

# “Behavioural intention towards mobile banking usage by South African retail banking clients”

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## Behavioral intention towards mobile banking usage by South African retail banking clients

### Abstract

In spite of the widespread acceptance and use of the mobile technology and its associated services, South Africa retail banks face a monumental challenge in convincing its clients to accept mobile banking services. Understanding retail banking clients' behavioral intention toward mobile banking services usage is a key issue in accelerating rapid adoption of the services. Yet, current research pays little attention to the drivers of behavioral intention towards mobile banking usage. This study investigated retail banking clients' behavioral intention towards mobile banking services usage in South Africa. The results of the analysis based on data sourced from 394 retail banking clients of the four major retail banks in South Africa indicate that all the hypothesized relationships in the core conceptual research model based on theoretical considerations rooted in the TAM and its extensions were supported. Therefore, this study does not only verify that the TAM can be deployed to explain and predict mobile banking acceptance but also derived a research model specifying key drivers of retail banking clients' behavioral intention towards mobile banking services usage in South Africa. The study also offers practical insights for industry players in designing and marketing mobile banking services in order to garner favorable attitudes and increased behavioral intention among clients to use mobile banking services in South Africa.

**Keywords:** retail banking, clients, mobile banking, behavioral intention.

**JEL Classification:** O33, M310.

### Introduction

It is perhaps no exaggeration to assert that the most ubiquitous personal device in the world today is the mobile device (Ahluwalia, Varshney, Koong & Wei, 2014; Mwangi & Brown, 2014; Jayawardhena, Kuckertz, Karjaluo & Kautonen, 2009). Its use is nearly universal in most countries. Statistics of the International Telecommunication Union (ITU, 2013) put the global cellular mobile penetration rates at between 96% and 128% in developed countries; and 89% in developing countries respectively. Although mobile phones were originally developed to assist users to communicate with each other, the uptake of recent developments to the mobile phone including services such as short messaging service (sms), multimedia messaging services (mms), web browsing, mobile e-mail and mobile TV have witnessed rapid growth in recent years (Jayawardhena et al., 2009). The mobile technology has thus become central to the recent radical transformations taking in many sectors of the economy including the banking sector due to its widespread adoption and use (Muthu & Kumar, 2014; Rust & Huang, 2014; Vadari & Malladi, 2014; Zhang et al., 2014).

In recent times, the use of direct channels and self-service has become top priority for modern day retail banking clients. This phenomenon is fuelled by the clients' quest for better and more personalized services. Moreover, clients have also developed ample sensitivity towards pricing strategies for retail banking services and products

(Accenture, 2014). To address this increasing sophistication and the changing behavior of clients, the banking sector, which has traditionally been one of the heaviest investors into information technology due to the digital nature of its products and services, has widely embraced mobile technology to offer banking services to its clients through the system of mobile banking (Goyal et al., 2012). Mobile banking is described as an approach to performing financial services over mobile communications technology. It enables banking clients to perform a diverse range of financial services including checking account balances, linking of accounts, inter- and intra-transfer of funds, payment of bills, Internet purchases, and resetting of passwords (Agwu & Carter, 2014; Püschel, Mazzon & Hernandez, 2010). Through the use of mobile banking, clients are able to conduct banking services anywhere and anytime by means of a mobile device, tablet or mobile phone (Dineshwar & Steven, 2013).

The deployment of the mobile technology by financial institutions to provide banking services, like the others before it, has become a prerequisite to gaining a competitive edge in the fight for new clients and winning back the trust of their existing clients (Accenture, 2013). Indeed, a study by KPMG (2013) demonstrates that mobile banking affords a unique opportunity to build customer loyalty, unravel cross-selling propositions and create a more efficient and effective interface for processing transactions. Additionally, mobile banking solutions boost clients' experience of banking transactions, increase clients' throughput and facilitate an added information-rich encounter for loyalty and targeting

propositions, compared to the other forms of electronic banking delivery channels. This leads to a stronger relationship between retail banks and their clients (Hanafizadeh et al., Tabar, 2014; KPMG, 2013; Laukkanen, 2007). From the foregoing, it is abundantly clear that the use of mobile banking holds tremendous prospects for retail banks and their clients.

Consequently, the potential of mobile banking as widely acknowledged, is expected to epitomise the success of Internet banking (Goyal et al., 2012; Püschel et al., 2010). However, recent statistics demonstrate that mobile banking adoption and usage is not as widespread and massive as Internet banking (Koenig-Lewis, Palmer & Moll, 2010). Research findings by the Federal Reserve (2013) indicate only 28% of mobile phone users in America have reported using mobile banking in the past 12 months compared with 63% of Internet banking users within the same period. A comparable research report by Deloitte (2013) also highlights that only 28% (compared with 79% Internet banking users) of the respondents in the Netherlands reported using their standard or smartphones to conduct mobile banking services in 2011. This is the highest in Western Europe; with Belgium being the lowest region with 11% of customers reported using mobile banking services in the same year. A more recent study by World Wide Worx (2014) shows that only 32% of South African retail banking clients performed mobile banking facilitated by USSD in 2013, with 12% conducting mobile banking using through mobile Internet and 9% accessing banking facilities through mobile apps. Overall, 37% of the respondents have reported using mobile banking services in 2013.

Regardless of the tremendous efforts that retail banks put into promoting the adoption and use of mobile banking among their clients, the percentage of current users, as illustrated by the statistics above, is far smaller than the level predicted by industry experts (Hanafizadeh et al., 2014). A review of extant South African literature shows that retail banks face a monumental challenge in persuading clients to bank online (Maduku, 2013; Brown & Molla, 2005; Singh 2004). However, attracting potential clients to online banking and maintaining existing clients are imperative to sustaining the longterm business success of the banking sector (Lin, 2011). Understanding retail banking clients' behavioral intention toward mobile banking services usage has become a key issue in accelerating a more rapid adoption of the services (Lin, 2011; Kuo & Yen, 2009). However, there is little empirical evidence that establishes our understanding on retail banking clients' behavioral intention towards

mobile banking in the South African context. Motivated by these needs, this study extends the Technology Acceptance Model (TAM) by including clients' trust of the mobile banking system and subjective norm to examine retail banking clients' behavioral intention towards mobile banking usage in South Africa. Moreover, the study also examines clients' awareness of the benefits of mobile banking as an external variable of perceived usefulness, and perceived self-efficacy and quality of mobile connectivity as external variables of perceived ease of use to determine their influence on attitude towards mobile banking usage among retail banking clients.

This study comes with both theoretical and managerial implications. By including clients' awareness of mobile banking benefits as external variable of perceived usefulness, and self-efficacy and quality of mobile connectivity as external variables of perceived ease of use, this study aims to provide a model that is capable of providing an understanding of determinants of clients' adoption of mobile banking services. From a managerial perspective, the findings of the study should be useful for retail banks in South Africa and other banks operating in similar context for devising fitting marketing strategies to increase the uptake of mobile banking services in the future.

## 1. Literature review

**1.1. Overview of the South African banking industry and mobile banking.** South Africa has a developed and well regulated banking system which compares favorably with those of the developed countries (Banking Association of SA, 2012). A rating by the World Economic Forum Competitive Survey 2012/13 ranks South African banks in second position in terms of soundness and third in terms of financial sector developments. The South African banking sector is made up of 17 registered banks, 2 mutual banks, 12 local branches of foreign banks, and 41 foreign banks with approved local representative offices. However, ABSA, FirstRand, Nedbank and Standard Bank are the four biggest banks in the country, often referred to as the "big four" in the sector. These banks are fast following a path similar to that of the international banking community with respect to the use of technology to provide banking services to clients. Evidence of which is seen with introduction of Automated Teller Machines (ATMs), banking by telephone, Internet banking, and more recently mobile banking.

The mobile banking technologies used by banks in South Africa vary. For example, ABSA and Standard Bank use the Wireless Internet Gateway (WIG) for mobile banking whilst First National Bank (FNB) uses the Unstructured Supplementary Services Data

(USSD) with an SMS approach (Chikomo et al., 2006). FNB requires the user to first send a USSD string with the user's PIN to the banking server. Thereafter, the server returns a message to notify the user that the server is ready to accept banking SMS messages (Chikomo et al., 2006). However, mobile banking in South Africa uses heightened security procedures that compares favorably with those in the Western world. Expectations are that South African retail banks will ride on the back of the unprecedented growth in the adoption and use of mobile phones, and mobile services to promote a rapid adoption and use of mobile banking services among retail banking clients in the country.

**1.2. Theoretical background.** The rapid adoption of mobile banking is the central interest of this study, and presents major managerial challenges to the implementation of mobile banking services by retail banks in South Africa. A review of extant literature suggests that the Technology Acceptance Model (Davis, 1989), is the most common theoretical framework used in addressing why users accept or reject an information technology system. Previous studies have also suggested that the TAM may be modified and extended in order to study the adoption of other forms of technology including mobile technology (Gu, Luarn & Lin, 2005; Lee & Suh, 2009; Lin, 2011).

*1.2.1. The Technology Acceptance Model (TAM).* The Technology Acceptance Model (TAM) postulated by Davis (1989) was founded on the Theory of Reasoned Action (Ajzen & Fishbein, 1980; Fishbein & Ajzen, 1975). The TAM has been proposed to provide a conceptual framework which highlights a theoretical foundation and parsimony to aid our understanding in explaining and predicting behavioral intention and usage behavior of information technology acceptance. The TAM clarifies the disposition of belief-attitude-intention-behavior and their underlying relationship with the degree of information technology adoption (Hanafizadeh et al., 2014). The TAM postulates that the acceptance of information technology is predicted by users' behavioral intention (BI), attitude towards use (A), and two other internal beliefs: perceived usefulness (U) and perceived ease of use (E). Perceived usefulness is described by Davis (1989) as "the potential user's subjective probability that using a specific application system will increase his or her job performance within an organizational context" and perceived ease-of-use is defined as "the degree to which the potential user expects the target system to be free of effort". Perceived usefulness is speculated to be connected to productivity whereas ease-of-use is connected to effort (Venkatesh, 2000). These two basic beliefs are posited to exert

an influence on an individual's attitude towards usage, which in turn predicts the individual's behavioral intention, which eventually induces his/her actual usage of IT (Davis, 1989). Moreover, perceived ease-of-use is posited to have an effect on perceived usefulness since the easier it is for an IT to be used, the more useful it is likely to be.

The earliest researchers who applied the TAM in studying behavioral intention towards spreadsheet usage (Doll et al., 1998; Adams et al., 1992; Hendrickson et al., 1993; Mathieson, 1991) and e-mail (Adams et al., 1992; Segars & Grover, 1993) have demonstrated the validity of the TAM in these diverse technology usage situations. Consequently, the TAM has been extensively applied by previous researchers to predict user behavioral intention in a variety of technology contexts including Internet and mobile banking technologies in different environmental contexts and has consistently proven to be a robust and parsimonious framework (Schierz, Schilke & Wirtz, 2010; Crabbe et al., 2009; Kuo & Yen, 2009; Wang, Lin & Luarn, 2006).

In spite of the robustness and the parsimony of the TAM, it has been criticized in a number of ways. For instance, Moon and Kim (2001) decry it that the TAM's fundamental constructs do not completely manifest specific influences of technology and usage-context variables that may influence users' acceptance. Moreover, Mathieson (1991) as well as y Monsuwé, Dellaert and De Ruyter (2004) also criticized the TAM for not providing enough information on potential users' opinion on novel systems. Also, granted that a considerable number of studies establish the validity of the TAM as a parsimonious framework in diverse technology-related contexts, literature highlights this parsimony as a major limitation of the TAM (Ha & Stoel 2009; Venkatesh, 2000; Vijayarathy, 2004). On the basis of this, researchers have suggested that the inclusion of belief factors such as trust, enjoyment, subjective norm and performance in future studies to increase the predictive power of the TAM (Moon & Kim, 2001; y Monsuwé, 2004).

*1.2.2. Extending the TAM.* Vijayarathy (2004) contends that the constructs in the TAM are better suited to technology-context environments than to situations involving users' voluntary choices, like a decision to use mobile banking services. Consequently, the original constructs of the TAM may not sufficiently encapsulate crucial beliefs influencing clients' attitude and behavioral intention towards mobile banking services usage (Ha & Stoel, 2009; Vijayarathy, 2004). Therefore, to understand users' behavioral intention towards mobile banking usage, this study integrates two additional constructs, namely: subjective norm and trust of banks offering



mobile banking. Moreover, in the original TAM, antecedents that directly influence perceived ease of use and perceived usefulness are simplified only as external variables. According to Igarria, Guimaraes and Davis (1995) earlier researchers have generally ignored the external variables in comparison to the other variables. Follow-up researchers may well not be able to discover the content of the external variable in the TAM (Kuo & Yen, 2009, p. 104). Accordingly, this study presents perceived self-efficacy and quality of mobile connectivity as external variables to perceived ease of use, and clients' awareness of mobile banking benefits as an external variable to perceived usefulness.

### 1.3. Conceptual research model and hypotheses.

As shown in Figure 1, the proposed conceptual model for this study presents the constructs espoused in the original TAM (Davis, 1989). However, it introduces two variables, namely perceived self-efficacy and quality of mobile connectivity as external variables to perceived ease of use and one variable, namely awareness of mobile banking benefits as an external variable to perceived usefulness. Moreover, two additional variables: clients' trust of banks offering mobile banking services and subjective norm are further introduced to determine their effect on clients' attitude and behavioral intention towards mobile banking usage in South Africa. The succeeding section provides detailed discussion on all the hypotheses regarding the relationships among the variables in the conceptual research model.

*1.3.1. Perceived usefulness, perceived ease of use, attitude and behavioral intention.* Numerous empirical research projects in IT have employed the TAM in its investigations, and have basically validated the hypotheses underlying the TAM constructs. That is, attitude has a significant positive effect on behavioral intention (Van der Haiden,

Verhagen & Creemers, 2003; Lee, Xion & Hu, 2012; Lin, 2011; Mathieson, 1991; Moon & Kim, 2001); perceived usefulness and perceived ease of use have significant positive effects on attitude towards usage (Holden & Karsh, 2010; Legris, Ingham & Collette, 2003; Taylor & Todd, 1995; Teo, 2011); perceived ease of use significantly influences perceived usefulness (Hsiao & Yang, 2001; Liao et al., 2007; Pai & Huang, 2011; Sanchez-Franco, 2010; Shih et al., 2011; Turner et al., 2010). Previous empirical studies on mobile banking delivered similar results. For instance, customers who have a positive attitude towards mobile banking will demonstrate positive behavioral intention towards mobile banking usage (Akturan & Tezcan, 2012; Liao, 2007; Lin 2011; MohdDaud et al., 2011; Zhou, 2011). Also users who perceive mobile banking to be useful and easy to use will have a positive attitude towards usage (Koenig-Lewis et al., 2010; Akturan & Tezcan, 2012, Maduku & Mpinganjira, 2012; MohdDaud et al., 2011; Zhou, 2011). Finally customers who perceive mobile banking to be easy to use demonstrated a higher level of perceived usefulness of mobile banking (Luo, Zhang & Shim, 2010; Lin, 2011; Schierz et al., 2010; Wu & Wang, 2005). Accordingly, the following hypotheses can be presented:

*H1: There is a positive relationship between attitude towards mobile banking usage and behavioral intention to start or continue using mobile banking.*

*H2: There is a positive relationship between perceived usefulness and attitude towards mobile banking usage.*

*H3: There is a positive relationship between perceived ease of use and attitude towards mobile banking usage.*

*H4: There is a positive relationship between perceived ease of use and perceived usefulness.*

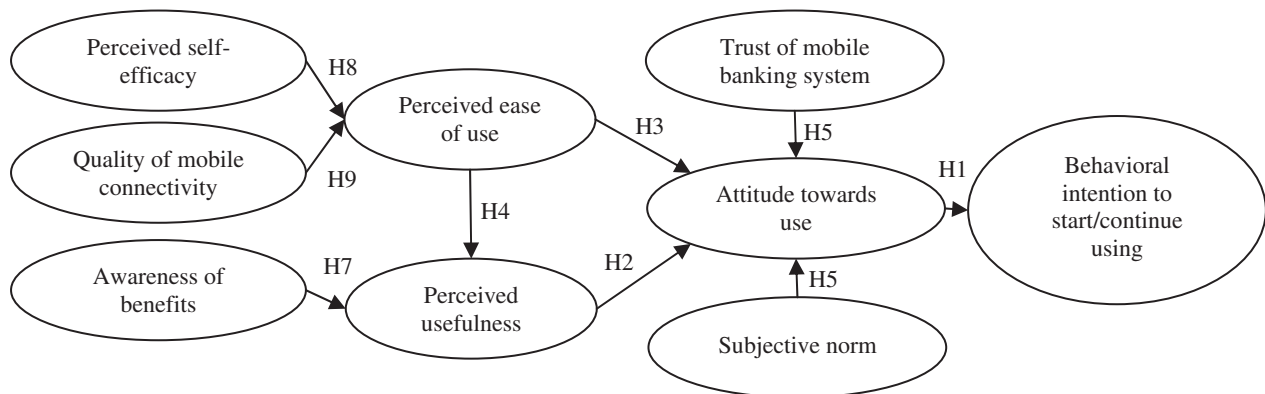


Fig. 1. Conceptual research model

*1.3.2. Trust.* Trust refers to “one’s belief that others will behave in accordance with one’s expectation” (Grazioli & Jarvenpaa, 2000; Luhmann, 2000) and “an expectation that the one others choose to trust will not behave unscrupulously by taking undue advantage of the situation” (Gefen & Straub, 2003). Innovations generally come with risks (Schierz et al., 2010). Trust therefore becomes a prerequisite for mitigating the impact of risk associated with innovations (Luo et al., 2010). Trust helps assuage potential users’ concern about risk and facilitates transaction in an online environment by mitigating uncertainties and possible risks (Gu et al., 2009; Wang & Benbasat, 2005). Previous empirical studies have identified lack of trust as a key reason why many consumers refrain from engaging in online transactions (Grewal, Lindsey-Mullikin & Munger, 2004; Ha & Stoel, 2008; Schierz et al., 2010). Contributing to the lack of trust in online business transactions are the lack of credible standards for secure payment, lack of appropriate legal structures to protect customers from the harm of online transactions, and consumers’ apprehension that their personal data may be disclosed during online transactions (Ha & Stoel, 2008; Schierz et al., 2010).

The idea of trust has been a crucial issue in online banking because it underscores key criteria for what constitutes a conducive online banking environment (Lee, Tsai & Lanting, 2011). Indeed, the issue of trust in online banking has assumed a more critical posture than in offline banking due to the non-existence of a physical branch as well as the absence of a physical interaction between bank personnel and the customer (Aladwani, 2001). Ample empirical evidence suggests that many customers refrained from migrating to online banking because they do not trust the system (Beldad, de Jong & Steehouder, 2010; Hanafizadeh et al., 2014; Luo et al., 2010; Riffai et al., 2012; Shaw, 2014). With regard to mobile banking, extant literature demonstrates that the lack of trust in the mobile banking system poses a significant challenge to widespread acceptance (Cheng & Huang, 2013; Gu et al., 2009; Masrek, Norm & Dang, 2013; Rouibah, Abbas & Rouibah, 2011; Shaw, 2014; Shieh et al., 2013; Zhou, 2012). Accordingly, this research proposes the following hypothesis:

*H5: There is a positive relationship between clients’ trust of the mobile banking system and attitude towards mobile banking usage.*

*1.3.3. Subjective norm.* Although the TAM contributes significantly to the understanding of information systems usage behaviors, it does not account for social context in the adoption and usage of information systems (Jan & Contreras, 2011; Malhotra & Galletta, 1999). Davis Bagozzi and

Warshaw (1989) as well as Davis (1986) emphasize that the exception of social impact from TAM, presents an important research gap for future researchers. Schierz et al. (2010) argue that the social context of the potential user should not be neglected when investigating the acceptance of technological innovations, because it plays a crucial role in the decision-making process. This role is more pronounced in situations where the innovation is at the early stages of development or diffusion. At this stage, potential users lack reliable and consistent information on the innovation. They therefore rely on information from their social network about the innovation to form their attitude. Consistent with Fishbein and Ajzen (1975), this study integrates the social context in the conceptual research model by including subjective norm, which is defined as ‘an individual’s perception that most people who are important to him think he/she should or should not perform the behavior in question’ (Fishbein & Ajzen, 1975). The significance of subjective norm on potential users’ attitude towards a technological innovation has been established in previous empirical studies (Jan & Contreras, 2011; Malhotra & Galletta, 1999; Schierz et al., 2010; Teo, 2010). In terms of mobile banking application, available research shows that subject norm plays a critical role in forming potential users’ attitude towards the innovation because it is fairly new (Maduku & Mpinganjira, 2012; Shierz et al., 2010; Yu, 2012). For instance, a study conducted by Yu (2012) on determinants of mobile payments in Taiwan identified subjective norm as the most dominant belief affecting users’ attitude towards and behavioral intention to adopt mobile banking usage. Accordingly, the following hypothesis was formulated:

*H6: There is a positive relationship between subjective norm and attitude towards mobile banking usage.*

*1.3.4. External variables of perceived usefulness and perceived ease of use.*

**Awareness of benefits.** Online banking is a revolutionary and a nascent banking delivery channel that is aimed to provide convenience to banking clients. The widespread adoption of this innovative banking channel will not be possible without awareness (Al-Somali, Gholami & Clegg, 2009; Amin, 2007). However, lack of awareness is frequently cited as a major hindrance in the adoption of online banking as clients do not appear to fully understand the benefits offered by online banking (Al-Somali et al., 2009; Amin, 2007; Papazafeiropoulou, Pouloudi & Doukidis, 2002; Sathye, 1999). These studies accentuated the overwhelming effect of lack of clients’ awareness on the acceptance of newly

emerging banking innovations. For instance, Al-Somali et al. (2009) as well as Sathye (1999) identified the lack awareness of online banking among banking clients as a major reason why they ignore online in favor of branch banking. A study by Laforet and Li (2005) on factors influencing the adoption of online banking among Chinese banking clients puts this into perspective. The results show that two-thirds of their surveyed sample did not adopt online banking because they were either not aware of the service or were not clear about its benefits. This lack of awareness of the benefits of online banking has been demonstrated to have a significant positive effect on perceived usefulness (Al-Somali et al., 2009). Therefore, the following hypothesis is presented by this study:

*H7: There is a positive relationship between awareness of mobile banking benefits and clients' perceived usefulness.*

**Perceived self-efficacy.** Self-efficacy “refers to belief in one’s capabilities to organize and execute the course of action required to produce given attainments” (Bandura, 1997). It is believed to result from past accomplishments, vicarious experience, verbal persuasion, and emotional arousal (Bandura, 1977). The term computer self-efficacy has been applied to studies involving IT systems. It was derived from the social-psychological concept of self-efficacy which postulates that one’s perception of his/her abilities affects his/her actual performance. Computer self-efficacy (CSE) is described by Scott and Walczak (2009) as one’s judgment of his or her ability to use a computer system. Torkzadeh and Van Dyke (2002) highlight computer self-efficacy as a paramount concept that facilitates our understanding of technology acceptance, implementation, and use. In an empirical study, Tan and Teo (2000) for instance established that users who have confidence in their ability to use the Internet have shown remarkable propensity to adopt Internet banking services and consequently, Chau and Ngai (2010) emphasized that self-efficacy performs a crucial role in moulding user’s feelings about using Internet banking services. Empirical research findings have established that self-efficacy has a significantly positive influence on perceived ease of use (Hsu, Wang & Chiu, 2009; Igbaria & Iivari, 1995; Venkatesh, 2000; Venkatesh & Davis, 1996). Hsu et al. (2009) for example carried out a survey on 207 MBA students from an AACSB accredited University in the Midwest of the United States of America. Their analysis revealed a significantly positive relationship between self-efficacy and perceived usefulness of computer software. Founded on the prevailing theoretical and empirical support, this study proposes the following hypothesis:

*H8: There is a positive relationship between perceived self-efficacy and perceived usefulness.*

**Quality of mobile connectivity.** The quality of the Internet/mobile phone connection is a fundamental element of any online application (Al-Somali et al., 2009). The slow and unreliable wireless network connection with low bandwidth is often reported as common impediment for mobile applications (Longoria, 2001; Zhang & Adipat, 2005). This hindrance significantly impacts upon data downloading time and quality of streaming media (Zhang & Adipat, 2005). In a wireless network, the strength of mobile signals and the rate of data transfer may differ at different times and locations, aggravated by user mobility (Sears & Jacko, 2000). This poses serious challenges for the acceptance of online banking. For instance, empirical studies by Al-Somali et al. (2009), Pikkarainen et al. (2004) and Sathye (1999) have all established significantly positive associations between the quality of internet connectivity and users’ perception of ease regarding online banking. As a result, the following hypothesis has been formulated for this study:

*H9: There is a positive relationship between quality of mobile connectivity and clients' perceived ease of use.*

## 2. Research method

**2.1. Subjects.** The study focused on retail banking clients of the four major banks (ABSA, First National Bank, Nedbank and Standard Bank) in South Africa who are residents of the Gauteng Province of South Africa. Gauteng was chosen because it is the most cosmopolitan province, widely regarded as the microcosm of South African population dynamics. Besides, it is the largest province in terms of population and Gross Domestic Product (GDP) contribution to South Africa. Because there was no sampling frame, a non-probability sampling technique in the form of convenience sampling was used to obtain the research respondents. A mall intercept technique was therefore used to obtain the data by approaching research participants who voluntarily agreed to participate in this study during working hours (09h00 – 17h00) of weekdays (Monday – Friday). A total of 700 questionnaires were distributed, however, only 394 usable responses, representing an effective response rate of 56% was obtained. This sample size was considered adequate in keeping with the methods of statistical analysis employed in this study as well as the sample sizes obtained in similar studies by Hanfzadeh et al. (2014) where 361 responses were obtained and that of Khraim, Shoubaki and Khraim (2011) where 301 responses were obtained.



**2.2. Questionnaire design.** Based on the hypothesized model (Figure 1) developed through an extensive review of related literature on user acceptance of technology, electronic banking and mobile banking, a 37-item questionnaire was developed as a measurement scale for this study. The items were formulated as Likert-type statements anchored by a five-point scale ranging from 1 ('strongly disagree') to 5 ('strongly agree'). In order to ensure construct validity, the items were mainly extracted from previous studies. Table 1 shows the constructs, scale items used to measure the constructs as well as its source. Prior to the main survey, the questionnaire was pre-tested using ten retail banking clients, three lecturers majoring in marketing and banking, and two branch managers of two of the four major retail banks in South Africa in order to refine and finalise the main survey instrument. The final questionnaire consisted of two parts. The first part was designed to understand respondents' basic data and their use of mobile banking services. The second part consisted of the scale items which measured respondents' perception of each construct in the model.

A reliability analysis using the Cronbach's alpha coefficient ( $\alpha$ ) was performed in order to establish the reliability of all the scales employed in this study before their inclusion in the main analysis. Nunnally (1978) posits that Cronbach alpha values which are above .7 are widely considered as suitable pointers of internally consistent (reliable) scales. Results of the analysis computed for this study as presented in Table 1, denote that the Cronbach alpha values for all the constructs ranged from .936 to .963. As a result, it is concluded that the measurement scales used in this study are favorably reliable.

Factor analysis using the Principal Component Analysis (PCA) was performed to ascertain the construct validity of the scales. To achieve construct validity, Hair et al. (2011) recommends that factor loadings be statistically significant and achieve a factor loading of 0.50 or higher with an ideal bottom cut-off point of 0.70. Results as per Table 1, indicate that the factor loadings for the items used in the study ranged from .836-.981. Therefore all the items used in study have attained convergent validity.

Table 1. Reliability and validity analysis of measures of constructs

Construct	Measurement Items	Source	Factor loadings	Cronbach's alpha ( $\alpha$ )
Perceived usefulness	Mobile banking makes it easier to do banking activities Mobile banking enables one to do banking activities more quickly I think mobile banking enables one to complete banking activities more conveniently I think mobile banking allows one to manage banking activities more efficiently I think mobile banking is useful in conducting banking activities	Nor and Pearson (2008)	.887 .931 .920 .889 .891	.944
Perceived ease of use	I think it is easy to learn how to use mobile banking I think it is easy to get mobile banking to do what I want it to do I think it is easy to become skilful at using mobile banking Overall, I think mobile banking is easy to use	Nor and Pearson (2008) and Pikkariainen et al. (2004)	.934 .942 .950 .925	.954
Trust in the e-banking system	I think mobile banking has enough safeguards to make me feel comfortable using it I feel assured that legal structures adequately protect me from problems associated with using mobile banking services I feel confident that technological advances (such as encryption) on mobile make it safe for me to use mobile banking In general, the mobile device is a safe environment in which to transact banking activities	Nor and Pearson (2008)	.855 .876 .836 .839	.936
Subjective norm	People who influence my behaviour believe I should use mobile banking People who are important to me believe I should use mobile banking People whose opinion I value believe I should use mobile banking People who influence my decisions think I should use mobile banking	Nor and Pearson (2008)	.900 .934 .934 .934	.936
Attitude	Using mobile banking is a good idea I like the idea of using mobile banking Using mobile banking is a pleasant idea Using mobile banking is an appealing idea Using mobile banking is an exciting idea	Nor and Pearson (2008)	.921 .948 .966 .938 .896	
Behavioral intention	I intend to start/continue using mobile banking services in future I will use mobile banking services regularly in the future	Al-Somali et al. (2009)	.981 .981	.946
Awareness of mobile banking	I receive enough information about mobile banking services I receive enough information about the benefits of mobile banking I receive enough information on using mobile services I receive information about mobile banking services from my bank	Al-Somali et al. (2009)	.913 .940 .944 .885	.940
Perceived self-efficacy	I feel confident using the mobile device I feel confident using the user's guide/help menu when help is needed I feel confident making selections from an on-screen menu I feel confident moving the cursor around the monitor screen I feel confident understanding the three stages of data processing namely: input, processing and output	Torkzadeh et al. (2006)	.911 .922 .950 .936 .913	.958
Quality of mobile connectivity	Gaining access to mobile network is easy My cell mobile network connection is fast My mobile network connection is reliable Pages on my mobile internet device load quickly	Al-Somali et al. (2009)	.929 .954 .949 .909	.952



### 3. Data analysis, results and discussion

**3.1. Sample characteristics.** Among the usable responses, 204 participants were males (51.8%) and 190 were females (48.2%). This illustrates that the survey observed a slightly higher percentage of men than women. In terms of age, the survey was partially skewed towards the younger age with 274 out of 394 surveyed respondents below the age of 40 years. This denotes that 69.5% of the respondents are below the age of 40, whilst 120 (30.5%) of the respondents are

over the age of 40. With respect to the highest level of education completed, 31 (7.9%) stated matric as their highest level of education completed while 115 (29.2%) held an undergraduate degree. 22.8% (90 respondents) had completed some tertiary education and 10.1% (40 respondents) held a post-graduate degree (master's degree and doctoral degrees). In terms of income, the greatest single proportion of the respondents, 78 (19.8%) earn a gross monthly income of between R7, 501ZAR and R10, 000ZAR.

Table 2. Demographic characteristics of the respondents

Respondent characteristics	Number of respondents (n = 394)	Percentage (%)
Gender		
Male	204	51.8
Female	190	48.2
Age		
18 – 29	153	38.8
30 – 39	121	30.7
40 – 49	75	19.0
50 – 59	27	6.9
60 – 69	15	3.8
70+	3	0.3
Highest level of education completed		
Primary	3	.8
Some High School	28	7.1
Matric (Grade 12)	118	29.9
Some tertiary education	90	22.8
University/college undergrad	115	29.2
Masters	34	8.6
Doctorate	6	1.5
Gross monthly income (in ZAR)		
0 – 2500	67	17.0
2501 – 5000	68	17.3
5001 – 7500	78	19.8
7501 – 10000	53	13.5
10001 – 12500	39	9.9
12501 – 15000	21	5.3
15001 – 17500	16	4.1
17501 – 20000	17	4.3
20001 – 22500	10	2.5
22501+	25	6.3
Access to mobile banking enabled devices		
Yes	343	87
No	34	9
Unsure	17	4
Mobile banking usage		
Yes	198	57.7
No	145	42.3

The majority of survey respondents indicates that they have access to mobile banking enabled devices with 343 respondents (87%) specifying they have access mobile devices that can perform mobile banking and 34 (9%) specifying that their mobile devices cannot perform the function. A further 17 respondents (4%) are unsure whether or not their mobile devices can accommodate mobile banking transactions. With regard to mobile banking usage, 198 (57.7%) of the respondents who have mobile banking enabled mobile devices pointed out they use mobile banking, while 145 (42.3%) indicated that they do not. The percentage of mobile banking users among the respondents is therefore higher by 15.4% than that of non-users.

One open-ended question was built in to the questionnaire to establish from non-users of mobile banking services the reasons for this. Many respondents ignored this question, possibly because it was an open-ended question requiring an individually thought-out answer. Table 3 outlines the issues put forward as reasons for non-use of mobile banking services by those who responded. As can be inferred from the table, trust and security issues are the fundamental reasons stated for non-use of mobile banking services. This observation supports the findings of Hanafizadeh et al. (2014), Gu et al. (2009), Masrek et al. (2013). In these studies trust and security concerns of the mobile banking system were found to be significant deterrents to widespread mobile banking acceptance by retail banking clients.

Table 3. Reasons for not using mobile banking services<sup>a</sup>

Reason for non-use of mobile banking	Frequency	Percentage	Rank
Trust and security issues	28	22.58	1
Lack of interest/customer apathy	20	21.50	2
Lack of information on mobile banking	10	10.75	3
Preference for traditional modes of banking	9	9.68	4
No access to mobile banking enabled device	8	8.60	5
I do not know why/I am not sure	7	7.53	6
Perceived difficulty or complexity of using mobile banking	6	6.45	7
Not technologically inclined	5	5.38	8
Do not see the need for it	5	5.38	9
Perceived high charges and/or hidden costs	2	2.15	10

Note: <sup>a</sup> this question was an open-ended question.

**3.2. Hypothesis testing.** Univariate and multivariate linear regressions were used to analyze the functional relationships between the variables, and to explain and predict the variations that exist between the dependent and independent variables (Chatterjee et al., 2011).

H1 posits a positive relationship between attitude towards mobile banking usage and behavioral intention towards usage. To confirm this, a regression analysis was conducted with attitude as the sole predictor variable for behavioral intention. The significant positive coefficients in Table 4 provide strong support to the hypothesis. The regression model is significant at ( $p = .000 < 0.01$ ).  $R^2$  values suggest that attitude towards usage can explain 62.8% of the variance related to behavioral intention towards mobile banking usage. This result is consistent with previous studies (Akturan & Tezcan, 2012; Liao, 2007; Lin 2011; MohdDaud et al., 2011; Zhou, 2011) which found that users with a positive attitude towards mobile banking services equally have positive behavioral intention to use the services.

Table 4. Regression analysis for attitude on behavioral intention

Independent variable	Unstandardized		Standardized	t	Sig
	Beta (β)	Standard error	Beta (β)		
H1: Attitude	.965	.034	.793	25.740	.000
Equation					
R	.793				
R <sup>2</sup>	.628				
F	662.529***				

Notes: \*\*\*  $p < 0.01$  ~ Dependent variable: behavioral intention towards mobile banking usage.

A multiple regression analysis was performed to ascertain the relationships between H2, H3, H5, H6 and attitude towards mobile banking usage. H2 states a positive relationship between perceived usefulness and attitude toward mobile banking usage. The results of the analysis demonstrate that perceived usefulness is significantly associated with attitude towards usage ( $p = .000 < 0.01$ ). This result

provides robust support for H2, which is consistent with previous studies (Koenig-Lewis et al., 2010; Akturan & Tezcan, 2012; Maduku & Mpinganjira, 2012). The result explains that South African retail banking clients will have a positive attitude towards mobile banking services usage if they perceive the services to be useful to conducting their banking transactions.

Table 5. Multiple regression analysis for predictors of attitude

Independent variable	Unstandardized		Standardized	t	Sig
	Beta (β)	Standard error	Beta (β)		
Constant	-.085	.143		-5.91	.555
H2: Perceived Usefulness	.271	.047	.243	5.740	.000
H3: Perceived Ease of Use	.172	.050	.166	3.446	.001
H5: Trust	.514	.049	.445	10.521	.000
H6: Subjective Norm	.101	.038	.101	2.634	.009
Equation					
R	.825				
R <sup>2</sup>	.681				
F	206.337***				

Notes: \*\*\*  $p < 0.01$  ~ Dependent variable: attitude towards mobile banking usage.

With regard to H3, the results presented in Table 5 demonstrate that perceived ease of use ( $p = .001 < 0.01$ ) is significantly related to attitude towards mobile banking usage. This significant positive relationship is seen in the positive coefficients values reflected in Table 4, thus providing solid support for H3, that perceived usefulness is significantly related to attitude towards mobile banking usage. This implies that when mobile banking services are easy to use, retail banking clients feel that they will exert less effort to operate the services, leading to the development of a positive attitude towards usage. This finding is in line with previous studies (Lin, 2011; Luo et al., 2010; Schierz et al., 2011), which have found perceived ease of use to be strongly associated with attitude towards usage.

Moreover, results presented in Table 5, provide strong empirical support for H5, which postulates a positive relationship between clients' trust of the mobile banking system and their attitude towards mobile banking usage. The results' positive coefficients ( $p = .000 < 0.01$ ) shown in the table attest to this, hence H5 was supported. This result echoes those of previous researchers (Cheng & Huang, 2013; Gu et al., 2009; Rouibah et al., 2011). Thus retail banking clients will have favorably positive attitude towards mobile banking services usage if they trust the mobile banking system. It implies that to boost retail banking clients' attitude towards mobile banking usage, banks must relentlessly seek to reinforce their security systems on the mobile banking platforms and have these security enhancements continuously communicated to their target market.

Additionally, the results in Table 5 also indicate that subjective norm has a significantly positive relationship with attitude towards mobile banking usage ( $p = .009 < 0.01$ ), therefore H6 was supported. This result is consistent with those of earlier studies (Jan & Contreras, 2011; Maduku & Mpinganjira, 2012; Shierz et al., 2010; Teo, 2010; Yu, 2012). This demonstrates that clients' attitude towards mobile banking services usage is influenced by the people who are important to them. It therefore means banks can develop a positive attitude toward mobile banking services among their target market by identifying and using the people who consider their target market as important to them to promote the mobile banking services to them.

It is noteworthy that the  $R^2$  value of the multiple regression analysis presented in Table 5 suggests that when combined, the four constructs can predict 68.1% of variance in attitude towards mobile banking usage. This demonstrates a high explanatory power. Moreover, among the constructs, the results highlight trust of the mobile banking system as the most crucial determinant of clients' attitude towards mobile banking services usage in South Africa. This is corroborated by the fact that trust has the greatest standardized beta coefficient value (.445). This was followed by perceived usefulness (.243), perceived ease of use (.166) with subjective norm being the least (.101). This gives an indication that the efforts of banks directed at creating a more favorable attitude towards mobile banking usage among their target market will not yield any substantial dividend until clients' trust in the mobile banking system is enhanced.

A significant relationship between perceived ease of use and perceived usefulness has also been established in this study. The results as presented in Table 6 signify that perceived usefulness has a significant positive relationship with perceived ease

of use ( $p = .000 < 0.01$ ), so H4 was supported. The  $R^2$  value indicates that 50% of the variance in perceived usefulness can be attributed to perceived ease of use. This is validated by previous researchers (Lin, 2011; Luo et al., 2010; Schierz et al., 2010; Wu & Wang, 2005) who uncovered that perceived ease usefulness is substantially related to perceived ease of use of mobile banking services. Consequently, the higher the perceived ease of uses, the more probable that mobile banking services are useful for retail banking clients in South Africa.

Table 6. Regression analysis for perceived ease of use on perceived usefulness

Independent variable	Unstandardized		Standardized	t	Sig
	Beta (β)	Standard error	Beta (β)		
H4: Perceived Ease of Use	.733	.037	.707	19.813	.000
Equation					
R	.707				
R <sup>2</sup>	.500				
F	392.545***				

Note: \*\*\*  $p < 0.01$  ~ Dependent variable: perceived usefulness.

In an effort to ascertain the external variable of perceived usefulness, this study hypothesized that awareness of mobile banking benefits has a positive relationship with perceived usefulness (H7). The results of the analysis depicted in Table 7 denote that awareness of mobile banking benefits has a significant positive relationship with mobile banking ( $p = .000 < 0.01$ ). Therefore H7 was supported.  $R^2$  value implies that 59.8% of the variance in perceived usefulness can be attributed to awareness of benefits. These results are supported by previous findings (Al-Somali et al., 2009; Amin, 2007; Papazafeiropoulou et al., 2002; Sathye, 1999). This study emphasizes awareness creation of the benefits of mobile banking has a higher ability to explain and predict perceived usefulness. It is thus important for retail banks to put more effort into creating awareness of mobile banking services if they want their customers to realize the benefits of the services.

Table 7. Regression analysis for awareness of benefits on perceived usefulness

Independent variable	Unstandardized		Standardized	t	Sig
	Beta (β)	Standard error	Beta (β)		
H7: Awareness of benefits	.888	.037	.774	23.729	.000
Equation					
R	.774				
R <sup>2</sup>	.598				
F	563.055***				

Note: \*\*\*  $p < 0.01$  ~ Dependent variable: perceived usefulness.

This study presented perceived self-efficacy and quality of mobile connectivity as antecedents of perceived ease of use. To test the relationships between perceived self-efficacy and perceived ease of use, and quality of mobile connectivity and perceived self-efficacy, this study employed a multiple linear regression. Results of the analysis as presented in Table 8 indicate that a significant positive relationship exists between perceived self-efficacy and perceived ease of use ( $p = .000 < 0.01$ ), hence H8 is supported. Moreover, a significant positive relationship has also been established between quality of mobile connectivity and perceived ease of use ( $p = .000 < 0.01$ ). These findings are consistent with the findings of earlier researchers (Al-Somali et al., 2009; Hsu et al., 2009; Igbaria & Iivari, 1995; Pikkarainen et al., 2004; Sathye, 1999).

Table 8. Multiple regression analysis for predictors of perceived ease of use

Independent variable	Unstandardized		Standardized	t	Sig
	Beta ( $\beta$ )	Standard error	Beta ( $\beta$ )		
H8: Perceived Self-efficacy	.496	.037	.548	13.253	.000
H9: Quality of connectivity	.272	.043	.263	6.361	.000
Equation					
R	.723				
R <sup>2</sup>	.523				
F	214.380***				

Notes: \*\*\*  $p < 0.01$  ~ Dependent variable: perceived ease of use.

## Concluding remarks

This study investigated retail banking clients' behavioral intention towards the use of mobile banking services in South Africa. This study is one of the earliest to empirically test the determinants of behavioral intention in clients towards mobile banking services usage in the South African context. The results of the analysis denote that all the hypothesized relationships in the core conceptual research mode based on theoretical considerations rooted in the TAM were supported. Therefore, this

study not only verifies that the TAM can be deployed to explain and predict mobile banking acceptance but also derived a research model specifying key drivers of retail banking clients' behavioral intention towards mobile banking services usage in South Africa.

Trust and security issues of the mobile banking technology were the most cited reasons for non-adoption among current non-users of mobile banking services in South Africa. Similarly, the study also found clients' trust of the mobile banking system as the most significant factor that exerts an influence on their attitude towards mobile banking services usage. This is an important finding, considering that many earlier studies in different environmental contexts have found perceived usefulness to be the strongest predictor of attitude towards usage. This implies that South African retail banks and other players in the industry are challenged to continuously improve on the safety and security of their mobile banking platforms in an effort to garner a more favorable attitude among their clients. Moreover, advertisement messages that seek to promote the acceptance of mobile banking among retail banking customers must not only outline the benefits of the services, but also seek to bolster clients' confidence in the mobile banking system by emphasizing the safety and security features of the mobile banking platform.

This study is limited in generalizing the results of the study. Firstly, this study conducted a survey of retail banking clients in only one of the nine provinces in South Africa. Moreover, the convenience sampling technique adopted has limitations which impede the generalization of the findings to retail banking customers in the entire country. For instance, the sample was more biased towards men and clients in the younger age bracket (i.e. under 40 years old). Future studies could consider extending the study to the other provinces of South Africa using probability sampling procedures and more robust methods of analysis like Structural Equation Modelling (SEM) to discuss causal relationships between the constructs.

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