see online version for colours)
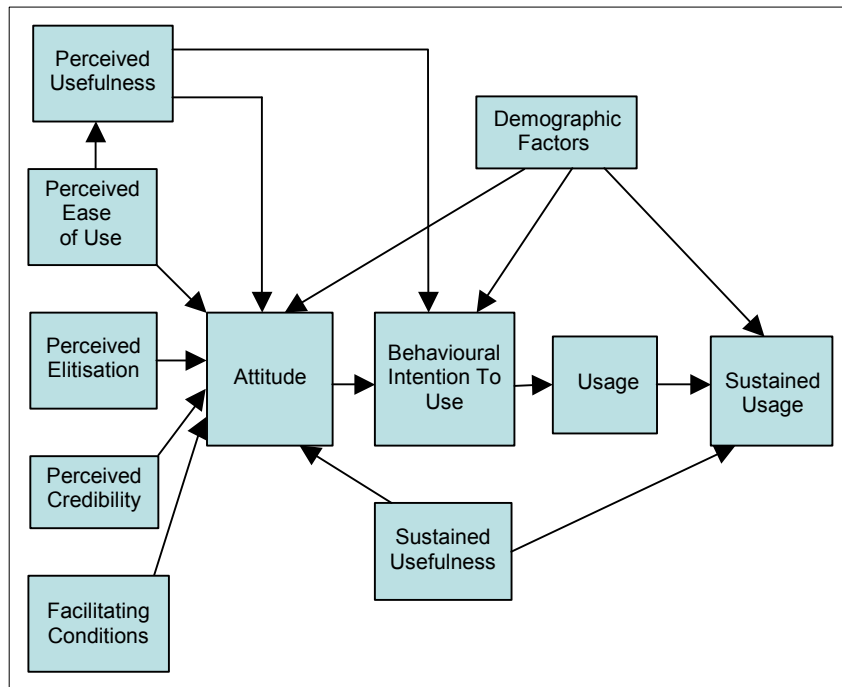
3.1   Perceived usefulness

Perceived usefulness has long been found to have a significant influence on attitude and intention-to-use an innovation (Davis, 1989; Agrawal and Prasad, 1999; Venkatesh, 1999; Venkatesh and Davis, 2000). Originally referred to job-related productivity, performance and effectiveness, perceived usefulness is an important belief identified in the TAM for providing diagnostic insight into how user beliefs and attitude toward usage, and intention-to-use are influenced (Lu *et al*., 2003). However, recent research in use and gratification (Thompson *et al*., 1999) have shown that such extrinsic motivation of mobile services are not restricted to effectiveness and efficiency and that it includes motivations of accessibility, flexibility, sociability and security (Pedersen and Nysveen, 2002).

Perceived usefulness of mobile banking is therefore expected to have a positive impact on attitude, intention and usage behaviour. It is thus proposed that:

H1.1   Perceived usefulness will have a significant positive effect on attitude towards mobile banking in Ghana.

H1.2   Perceived usefulness will have a significant positive relationship with intention.

H1.3   Perceived usefulness will have a significant positive relationship with usage.

H1.4   Perceived usefulness will have a significant positive relationship with sustained usage.

3.2   Perceived ease-of-use

Shi and Lee (2008) found that the quality of the internet banking website was important in determining the extent of its use. Empirical studies have found a positive correlation between perceived ease-of-use and technology acceptance (Davis *et al.*, 1989; Venkatesh, 1999). However, some research has found that ease-of-use plays an important role only in the exploratory state of technology use when users have very limited experience and that as users become proficient their importance diminishes (Chau, 1996). Others have also pointed out that as technology becomes more user-friendly and handy; the effect of perceived ease-of-use becomes less significant. It is proposed that:

H2.1   Perceived ease-of-use of mobile banking will not have a significant positive effect on attitude.

H2.2   Perceived ease-of-use will have a significant positive effect on attitude towards SMS banking.

3.3   Perceived elitisation

Defined as the individual's wilful exclusion (or inclusion) of oneself as incapable (or capable) of using a technology because it is made for a specific class of users, perceived elitisation can motivate or impede adoption.

Social influences which include superior influence, peer influence and image building (Venkatesh and Davis, 2000) can result in elitisation. Moore and Benbasat (1991) defined image as the extent to which the use of an innovation is perceived as enhancement of one's status in a social system. Those outside the elite group may see associate the service with improved self-image and therefore adopt it for this reason. Elitisation thus, has the potential to motivate adoption behaviour. Elitisation is expected to influence initial adoption decisions and may influence attitude and intention. It is thus proposed that:

H3.1   Perceived elitisation will not have a significant positive effect on adoption and use of mobile banking.

H3.2   Perceived elitisation will have a significant positive effect on adoption and use of mobile banking.

3.4   Perceived credibility

Perceived Credibility (PC) as a component of trust in transactional relationships is defined as the extent to which one partner believes that the other partner has the required expertise to perform a job effectively and reliably. In studies related to banking where the issues of prudence and trust are required, perceived credibility has been added to the TAM to investigate how trust related issues can affect adoption behaviour. For example Wang *et al*. (2003) used perceived credibility as an additional construct in the TAM to reflect security and privacy concerns in the adoption of internet banking. They found strong relationships between perceived credibility and intention-to-use internet banking. Perceived credibility was also found to have a stronger positive relationship with intention to adopt mobile banking than beliefs of usefulness and ease-of-use (Luarn and Lin, 2005). It is thus proposed that:

H4.1   Perceived credibility will have a significant positive effect on attitude.

H4.2   Perceived credibility will have a significant positive relationship with intentions.

H4.3   Perceived credibility will have a significant positive relationship with usage.

H4.4   Perceived credibility will have a significant positive relationship with sustained usage.

3.5   Facilitating conditions

Facilitating conditions refer to an individual's belief that organisational and technical infrastructure is available to support the use of a technology. The socio-economic environment, policies, regulations and the legal environment are important conditions for technology acceptance. Standardisation of protocols and other regulations are also crucial for the growth of wireless communication systems and digital networks around the world (Burnett, 2000; Sanghiran and Takefuji, 2000). Facilitating conditions will therefore help in the delivery of service, increase perception of usefulness and confidence of users towards mobile banking, and result in increased usage. It is thus proposed that:

H5.1   Facilitating conditions will have a significant positive effect on attitude.

H5.2   Facilitating conditions will have a significant positive effect on intention-to-use mobile banking.

H5.3   Facilitating conditions will have a significant positive effect on usage of mobile banking.

H5.4   Facilitating conditions will have a significant positive effect on sustained usage.

3.6   Sustained usefulness

Sustained usefulness refers to the belief that mobile banking has the ability to retain its usefulness consistently or progressively, long after its initial adoption. The sustained usefulness construct is expected to impact positively on attitude, intentions and sustained usage of mobile banking. This relationship will however, depend on the ability of mobile banking services to provide value-added services that meet customers' expectation. The delivery of superior quality service and maintenance of service usefulness can provide satisfaction of customers towards the service. It is proposed that:

H6.1   Sustained usefulness will have a significant positive effect on attitude.

H6.2   Sustained usefulness will have a significant positive effect on intention-to-use mobile banking.

H6.3   Sustained usefulness will have a significant positive influence on usage behaviour.

H6.4   Sustained usefulness will have a significant positive influence on sustained usage.

3.7   Attitude and intention-to-use

Attitude has been identified as a cause for intention-to-use and actual usage. Fishbein and Ajzen (1975) distinguished between attitude towards the object and attitude towards the behaviour. Attitude towards a behaviour evaluates specific behaviours leading to behavioural intentions while attitude towards an object is an objective assessment of the characteristics of the innovation which also leads to intention formation and usage. This research takes a holistic position of attitude toward the object and behaviour, and proposes that:

H7.1   Attitude will have a significant positive effect on intention-to-use mobile banking.

H7.2   Attitude will have a significant positive relationship with usage.

H7.3   Attitude will have a significant positive relationship with sustained usage.

The TAM proposed that system usage behaviour is influenced by individual's intention-to-use the system. Several studies have replicated and validated the relationship between intention and usage (Taylor and Todd, 1995) while others have defined intentions-to-use to imply usage behaviour (Wang *et al*., 2003) and have settled with intentions as the sole dependent variable. It is therefore proposed that:

H7.4   Behavioural intention-to-use will have a significant positive relationship with usage.

*H7.5   Behavioural intention-to-use will have a significant positive relationship with
         sustained usage.*

3.8   Usage and sustained usage behaviour

This study concedes that using a system in the short term does not necessarily mean
the individual is likely to continue using it. Many studies have differentiated initial
adoption from long-term adoption and have assigned various reasons why there could be
cessation of use. Factors that account for cessation of use of technology may be financial
considerations (Carroll *et al.*, 2002; Luarn and Lin, 2004); self-efficacy (Bandura, 1982;
Agrawal and Karahanna, 2000), or ease-of-use (Venkatesh and Davis, 2000; Wang *et al.*,
2003). A positive experience with the technology can lead to continue usage especially
when sustained usefulness benefits are at play. This study suggests that with sustained
usefulness of mobile banking services, users are likely to continue usage long after the
initial adoption. It is proposed that:

H8.1   Usage will have a significant positive relationship with sustained usage.

3.9   Individual differences

This study attempts to understand the effects of individual differences on the adoption
of mobile banking. Demographic factors such as gender, age, educational background,
occupation and income are expected to play a significant role in determining the adoption
behaviours of mobile banking. It is thus proposed that:

*H9.1   Demographic factors will not have a significant effect on adoption of mobile
         banking in Ghana.*

*H9.2   Demographic factors will have a significant effect on adoption of mobile banking
         in Ghana.*

3.10   Previous banking experience

As mentioned above, prior banking experience is expected to impinge on an individual's
decision to adopt mobile banking in Ghana. Prior experience has long been found as a
factor identifying individual differences in technology acceptance (Lu *et al.*, 2003). Past
experience in using similar technologies has been found to influence adoption of a
new technology (Chau, 1996; Jiang *et al.*, 2000), and therefore negative experiences are
expected to negatively influence adoption of similar technology. It is proposed that:

*H10.1   Previous banking experience will not have a significant influence on adoption of
         mobile banking in Ghana.*

*H10.2   Previous banking experience will have a significant influence on adoption of
         mobile banking in Ghana.*

4 Methodology

4.1 Questionnaire design

The self-administered, closed questionnaire used in the survey was organised in three parts: the first part had respondents answer questions about their banking habits, the second part dealt with attitude and usage behaviour of mobile banking, and the third part was made up of demographic questions.

The questions, which were in simple short sentences, required no translation. However, translations were made into the local Akan dialect, copies of which were kept by the enumerators to be used where necessary. The distribution method used in the survey allowed questionnaires to be handed personally to participants by the research team. In this way, any doubts the respondents may have had regarding any question while completing the questionnaire in the presence of the research team could be clarified on the spot, while the research team had the opportunity to introduce the research topic and motivate the respondents to give frank answers (Cavana *et al*., 2001).

Subjects were promised confidentiality and anonymity and were required to indicate their agreement or disagreement with a set of statements using a seven-point Likert scale with anchors ranging from 'strongly agree' to 'strongly disagree'.

4.2 Sample frame

The sample was selected from among the new elites in the society, comprising owners of small and medium enterprises, importer/exporters, retailers/wholesalers, public servants in banks and other financial institutions. These groups of elites were selected because they constitute the cream of busy men/women who already have banking accounts either personal or business account and may have used some kind of banking and/or electronic banking services and will have the attributes to provide useful information needed for the survey. The sample was also selected from both private business owners and public and financial sector managers in order to have balanced responses to alleviate any biases from one sector.

4.3 Sample selection procedure

To make it possible to identify enterprise owners who have bank accounts, a list of SMEs with bank accounts at the time of registration and their contact addresses was collected from the Ministry of Trade. Similar lists for the senior public officers and senior financial institution workers were sourced from the Social Security and National Insurance Trust (SSNIT) for senior officials of the Civil Service and Financial Institutions. In all, a total of 5837 names were used for the selection of samples.

A systematic sampling design was employed to select respondents based on the total number of individuals/enterprises in each sample group. The use of systematic sampling is the convenience to randomly select participants from lists provided by the Ministry of Trade for business enterprises, and also from the SSNIT for senior officials of the Civil Service and Financial Institutions. According to Cavana *et al*. (2001) systematic sampling is appropriate for market surveys and consumer attitude survey. The result of the sampling technique selected 26 individuals from the public service, 15 from the

banking sector, ten from the non-bank financial institution sector, 201 from the retailer/wholesaler sector, 38 from among the importer/exporter category, and ten from the manufacturing sector.

4.4   Conduct of survey

In order to ensure that participants were anonymous to the researcher, a research company was tasked to select sample and distribute the questionnaires. The organisation, as a result of its high reputation, networking capabilities and its constant interactions with many organisations in the area of research in Africa and within Ghana, was able to source the lists from the Ministry of Trade, and SSNIT in the shortest possible time to be used for the selection of the sample.

A one-day seminar was organised by the researcher for the field workers and coordinators to explain the aim of the study, what each item in the questionnaire meant and possible questions that may be asked by participants. In addition, phone lines for the researcher and the coordinators were made available to answer pertinent questions that the enumerators were unable to answer and also to assure respondents of their privacy and confidentiality.

Copies of the questionnaire which also introduced the project and the name and contact address of the researcher were distributed to selected participants during March and April 2006. In order to reduce the number of un-returned completed questionnaires, on the spot completion of questionnaires was demanded. Those who were unable to complete the questionnaire and return them to the field workers on the spot but were willing to participate, were asked to give date and time that the completed questionnaire could be picked up. Telephone calls were made to individuals who were not met when the enumerators called on their premises but whose telephone numbers were given to the field workers. A total of 271 responses were received out of the 300 questionnaires distributed which represents about a 90% response rate.

5   Findings

The demographic profile of respondents presented in Table 1 indicates that 73% of respondents are male and 27% are females. Fifty-two percent of all respondents are below the age of 40, 35% of respondents are between the ages 40 and 49. Thirteen percent of respondents are above the age 50. In terms of educational background 48% of respondents have secondary level education while 49% have tertiary educational background or higher. With respect to occupation, about 80% of respondents are from the business and industry sector while 20% are public and financial institution workers. In addition, while 72% of respondents earn incomes between cedi 2 million and 6 million per annum, 13% of respondents earn above cedi 6 million (US$1 = cedi 9,000).

All the respondents have banking accounts with 61% who have maintained banking accounts for over four years (Table 2). While 26% of respondents do not use any electronic banking products, the majority of users are multi-channel. Fifty-one percent of electronic banking users access ATMs, 30% use telephone banking, 24% use mobile (SMS) banking, 6% use credit card, and only 2% use internet banking. Users of electronic banking channels use the services mainly to make enquiries, that is, check

account balance (38%), and request statements and check books (29%). Forty-eight percent use ATM for cash withdrawal, while 16% of respondents use electronic banking for bill payments.

Eighty-seven percent of users are introduced to SMS banking either through bank staff (51%), a friend (31%), or a family member (5%) while 13% of users are made aware through the media. The motivation to use SMS banking is found to be mainly convenience in time-savings (100%) and urgency for time-critical information and transactions (66%).

Table 1 Demographic profile of respondents

Demographics	Mobile banking users total (%)	All respondents total (%)
Gender		
Male	48 (74)	198 (73)
Female	17 (26)	73 (27)
Age		
20–29	16 (25)	74 (27)
30–39	18 (28)	67 (25)
40–49	23 (35)	94 (35)
50–59	8 (12)	31 (11)
60 and above	0	5 (2)
Education		
Primary	1 (1)	7 (3)
Secondary	31 (48)	130 (48)
Tertiary	28 (43)	106 (39)
Post university	5 (8)	28 (10)
Occupation		
Public servants	4 (6)	25 (9)
Bank	2 (3)	12 (4)
Non-bank fin. inst	6 (9)	18 (7)
Retailer/Wholesaler	46 (71)	184 (68)
Importer/Exporter	6 (9)	22 (8)
Manufacturer	1 (1)	10 (4)
Income ('000)		
Less than 2000	2 (3)	41 (15)
2001–3000	14 (21)	63 (23)
3001–4000	5 (8)	35 (13)
4001–5000	34 (52)	82 (31)
5001–6000	3 (5)	14 (5)
Above 6000	7 (11)	36 (13)

Table 2   Banking habits of respondents

Item	Mobile banking users total (%)	All respondents total (%)
Length of bank account		
1–2 years	0	19 (7)
2–3 years	10 (15)	45 (17)
3–4 years	11 (17)	38 (14)
>4 years	44 (68)	166 (61)
Missing	0	3 (1)
Total	65 (100)	271 (100)
Banking channel used		
Not used	0	70 (26)
ATM	37 (57)	138 (51)
Credit card	10 (15)	15 (6)
Telephone	41 (63)	80 (30)
Internet	0	6 (2)
Mobile	65 (100)	65 (24)
Debit card	1	8 (3)
Length e-banking a/c		
Not used	1 (2)	86 (32)
<1 year	6 (9)	28 (10)
1–2 years	10 (15)	34 (13)
2–3 years	20 (31)	52 (19)
>3 years	28 (43)	71 (26)
Total	65 (100)	271 (100)
E-banking services		
Balance enquiries	48 (74)	104 (38)
Statement/Check	47 (72)	78 (29)
Cash withdrawal	34 (52)	129 (48)
Bill payment	28 (43)	42 (16)
Funds transfer	12 (19)	20 (7)
Others	9 (14)	24 (9)
Length SMS acct.		
<1 year	16 (25)	–
1–2 years	31 (48)	–
2–3 years	13 (20)	–
>3 years	5 (7)	–
Total	65 (100)	

Table 2 Banking habits of respondents (continued)

Item	Mobile banking users total (%)	All respondents total (%)
SMS awareness		
Media	9 (13)	44 (16)
Bank	33 (51)	87 (32)
Friend	20 (31)	51 (19)
Family	3 (5)	10 (4)
Missing		69 (29)
Motivation for SMS		
Convenience	65 (100)	–
Ease of operation	34 (52)	–
Quality of service	21 (32)	–
Urgency for time critical transaction	43 (66)	–
Avoid bank staff	2 (3)	–
Cost effectiveness	33 (51)	–
SMS Banking services		
Balance enquiries	56 (86)	
Statement/Check	51 (79)	
Forex quotes	7 (11)	
Bill payment	9 (14)	
Funds transfer	14 (22)	
Others	21 (32)	

5.1 Data reliability and validity

5.1.1 Reliability

Reliability of data is tested using the Cronbach's alpha. The results shown in Table 3 above indicate that the data collected from the survey are reliable and suitable for analysis of adoption behaviour of mobile banking in Ghana. The inter-item consistency measured by Cronbach's alpha for variables are all above the threshold (0.70) ranging from 0.798 to 0.839.

5.1.2 Validity

Construct validity testifies how well the results obtained from the use of the measure fit the theories around which the test is designed. Convergent and discriminant validity are tests of construct validity. Convergent validity is established when the scores obtained by two different instruments measuring the same concept are highly correlated (Cavana *et al.*, 2001). An exploratory factor analysis conducted (Table 3) using principal component analysis indicates that variance extracted and factor loadings are all within acceptable limits of validity. A recommended threshold of greater than 0.50 for the factor loading is regarded acceptable (Kline, 1998). An eigenvalue larger than one is used for

the selection of factors. The factors selected explain 65% of the variance of the variables. The Kaiser-Meyer-Olkin measure of sampling adequacy indicates a practical level of acceptance (KMO = .865) while the Bartlett's test of sphericity confirms that the items within the variables are correlated at $p < .001$ thus confirming convergent validity.

Table 3   Reliability tests

Factor	Cronbach's alpha	Variance extracted	Factor loading
Attitude (ATT)	.818	.68	.67
Perceived Usefulness (PU)	.813	.62	.73
Perceived Ease-of-Use (PEOU)	.839	.61	.59
Behavioural Intention (INT)	.828	.49	.56
Perceived Credibility (PC)	.827	.53	.55
Perceived Elitisation (PELI)	.838	.71	.66
Facilitating Conditions (FC)	.807	.60	.75
Sustained Usefulness (SUS)	.802	.75	.81
Usage	.819	.72	.67
Susage	.798	.79	.81

Note: N = 271.

5.2   Testing of factors affecting adoption

Adoption in this study is measured not only by usage but by sustained usage of mobile (SMS) banking. However, since attitude and intention have been found to play significant intermediating roles in determining adoption of IT (Davis, 1989; Ajzen and Fishbein, 1980; Venkatesh *et al.*, 2003), the hypotheses to be tested considered the impact of the independent factors on attitude, intention-to-use, usage and sustained usage. Demographic factors and banking experience are also tested to determine their moderating role in adoption.

5.2.1   Factors affecting attitude

An inter-item correlation analysis (Table 4) reveals moderate positive correlation but significant relationships between attitude and most of the predictors at the 0.01 level. Perceived usefulness has the highest correlation coefficient ($r = 0.53$) followed by sustained usefulness ($r = 0.48$), facilitating condition ($r = 0.41$), perceived credibility ($r = 0.38$) and perceived ease-of-use, ($r = 0.27$). The result substantiates hypotheses H1.1, H2.2, H4.1, H5.1 and H6.1 that 99 times out of 100 there will be significant positive relationship between attitude and the variables.

A stepwise regression analysis was conducted to assess the best predictors among the independent variables believed to impact on attitude. The results presented in Table 5 indicate that only 38.3% of the variance in attitude ($t = 6.53$, $p < .001$) is explained by the predictors in the model. Perceived usefulness has the highest explanatory value of 28.3% ($b = 0.298$, $t = 4.9$, $p < .001$), followed by sustained usefulness, 4.4% ($b = 0.222$, $t = 3.46$, $p = .004$), perceived credibility, 3.7% ($b = 0.157$, $t = 2.89$, $p = .001$), facilitating conditions, 0.4% ($b = .114$, $t = 1.77$, $p > .05$), perceived ease-of-use, 0.1% ($b = .067$, $t = 1.25$, $p > .05$) and elitisation, 1.4% ($b = -0.129$, $t = -2.43$, $p = .016$).

Table 4 Results of correlation analysis for all variables

Factor	ATT	PU	PEOU	INT	PC	PELI	FC	SUS	Usage	Susage
ATT	1.00									
PU	.532**	1.00								
PEOU	.270**	.330**	1.00							
INT	.461**	.409**	.200**	1.00						
PC	.379**	.378**	.306**	.244**	1.00					
PELI	.056	.150*	.285**	.090	.159**	1.00				
FC	.411**	.460**	.301**	.275**	.365**	.371**	1.00			
SUS	.483**	.537**	.262**	.362**	.305**	.245**	.583**	1.00		
Usage	.273**	.285**	.246**	.290**	.207**	.262**	.414**	.559**	1.00	
Susage	.400**	.505**	.275**	.351**	.331**	.248**	.558**	.707**	.671**	1.00

Notes: ** $p = 0.01$, * $p = 0.05$, N = 271.

Table 5 Results of stepwise regression analysis for all respondents-attitude

Factor	R sq.	R sq. change	Beta	t	P
ATT				6.53	.000
PU	.283	.283	.298	4.9	.000
PC	.320	.037	.157	2.89	.004
SUS	.364	.044	.222	3.46	.001
FC	.368	.004	.114	1.77	.078
PEOU	.370	.001	.067	1.25	.213
PELI	.383	.014	−.129	−2.43	.016

Note: N = 271.

The results imply that for every unit change in factors that increase the perception of bank consumers on usefulness, sustained usefulness and perceived credibility of banks of mobile banking, attitude will increase positively by 29.8%, 22.2% and 15.7% respectively. On the other hand, for each change in factors that increase elitisation, negative attitude towards mobile banking is expected to increase by 13%. Thus, in predicting attitude towards mobile banking for Ghanaians, both the immediate and future usefulness of the service, credibility and elitisation issues are important.

The responses of 24% of respondents who are users of mobile banking (N = 65) are also analysed to predict whether their attitude will be different from the entire group. With a mean of 6.15 (Table 6), attitude of users (Table 7) correlates significantly positive (p = .01) with perceived credibility (r = 0.48), facilitating conditions (r = 0.46), perceived usefulness (r = 0.44) and perceived ease-of-use (r = 0.30). Hypotheses H1.1, H2.2, H4.1, and H5.1 are thus substantiated. The results implies that for users of mobile banking, a significant increase in factors that promote short-term usefulness, ease-of-use, credibility and facilitating conditions would impact significantly on attitude.

Table 6   Means of variables for users and non-users

Items	Mean N = 65	Std. dev. N = 65	Mean N = 206	Std. dev. N = 206
SUS	5.84	.67	5.52	.96
PU	5.89	.60	5.83	.98
PEOU	4.82	.84	4.79	.89
INT	5.67	.74	5.83	1.18
PC	5.48	.86	5.47	.82
PELI	4.76	.69	4.42	.88
FC	5.44	.89	5.23	1.02
ATT	6.15	.58	6.01	.86
Usage	5.86	.88	–	–
Susage	6.19	.71	–	–

Notes: Users (N = 65), Non-users (N = 206).

Table 7   Results of correlation analysis for mobile banking users

Factor	ATT	PU	SUS	PC	FC	PELI	PEOU	INT	Usage	Susage
ATT	1.00									
PU	.437**	1.00								
SUS	.175	.261*	1.00							
PC	.476**	.654**	.168	1.00						
FC	.464**	.505**	.197	.457**	1.00					
PELI	.110	.104	.038	.046	.349**	1.00				
PEOU	.299**	.277**	.216**	.254*	.395**	−.035	1.00			
INT	.123	.004	.227	.026	−.103	−.199	.206	1.00		
Usage	−.197	.020	.533**	.030	.006	.120	.162	.365**	1.00	
Susage	.176	.381**	.603**	.401**	.331**	.073	.156	.411**	.581**	1.00

Notes: ** $p = 0.01$, * $p = 0.05$, N = 65.

A stepwise regression analysis shown in Table 8 indicates the model explains 31% of the variance in attitude. Perceived credibility (b = .333, t = 2.74, p = .007) explains 22% of the variance in attitude, facilitating conditions explains 8% (b = .312, t = 2.62, p = .011). The result indicates that for every unit increase in perceived credibility and facilitating conditions, users attitude will increase by 33% and 31% respectively. The implication is that mobile banking users are concerned about the credibility of banks and the technical and organisational support needed to use the service effectively.

Table 8   Stepwise regression analysis for attitude-users

Factor	R sq.	R sq. change	Beta	t	P
ATT				8.46	.000
PC	.226	.226	.333	2.74	.007
FC	.303	.077	.312	2.62	.011

Note: N = 65.

Analysis of responses of non-users of mobile banking (N = 206) was also conducted to ascertain significance of the data and how much of the dependent variables are explained. With a mean value of 6.01 for attitude (Table 6), results of correlation analysis of non-users (Table 9) indicate the independent variables correlate significantly with attitude at 99% confidence level except elitisation which is not found significant. Perceived usefulness has the highest correlation (r = .544), followed by sustained usefulness (r = .523), facilitating conditions (r = .398), perceived credibility (r = .366) and perceived ease-of-use (r = .266). The result confirms significant positive correlation between attitude and the predictors and supports hypotheses H1.1, H2.2, H4.1, H5.1 and H6.1.

Results of a stepwise regression (Table 10) show that the independent variables explain 40% of the variance in attitude of non-users (t = 5.84, p < .001). Perceived usefulness has the highest explanatory power of 30% (t = 4.86, b = .330, p < .001), sustained usefulness explains 7% (t = 4.39, b = .305, p < .001), perceived credibility explains 2% (t = 2.96, b = .176, p < .01). While perceived elitisation explains only 1.5% of the variance, it again relates negatively with attitude (t = –2.28, b = –.130, p < .05). The result implies that perceived usefulness of mobile banking is a major determining factor explaining the attitude of non-users towards mobile banking. The result indicate that a unit change in perceived credibility can cause about 18% change in attitude whereas perceived usefulness and sustained usefulness account for 33% and 31% change respectively in attitude. On the other hand, a unit change in perceived elitisation will reduce the attitude of non-users by 13%.

Table 9 Results of correlation analysis for non-users

Factor	ATT	PU	SUS	PC	FC	PELI	PEOU	INT	Usage	Susage
ATT	1.00									
PU	.544**	1.00								
SUS	.523**	.577**	1.00							
PC	.366**	.332**	.344**	1.00						
FC	.398**	.456**	.652**	.341**	1.00					
PELI	.033	.155*	.257**	.191**	.365**	1.00				
PEOU	.266**	.344**	.216**	.322**	.276**	.361**	1.00			
INT	.513**	.461**	.397**	.296**	.351**	.149*	.204**	1.00		
Usage	.325**	.318**	.548**	.253**	.478**	.252**	.268**	.304**	1.00	
Susage	.423**	.528**	.713**	.334**	.621**	.240**	.305**	.371**	.663**	1.00

Notes: ** p = 0.01, * p = 0.05, N = 206.

Table 10 Stepwise regression analysis for attitude of non-users

Factor	R sq.	R sq. change	Beta	t	P
ATT				5.84	.000
PU	.296	.296	.330	4.86	.000
SUS	.362	.065	.305	4.39	.000
PC	.384	.022	.176	2.96	.003
PELI	.399	.015	–.130	–2.28	.024

Note: N = 206.

5.2.2 *Factors affecting behavioural intention-to-use*

The correlation analysis (Table 4) indicates that intention significantly correlates positively with all variables (p = .01) except perceived elitisation which has a weak correlation (r = .09) and is not significant at 95% alpha level. The results thus substantiate hypotheses H1.2, H4.2, H5.2, H6.2, H7.1, H7.4 and H7.5 shown below as:

- Perceived usefulness has a significant positive relationship with intention-to-use (H1.2).

- Perceived credibility will have a significant positive relationship with intention-to-use (H4.2).

- Facilitating conditions has a significant positive relationship with intention-to-use (H5.2).

- Sustained usefulness has a significant positive relationship with intention-to-use (H6.2).

- Attitude has a significant positive impact on intention-to-use (H7.1).

- Intention-to-use has a significant positive effect on usage (H7.4).

- Intention-to-use has a significant positive relationship with sustained usage (H7.5).

A stepwise regression analysis conducted for all respondent group (N = 271) shows that the model shown in Table 11 explains only 27% of the variance in intention-to-use, of which attitude accounts for 21% (b = .314, t = 5.02, p < .001), perceived usefulness accounts for 4% (b = .200, t = 3.19, p = .002) and usage, 2% (b = .148, t = 2.68, p = .008).

Table 11   Stepwise regression analysis for intention of all respondents

Factor	R sq.	R sq. change	Beta	t	P
INT				2.39	.017
ATT	.212	.212	.314	5.02	.000
PU	.250	.037	.200	3.19	.002
Usage	.269	.020	.148	2.68	.008

Note: N = 271.

Analysis of behavioural intention-to-use for non-users (N = 206) shows a higher mean of 5.83 for non-users of mobile banking (Table 6) than a mean of 5.67 (Table 6) for users which shows favourable indication of intention-to-use mobile banking by non-users. A correlation analysis conducted to ascertain what factors contribute to behavioural intention-to-use mobile banking shows that intention has significant moderate correlation with all variables at p = .01 except perceived elitisation which is significant at p = .05 (Table 9). Attitude has the highest significant positive relationship with intention (r = .513), followed by perceived usefulness (r = .461), sustained usefulness (r = .397), sustained usage (r = 371), facilitating conditions (r = .351), usage (r = 304) perceived credibility (r = .296) while weak positive correlation is found with perceived-ease-of-use (r = .204) and perceived elitisation (r = .149). The result thus confirms the hypotheses for the group stated above.

A stepwise regression analysis (Table 12) shows that attitude (t = 8.54, b = .513, p < .001) significantly explains 26% of the variance in intention for non-users. The result implies that for every unit change in behavioural intention-to-use the service attitude towards mobile banking increases by 51%.

Table 12 Stepwise regression analysis for intention of non-users

Factor	R sq.	R sq. change	Beta	t	P
INT				3.17	.002
ATT	.263	.263	.513	8.54	.000

Note: N = 206.

The responses of mobile banking users are analysed to ascertain factors that motivate intention-to-use the service. A correlation analysis (Table 7) indicates that intention-to-use has significant positive relationship with sustained usage (r = .411, p = .01) and usage (r = .365, p = .01) and confirms hypotheses H7.4 and H7.5.

A stepwise regression analysis (Table 13) however, shows that perceived elitisation (b = –230, t = –2.05, p = .04) and sustained usage (b = .428, t = 3.81, p < .001) explains 22% of the variance in intention of users. Sustained usage explains 17% of intention while elitisation, which explains 5% of the variance, relates negatively to intention-to-use. The results show that for users of mobile banking a percent increase in perceived elitisation of the service will reduce intention-to-use the service by 23%, whereas a percent increase in factors that sustains the use of the service will increase intention-to-use by 43%.

Table 13 Stepwise regression analysis for intention of users

Factor	R sq.	R sq. change	Beta	t	P
INT				4.50	.000
Susage	.169	.169	.428	3.81	.000
PELI	.222	.053	–.230	–2.05	.044

Note: N = 65.

5.2.3 Factors affecting usage

In measuring usage, respondents were asked to indicate their degree of agreement to the frequency of usage and to ascertain whether they would want to use mobile banking for only urgent banking transactions. A correlation analysis (Table 4) indicates significant moderate positive correlation with all the variables (p = 0.01). Sustained usefulness has the highest correlation (r = .556) followed by facilitating conditions (r = .414) and behavioural intention-to-use (r = .290). The results show significant positive relationship with all the variables (p = .01) and support the hypotheses as follows:

• Sustained usefulness has a significant positive relationship with usage of mobile banking in Ghana (H6.3).

• Intention-to-use has a significant positive relationship with usage (H7.4).

- Facilitating conditions has a significant positive relationship with usage (H5.3).

- Perceived usefulness has a significant positive relationship with usage (H1.3).

- Perceived elitisation has a significant positive relationship with usage (H3.2).

- Attitude has a significant positive relationship with usage H7.2).

A stepwise regression (Table 14) reveals that usage (t = 1.96, p = .05) is mainly explained by sustained usefulness (t = 5.31, b = .559, p < .001) which accounts for 31% of the variance in usage. Since variables with t-values that are not significant at 95% confidence level are ignored, sustained usefulness becomes the only factor that influences usage for all respondents.

Table 14   Stepwise regression analysis for usage of all respondents

Factor	R sq.	R sq. change	Beta	t	P
Usage				1.96	.050
SUS	.313	.313	.559	5.31	.000
INT	.322	.009	.101	1.87	.063

Note: N = 271.

Analysis for mobile banking users shows usage has a mean of 5.86 (Table 6) and has significant positive correlation (Table 7) with sustained usefulness (r = .581, p = .01), and intention-to-use (r = .365 p = .01). A stepwise regression (Table 15) indicates the model explains about 45% of the variance in usage. Sustained usefulness has the highest explanatory power (b = .525, t = 5.31, p < .01), followed by behavioural intention-to-use, 8% (b = .285, t = 2.91, p < .01). Attitude (t = −3.35, b = −.325, p = .001) however, has an inverse relationship with usage and explains 4% of the variance in usage.

Table 15   Stepwise regression analysis of usage for users

Factor	R sq.	R sq. change	Beta	t	P
Usage				2.57	.013
ATT	.039	.039	−.325	−3.35	.001
SUS	.371	.332	.525	5.31	.000
INT	.448	.077	.285	2.91	.005

Note: N = 65.

5.2.4 Factors affecting sustained usage

A correlation analysis for the variables (Table 4) indicate significant positive relationship with all variables (p = 01). Sustained usage has a strong positive correlation with sustained usefulness (r = .707) followed by usage (r = .671), facilitating condition (r = .558) and perceived usefulness (r = .505). Sustained usage also has moderate correlation with attitude (r = .400), intention-to-use (r = .351), perceived credibility (r = .331). The results infer that:

- Sustained usefulness has significant positive impact on sustained usage (H6.4).

- Usage has a significant positive relationship with sustained usage (H8.1).

- Facilitating conditions have a significant positive relationship with sustained usage (H5.4).

- Perceived usefulness has a significant positive relationship with sustained usage (H1.4).

- Behavioural intention-to-use has a significant positive relationship with sustained usage (H7.5).

- Perceived credibility has a significant positive relationship with sustained usage (H4.4).

- Attitude has a significant positive relationship with sustained usage (H7.3).

Results of the stepwise regression analysis indicate the model shown in Table 16 explains 64% of the variance in sustained usage. Sustained usefulness (t = 10.51, b = .484, p < .001) explains 50.0% of the variance in sustained usage while usage (t = 8.70, b = .400, p < .001) explains 11% of the variance, perceived usefulness (t = 3.87, b = .185, p = .001) explains 3% of the variance in sustained usage. The result shows that for every unit change in sustained usefulness, usage and perceived usefulness, sustained usage will increase by 48%, 40% and 19% respectively.

Table 16 Stepwise regression analysis for sustained usage of all respondents

Factor	R sq.	R sq. change	Beta	t	P
Susage				2.84	.005
SUS	.500	.500	.484	10.51	.000
Usage	.610	.110	.400	8.70	.000
PU	.635	.025	.185	3.87	.001

Note: N = 271.

Analysis on factors affecting sustained usage from mobile banking users' perspective shows interesting results. With a mean of 6.19 (Table 6) sustained usage correlates (Table 7) highly with sustained usefulness (r = .603, p = .01) followed by usage (r = .581, p = .01) and moderately correlates with intention-to-use (r = .411, p = .01), perceived credibility (r = 401, p = .01), and perceived usefulness (r = .381, p = .01). Sustained usage does not have significant positive relationship with perceived elitisation, attitude, and perceived ease-of-use. The results support hypotheses H6.4, H8.1, H7.5, and H4.4.

A stepwise regression analysis (Table 17) shows that 46% of the variance in sustained usage can be explained by sustained usefulness and usage. Sustained usefulness has explanatory power of 36.4% (b = .410, t = 3.71, p < .001) and usage, 9.4% (b = .363, t = 3.29, p = .002). The result implies that for every unit change in sustained usefulness and usage, sustained usage behaviour will surge by 41% and 36% respectively. It also implies that usage and sustained usage behaviours of users depend to a large extent on sustained usefulness of the service.

Table 17   Stepwise regression analysis for sustained usage of users

Factor	R sq.	R sq. change	Beta	t	P
Susage				3.10	.003
SUS	.364	.364	.410	3.71	.000
Usage	.458	.094	.363	3.29	.002

Note: N = 65.

5.3   Influences of demographic factors on adoption

Analysis of Variance (ANOVA) is conducted to examine the effect of demographic factors such as gender, age, occupation, education and income on adoption. Of particular interest is to find whether significant differences in attitude, behavioural intention-to-use, usage and sustained usage can be attributable to demographic groupings and to establish whether sample variances differ from each other.

5.3.1   Gender

ANOVA is also conducted to determine whether significant differences exist in the dependent variables as a result of gender influences for users of mobile banking. The results found that for users of mobile banking there are no significant differences in attitude (p = .309), intentions (p = .316) and usage (p = .602) but significant difference exist in sustained usage (p = .018) as a result of gender. The null hypotheses for attitude, intentions and usage are accepted while that of sustained usage is rejected. In the case of non-users, the result of the ANOVA shows significant differences exist in the means of attitude (p = .004) and intentions (p = .014) with females being less positive in attitude and intention. The null hypothesis is rejected for both attitude and intentions which implies that individual's attitude and intentions-to-use mobile banking may differ as a result of gender.

5.3.2   Age

ANOVA results for mobile banking users indicate significant differences in the mean of attitude (p = .017) based on age with older people being less positive but found no significant differences in intentions (p = .929), usage (p = .242) and sustained usage (p = .109). The null hypotheses for intention, usage, and sustained usage are accepted which imply that the intention, usage and sustained usage behaviours of users do not depend on their ages. Users' attitude may however, depend on their ages. The ANOVA results for non-users also indicates significant difference in attitude (p = .006), but found no significant differences in intentions (p = .324) as a result of age. The null hypothesis is accepted for intentions and rejected for attitude implying that non-users intention-to-use mobile banking does not depend on their ages but their attitude may depend on their ages.

5.3.3   Education

The ANOVA results for mobile banking users indicate there are no significant differences based on educational levels in the means for intention (p = .709), usage (p = .285), and sustained usage (p = .809). Significant differences are however, found in

attitude (p = .047) of users based on educational background with the highly educated being less positive in attitude. The null hypothesis is accepted for intentions, usage and sustained usage. ANOVA results for non-users reveal significant differences in attitude (p = .002), and intentions (p = .005) based on education. The null hypothesis for attitude and intentions are rejected which implies that non-users attitude and intentions are influenced by their level of education.

5.3.4 Occupation

The results of ANOVA tests indicate there are no statistical differences between the means of attitude (p = .051), intentions (p = .512) and usage (p = .070) based on occupation. There is however, significant differences in sustained usage (p < .001) attributable to occupation. The null hypothesis is accepted for attitude, intentions and usage. The result implies that users' attitude, intentions and usage behaviour do not change as a result of their occupation, but their sustained usage behaviour may depend on their occupation. The ANOVA results for non-users shows there are no significant differences in means of attitude (p = .650) and intentions (p = .102) based on occupation. This means that the occupation of non-users does not significantly influence their attitude and intentions towards mobile banking. The null hypotheses are accepted for both attitude and intentions which implies that individual non-users attitude or intentions not to use mobile banking services may depend on other factors aside from their occupation.

5.3.5 Income

The ANOVA results below of income of users of mobile banking indicates that there are no statistical differences in terms of attitude (p = .051), intentions (p = .512), and usage (p = .071). Significant differences are however observed for sustained usage (p = .001). The null hypothesis is accepted for attitude, intentions and usage implying that individual users' attitude, intentions, and usage will not differ significantly as a result of their incomes. The rejection of the null hypothesis for sustained usage implies that income groups may differ in terms of using the services in the long term. The mean for sustained usage of income group less than cedi 2 million is significantly lower (4.66) than the rest of the groups. The result implies that users in low income groups in Ghana may not be willing to commit into using mobile banking in the long term. Results for non-users however show significant differences in terms of their intention to-use mobile banking (p = .046) with higher income groups having a greater intention-to-use but there are no significant differences in their attitude (p = .060) based on income. The null hypothesis is accepted for attitude and rejected for intentions-to-use which implies that non-users' intention-to-use mobile banking may depend on their income levels.

### 5.4 Influence of previous banking experiences on adoption of mobile banking

The calculated value of the Chi-square statistic is 11.49 (p = .074). However, eight cells have expected counts of less than five. Since this is not consistent with a rule-of-thumb in statistics which states that each cell must have counts of at least five, the significance level of the Likelihood Ratio is applied instead of the Pearson Chi-square (Ticehurst and Veal, 1999, p.208). The significance obtained (p = .033) is less than 0.05 therefore, the null hypothesis is rejected which implies that there is significant statistical relationship

between length of banking accounts and length of SMS accounts held. From the analysis it can be inferred that the more experience one has or the longer one has held banking account, the easier and earlier one adopts other banking channels like mobile banking and continue to use the channel.

6   Discussion

The findings of our study identify similarities between the reasons for adoption and non-adoption. However, there are a number of significant differences between these two groups. For current users of mobile banking their attitude is shaped by perceived credibility in the service and facilitating conditions and is moderated according to age, educational background and banking experience (Figure 2). Perceived elitisation influences behavioural intention-to-use. Gender, income and occupation also impact on sustained usage. Sustained usefulness is important in determining usage and sustained usage decisions related to mobile banking in Ghana. Attitude does not influence intention-to-use. This latter point could be expected when they are already using the service. Perceived ease-of-use did not influence attitude.

Figure 2   Model for continued adoption by users of mobile banking in Ghana (see online version for colours)
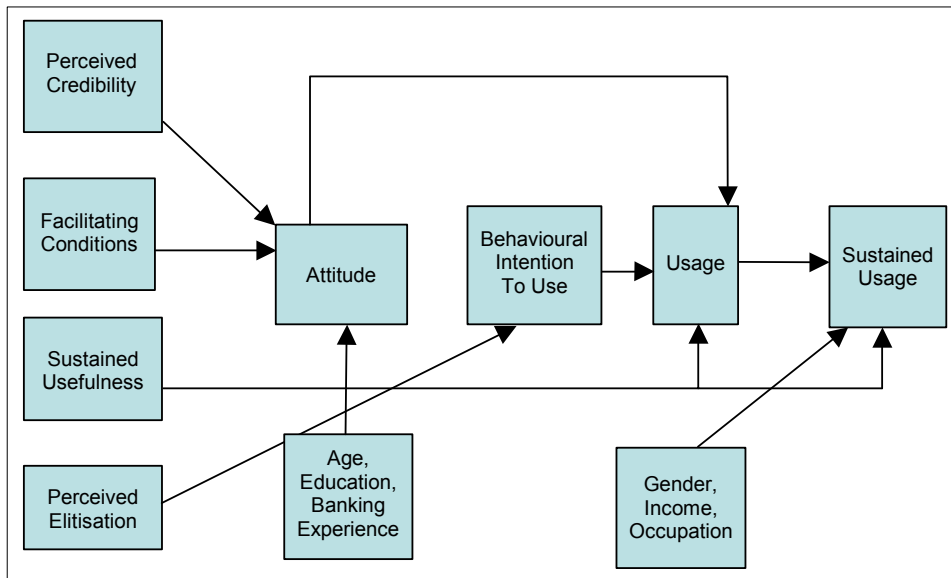
Perceived usefulness is the major factor that influences attitude of non-users while sustained usefulness plays a minor role in attitude (Figure 3). Both perceived credibility and perceived elitisation play some role in shaping the attitudes of non-users. Perceived elitisation has an inverse relationship with attitude, indicating that many non-users believe it be a service that is reserved for the elite of society and therefore out of their reach. Perceived credibility influences attitude. Demographic factors such as age, gender and education are also found to impact significantly on attitude. Attitude is the main

factor that influences intention-to-use mobile banking while gender and educational background also impact on intention-to-use. It is expected that positive intentions can lead to usage behaviour especially when sustained usefulness effect is strong. Perceived ease-of-use did not influence attitude for non-users also.

Figure 3 A model for adoption of mobile banking by non-users in Ghana (see online version for colours)
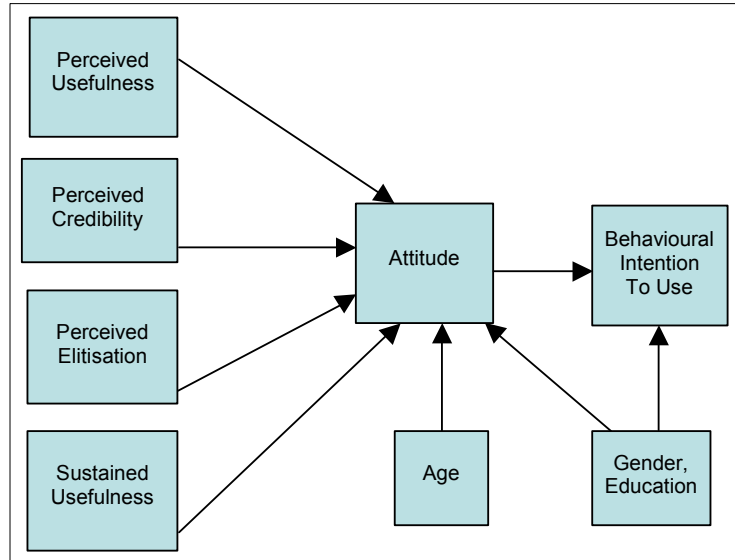
These findings highlight the importance of related social, economic and cultural factors in shaping attitude and behavioural intention-to-use mobile banking. The significance of perceived credibility, perceived elitisation, facilitating conditions and demographic factors all specifically relate to the social, cultural and economic conditions of the environment. Perceived elitisation has a negative relationship with behavioural intention-to-use mobile commerce for current users. Those using the service appear conscious that if the service is elitised further they will be less likely to use it. The non-user group is more heavily represented by lower income groups within the sample and more females. It is possible that people feel this service is beyond their reach and therefore not appropriate for them to adopt. The perception of elitisation is shaped not only by economic factors but social and cultural perceptions as what is considered appropriate for a male/female and for someone of a certain social status can condition behaviour and choices.

Although elitisation has been identified as an issue that can impact on adoption of technology, it has not featured significantly in leading studies in Western countries where social and economic distinctions between groups in society may not be as pronounced as in a country such as Ghana. Supporting the influence of socio-economic factors are the significant demographic factors in the study. Age, gender and educational background highlight social and economic conditions of the country where younger, more educated males are more likely to be conditioned to experience new technology and services as opposed to older, less educated females who are constrained socially or culturally in their choices and decisions.

The significance of perceived credibility reflects concerns over reliability and trust in the service (ref). These may be related to security and confidentiality issues in mobile banking. The quality of the wireless infrastructure is a factor (facilitating conditions) that influences attitude for current users. Clearly, both credibility and facilitating conditions are part of a wider set of concerns related to trust and confidence in society's institutions and infrastructure.

6.1 *Sustained use and usefulness*

Sustained usefulness is a construct that has been applied by some researchers to investigate the long-term usefulness of a technology in relation to its impact on one's social status and career prospects (Rogers, 1995; Lu *et al*., 2003; Venkatesh *et al*., 2003). It has been recognised as inadequate to measure adoption by mere intentions or attitude as use of a technology may stop shortly after initial adoption (Carroll *et al*., 2002; Pedersen and Nysveen, 2002; Black *et al*., 2001). Sustained usefulness in this study emphasised consistent value-adding from the products/services to cater for the lifestyle changes of the user. The demands for improvements and upgrading of services are frequently ignored in many developing economies since consumer satisfaction is not assessed or may not be considered. It is therefore not surprising that both perceived and sustained usefulness emerged as important factors impacting on adoption for both non-users and users respectively. Sustained usefulness is particularly important in determining usage and sustained usage behaviours.

7   Managerial implications

Internet banking has great potential for banks to reduce costs (Yang *et al*., 2007) and with the proliferation of mobile devices banks have an opportunity to develop cost effective service channels. One issue that management in banks have to be aware of is the influence of culture on adoption of mobile banking and related technologies. This study has found cultural influences on adoption as a result of beliefs held by individuals in certain age, income, occupation, educational and gender groups. Females for example, are found to have a lower attitude towards adoption and sustained usage of mobile banking services than males. Perceived elitisation is also a cultural issue that banks need to tackle. One way that the banks can overcome the negative implications of elitisation is to market it as affordable and useful.

The trust issue is another hurdle that banks have to overcome to build good relationships with customers. The primary objectives of banks introducing new technologies are to reaffirm an image of technology leadership, to strengthen customer relationships and earn opportunities to compete for new business (Gartner, 2001). Many banks rush to introduce services they are not ready for technically only to realise shortly it did not impact on its target customers and then withdraw the services (Gartner, 2001). This creates trust issues. The implication of the effect of sustained usage on intentions of users is that consumers require assurances from banks of the reliability of the services. For banks in Ghana to regain trust of their customers, extensive feasibility studies must be conducted in order to understand consumers and to personalise service to meet their needs.

7.1 Future studies

Future studies can be conducted in other social and cultural contexts in developing countries to determine if social and cultural factors figure prominently in the decision to adopt mobile banking. Until further studies are conducted to investigate this theme it is difficult to generalise as to the likelihood of factors such as elitisation and specific demographic characteristics impacting on adoption decisions. It is dangerous to generalise to other populations (Lee and Baskerville, 2003), especially when we are arguing that the social and cultural context needs to be considered. The term 'developing country' covers a vast array of different social, economic and cultural conditions and so the factors that impact on adoption decisions are likely to vary also. In particular, a nation's attitude to technology can influence levels of adoption even though per capita income levels may not be high by international standards.

8   Conclusions

In this study the social, economic and cultural context for technology adoption has been found to be very important in influencing adoption and sustained usage. Most studies of technology adoption have been conducted in developed economies and the significance of social, societal and cultural have largely been ignored except for basic demographic factors. Social and cultural factors are likely to be more significant in decisions on personal technologies adopted by individuals compared with technologies adopted at the organisational level. Although organisational decisions can be influenced by social and cultural factors, specific organisational cultures can vary and be similar to their western counterparts, especially if they are part of multi-national corporations. The conduct of more studies in developing countries will enable us to determine how specific social and cultural characteristics of a society impact on adoption of technologies and services.

References

Agrawal, R. and Karahanna, E. (2000) 'Time flies when you're having fun: cognitive absorption and beliefs about usage', *MIS Quarterly*, Vol. 24, No. 4, pp.665–694.

Agrawal, R. and Prasad, J. (1998) 'A conceptual and operational definition of personal innovativeness in the domain of information technology', *Information Systems Research*, Vol. 9, No. 2, pp.204–215.

Agrawal, R. and Prasad, J. (1999) 'Are individual differences germane to the acceptance of new information technologies?', *Decision Sciences*, Vol. 30, No. 2, pp.361–391.

Ajzen, I. and Fishbein, M. (1980) *Understanding Attitude and Predicting Social Behavior*, Englewood Cliff, NJ: Prentice-Hall.

Bandura, A. (1982) 'Self-efficacy mechanism in human agency', *American Psychologist*, Vol. 37, pp.122–147.

Black, N.J., Lockett, A., Winklhofer, H. and Ennew, C. (2001) 'The adoption of Internet financial services: a qualitative study', *Journal of Retail and Distribution Management*, Vol. 29, pp.8390–8398.

Burnett, R. (2000) 'Legal aspects of e-commerce', *Computing and Control Engineering Journal*, Vol. 11, No. 3, pp.111–114.

Carroll, J., Howard, S., Vetere, F., Peck, J. and Murphy, J. (2002) 'Just what do the youth of today want? Technology appropriation by young people', *Paper Presented at the HICSS 35*, Hawaii, USA, 7–10 January.

Cavana, R.Y., Delahaye, B.L. and Sekaran, U. (2001) *Applied Business Research: Qualitative and Quantitative Methods*, John Wiley and Sons Australia Ltd.

Chau, P.Y.K. (1996) 'An empirical assessment of a modified technology acceptance model', *Journal of Management Information Systems*, Vol. 13, No. 2, pp.185–204.

Davis, F.D. (1989) 'Perceived usefulness, perceived ease of use, and user acceptance of information technology', *MIS Quarterly*, Vol. 13, pp.319–340.

Davis, F.D., Bagozzi, R.P. and Warshaw, P.R. (1989) 'User acceptance of computer technology: a comparison of two theoretical models', *Management Science*, Vol. 35, pp.982–1002.

Fishbein, M. and Ajzen, I. (1975) *Belief, Attitude, Intention and Behaviour: An Introduction to Theory and Research*, Reading, MA: Addison-Wesley.

Gartner (2001) *Wireless Commercial Banking: Steak and Sizzle*, Gartner.

Gartner (2004) *Predicts 2005: Banks to Target Undeserved Customer Segments*, Gartner Research, No. G00123890.

Hofstede, G. (1980) *Culture's Consequences: International Differences in Work Related Values*, Beverly Hills, CA: Sage Publications.

Howell, M., Love, S. and Turner, M. (2008) 'User characteristics and performance with automated mobile phone systems', *Int. J. Mobile Communications*, Vol. 6, No. 1, pp.1–15.

International Telecommunication Union (ITU) (2004) 'Africa: the world's fastest growing mobile market. Does mobile technology hold the key to widening access to ICTs in Africa?', Geneva: International Telecommunication Union, http://www.itu.int/newsarchive/press_releases/2004/04.html.

Jiang, J.J., Hsu, M.K., Klein, G. and Lin, B. (2000) 'E-commerce user behaviour model: an empirical study', *Human Systems Management*, Vol. 19, No. 4, pp.87–114.

Kline, R.B. (1998) *Principles and Practice of Structural Equation Modeling*, New York: The Guildford Press.

Lee, A.S. and Baskerville, R.L. (2003) 'Generalizing generalizability in information systems research', *Information Systems Research*, Vol. 14, No. 3, pp.221–243.

Lu, J., Yu, C.S., Liu, C. and Yao, J.E. (2003) 'Technology acceptance model for wireless internet', *Internet Research: Electronic Networking Applications and Policy*, Vol. 13, No. 3, pp.206–222.

Luarn, P. and Lin, H. (2005) 'Toward an understanding of the behavioural intention to use mobile banking', *Computers in Human Behaviour*, Vol. 21, pp.873–891.

Moore, G.C. and Benbasat, I. (1991) 'Development of an instrument to measure the perceptions of adoption in information technology innovation', *Information Systems Research*, Vol. 2, No. 3, pp.192–222.

Pedersen, P.E. and Nysveen, H. (2002) *The Adoption of a Mobile Parking Services: Instrumentality and Expressiveness*, Grimstad/Bergen: The Research Council of Norway.

Rask, M. and Dholakia, N. (2001) 'Next to the customer's hart and wallet: framework for exploring the emerging m-commerce arena', *Paper Presented at the AMA Winter Marketing Educator's Conference*.

Rogers, E.M. (1995) *Diffusion of Innovations*, 4th ed., New York: The Free Press.

Sanghiran, S. and Takefuji, Y. (2000) 'Perspectives of unlicensed information imfrastructure using spread spectrum technology', *IEEE Communications Magazine*, Vol. 38, No. 5, pp.2–5.

Scornavacca, E. and Hoehle, H. (2007) 'Mobile banking in Germany: a strategic perspective', *Int. J. Electronic Finance*, Vol. 1, No. 3, pp.304–320.

Shi, W. and Lee, C. (2008) 'Does quality of alternatives matter for internet banking', *Int. J. Electronic Finance*, Vol. 2, No. 2 pp.162–179.

Srite, M. and Karahanna, E. (2006) 'The role of espoused national cultural values in technology acceptance', *MIS Quarterly*, Vol. 30, No. 3, pp.679–704.

Straub, D., Keil, M. and Brenner, W. (1997) 'Testing the technology acceptance model across cultures: a three country study', *Information & Management*, Vol. 33, No. 1, pp.1–11.

Suh, E., Diener, E., Oishi, S. and Triandis, H.C. (1998) 'The shifting basis of life satisfaction judgments across cultures: emotions versus norms', *Journal of Personality and Social Psychology*, Vol. 74, No. 2, pp.482–493.

Taylor, S. and Todd, P.A. (1995) 'Understanding information technology usage: a test of competing models', *Information Systems Research*, Vol. 6, pp.144–176.

Thompson, S.H., Lim, V.K.G. and Lai, R.Y.C. (1999) 'Intrinsic and extrinsic motivation in internet usage', *Omega*, Vol. 27, pp.25–37.

Ticehurst, G.W. and Veal, A.J. (1999) *Business Research Methods: A Managerial Approach*, Sydney: Longman.

Van der Heijden, H. (2004) 'User acceptance of hedonic information systems', *MIS Quarterly*, Vol. 28, No. 4, pp.695–704.

Venkatesh, V. (1999) 'Creating favorable user perception: exploring the role of intrinsic motivation', *MIS Quarterly*, Vol. 23, No. 2, pp.239–260.

Venkatesh, V. and Davis, F.D. (2000) 'A theoretical extension of the technology acceptance model: four longitudinal field studies', *Management Science*, Vol. 46, No. 2, pp.186–204.

Venkatesh, V., Morris, M.G., Davis, G.B. and Davis, F.D. (2003) 'User acceptance of information technology: toward a unified view', *MIS Quarterly*, Vol. 27, pp.425–478.

Wang, Y.S., Wang, Y.M., Lin, H.H. and Tang, T. (2003) 'Determinant of user acceptance of internet banking: an empirical study', *International Journal of Service Industry Management*, Vol. 14, No. 5, pp.501–520.

Wixom, B.H. and Todd, P.A. (2005) 'A theoretical integration of user satisfaction and technology acceptance', *Information Systems Research*, Vol. 16, No. 1, pp.85–102.

Yang, J., Whitefield, M. and Boehme, K. (2007) 'New issues and challenges facing e-banking in rural areas: an empirical study', *Int. J. Electronic Finance*, Vol. 1, No. 3, pp.336–354.