

GENERATION Y STUDENTS' PERCEIVED UTILITY AND TRUST IN MOBILE BANKING

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of the

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Vanderbijlpark

2015

DECLARATION

I declare that:

“Generation Y students’ perceived utility and trust in mobile banking”

is my own work and that all the sources I have used or quoted have been indicated and acknowledged by means of complete references, and that this thesis has not previously been submitted by me for a degree at any other university.



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To whom it may concern

This is to confirm that I, the undersigned, have language edited the **thesis** of

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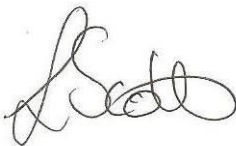
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Generation Y students' perceived utility and trust in mobile banking.

The responsibility of implementing the recommended language changes rests with the author of the thesis.

Yours truly,



Linda Scott

DEDICATION

I would like to dedicate this thesis to Jesus Christ and my exceptional parents, Danie and Ansie van Deventer.

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With the submission of this thesis, I acknowledge with gratitude the assistance, encouragement, and support of all the people involved in this study. In particular, I would like to sincerely thank the following individuals:

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Luke 12:29-31 "And do not seek what you are to eat and what you are to drink, nor be worried. For all the nations of the world seek after these things, and your Father knows that you need them. Instead, seek His kingdom, and these things will be added to you."

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ABSTRACT

KEYWORDS: Generation Y students, utility, trust, mobile banking attitude, mobile banking behaviour, technology acceptance model (TAM), South Africa.

Rapid advances in mobile technologies and the increase in mobile device usage and ownership, specifically mobile phones, have contributed to the introduction and development of mobile technology as a banking services delivery channel by retail banks. As such, mobile banking has emerged as the focal point of growth strategies for the retail banking industry. In comparison to traditional in-branch banking, mobile banking offers various utility advantages for both retail banks and consumers. However, the slow adoption rate of mobile banking as an emerging banking service remains a dilemma for strategists, analysts and banking- and marketing managers in emerging economies, such as South Africa. Owing to perceptions of high risk and uncertainty, building consumers' trust in digital banking channels, including that of mobile banking is essential for retail banks. This highlights the importance of understanding the extent to which perceived utility and trust in mobile banking influence consumers' attitudes towards and usage behaviour of mobile banking, including those of the youth. The Generation Y cohort, born between 1986 and 2005, is the most technologically astute generation to date. Owing to its sheer size, the Generation Y cohort presents as an attractive and lucrative market segment, especially those who hold a tertiary education. Individuals who pursue a higher education are linked to higher future earning potential.

The primary objective of this study was to propose and empirically test an extended TAM that measures the extent to which Generation Y students' perceived utility and trust in mobile banking influences their attitudes towards and usage behaviour of mobile banking within the South African context. The proposed model suggests that subjective norms, perceived behavioural control and perceived relative advantage have a direct positive influence on attitudes towards mobile banking. Furthermore, the model infers that perceived ease of use, perceived integrity and perceived system quality have a direct positive influence on mobile banking usage behaviour. In addition, the model advocates that attitudes towards mobile banking have a direct positive influence on mobile banking usage behaviour.

The sampling frame for the study comprised the 26 public registered HEIs situated in South Africa. From this initial list of 26 registered institutions, a non-probability judgement sample of three institutions in the Gauteng province was chosen. Of the three HEIs, one was a traditional university, one a university of technology and one a comprehensive university. Lecturers at each of the three HEI campuses were contacted telephonically and asked whether they would allow the questionnaire to be distributed to their students during class time. The questionnaires were hand-delivered to the participating academic staff members to be distributed to the students for voluntary completion during class time. A convenience sample of 450 full-time Generation Y students across these three campuses was taken in 2015. Of the questionnaires completed, 334 were usable. The statistical analysis of the collected data included exploratory principle components analysis, descriptive statistical analysis, correlation analysis, multicollinearity analysis, structural equation modelling, two independent-samples t-test, and one-way analysis of variance.

The findings of this study indicate that South African Generation Y students have a positive attitude towards mobile banking, perceive mobile banking as easy to use and take into consideration the opinions of their significant others regarding mobile banking usage. Furthermore, Generation Y students believe that they are in control of mobile banking in terms of their capability and resources needed to use mobile banking, and trust that their retail banks are likely to be honest, keep promises, and act ethically in providing mobile banking services. Moreover, these students report behaving actively in terms of their mobile banking usage and recognise the perceived utility in mobile banking concerning convenience and timesaving advantages. Furthermore, they trust that the mobile banking system likely has adequate structural assurances, can provide quality and relevant information and that the system is likely to be user-friendly in terms of navigation and loading of texts and graphics.

This study will contribute to filling the gaps that exist in understanding the extent to which Generation Y students' perceived utility and trust in mobile banking influences attitudes towards and usage behaviour of mobile banking; that is, the antecedents of attitudes towards and usage behaviour of mobile banking in South Africa by developing and empirically testing a conceptual model. An understanding of these antecedents will enable retail banks to tailor their mobile banking business- and marketing efforts towards

the Generation Y cohort in South Africa. From a strategic perspective, marketers, policy makers, and strategists could use the results of this study as a guide for deploying strategies to promote increased consumer acceptance of mobile banking, influence consumer behaviour as well as transform and integrate the retail banking distribution mix, thereby delivering substantial returns on investment in providing these services. In addition, the findings of this study will contribute to existing studies of mobile banking in South Africa, a subject matter that is largely under-researched, as well as the information systems knowledge base. Furthermore, the findings of this study will contribute to the literature on, and the development of, a profile of South African Generation Y students' consumer behaviour.

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CHAPTER 1

INTRODUCTION AND PROBLEM STATEMENT

“Strategy is an elusive and somewhat abstract concept, but a potentially powerful tool to cope with changing conditions”

— Ansoff and McDonell

1.1 INTRODUCTION

Previously, the banking sector comprised a large number of relatively small retail banks trading in distinctive geographical local markets. Furthermore, the banking sector’s traditional business model of accepting deposits and granting loans were delivered through a face-to-face meeting with a financial services company representative (Arnaboldi & Claeys, 2008). While the traditional business model, comprising bricks-and-mortar banking, will continue to play an important role in retail banking and will remain a key distribution channel (Kanchan *et al.*, 2012:3), retail banks increasingly are faced with various challenges. Examples of these challenges include distribution channel mix transformations and integrations (Cox *et al.*, 2008:9; Kanchan *et al.*, 2012:3), expanding business operations (Martins *et al.*, 2014:1), capturing a larger banking market share (Arnaboldi & Claeys, 2008) and reducing operating costs (Arnaboldi & Claeys, 2008; Martins *et al.*, 2014:1) while continuing to satisfy demanding consumers (Byers & Lederer, 2001:130). Furthermore, retail banks are confronted with surviving in an increasingly competitive environment (Arnaboldi & Claeys, 2008; Thornton & White, 2001:169), coupled with the changing landscape of the banking industry brought about by information technologies (Byers & Lederer, 2001:130; Liao & Cheung, 2002:283). In addition, retail banking is experiencing a significant shift in consumer behaviour due to the digital revolution that continues to influence the fundamental manner in which businesses and individuals transact (Standard Bank, 2015a). Moreover, new technologies, banking innovations and changing consumer behaviour mean that there are widening gaps between the banking processes of the past and the expectations of the new (Marous, 2013). As a result, these changes motivate the contemplation of a more innovative approach to delivering banking services (Arnaboldi & Claeys, 2008) in order to stay current, significantly innovate and transform for the future (PwC, 2014:1).

Given that the success or failure of retail banks is reliant on the management competencies needed to forestall and/or respond to challenges and changes in the financial marketplace (Gan *et al.*, 2006:360), the majority of retail banks have undertaken various developmental changes (Moutinho & Curry, 1994:191). Evidence of these changes are reflected in the banking sector's development of technology-driven strategies (Moutinho & Curry, 1994:191) and their adoption of different mind-sets through accentuating the importance of global markets. Further developmental changes include the banking sector embracing strategic flexibility and the capacity to accept and harness change (Schaap, 2006:13), with the primary purpose of determining consumer preferences (Byers & Lederer, 2001:130; Moutinho & Curry, 1994:191) and whether they will result in higher returns and market penetration (Moutinho & Curry, 1994:191).

According to OECD/Eurostat (2005:46), the conversions in the delivery of banking services brought about by information technologies, may be regarded as innovative. Through information technologies the implementation of a new or considerably improved product or service, process, marketing method, or a new organisational business practice method, workplace organisation or external relations are brought to the market. Narteh (2012:2) as well as Wessels and Drennan (2010:547) concur stating that rapid advances in the areas of telecommunications and information communication technology in the banking industry serve as a catalyst in the development of innovative products and services. According to various authors (Lee, 2002:238; Liao & Cheung, 2002:283), these rapid advances result in service market opportunities and motivate the evolvement of more information- and system-oriented management and business processes. As a result, in the search for a sustainable competitive advantage, retail banks have recognised the significance of differentiating themselves from other financial institutions through distribution channels, which include, amongst others, branch networks, automated teller machines (ATMs), call centres, mobile and Internet banking (Kanchan *et al.*, 2012:3) and mobile banking branches. Consequently, retail banks are constantly developing and using new alternative distribution channels to reach their consumers (Thornton & White, 2001:184). Clearly, there is a growing popularity of delivering banking services through multiple distribution channels (Martins *et al.*, 2014:2), particularly electronic or digital banking distribution channels as opposed to only over-the-counter banking or branch networks (Hanafizadeh *et al.*, 2014:62; Kim *et al.*, 2011:76; Usman & Shah, 2013:2; Yu & Guo, 2008:8).

Electronic banking, or digital banking as referred to by Kanchan *et al.* (2012:12), is the umbrella term used to describe the different forms of electronic retail banking distribution channels or technologies and includes Internet banking, ATMs, telephone- and mobile banking (Kim *et al.*, 2011:76). Electronic banking is defined as the utilisation of technology to connect with a retail bank where an account is held, for the purpose of communicating instructions and to obtain information (Gwasira & Nhavira, 2013:26). Salhieh *et al.* (2011:325) describe electronic banking as the automated delivery of innovative and traditional banking products and services directly to consumers through electronic and interactive communication channels. Electronic banking comprises the systems that permit retail banks, consumers, individuals or businesses, to access bank accounts, manage business transactions or acquire information on financial products and services by means of the Internet.

The evolution of the Internet has led to the establishment of numerous value-adding products and services, such as Internet banking (Redlinghuis & Rensleigh, 2010:1). The use of the Internet in business has increased intensely, nationally and internationally, with the banking industry being one of the earliest adopters of Internet innovations (Maduku, 2013:78). Consequently, retail banks have completely re-organised their retail banking channel mix to make way for this new distribution channel of financial service delivery (Arnaboldi & Claeys, 2008). Internet banking is defined as a banking service that permits consumers to access and complete financial transactions mainly from their personal computers with an Internet connection to the bank's website, using web browser software, such as Netscape Navigator or Microsoft Internet Explorer (Redlinghuis & Rensleigh, 2010:2). In 2012, Nel *et al.* (2012:30) opine that Internet banking in emerging economies, such as South Africa, may not be a viable option for many consumers, due to the low Internet penetration rate of only 10.8 percent. However, in 2014, the South African Internet penetration rate reached 51.5 percent (Internet World Stats, 2014). This, coupled with the rapid developments in mobile technologies and an increase of mobile devices, particularly mobile phones (Okazaki & Taylor, 2008:4; SouthAfrica.info, 2012) has seen the banking industry worldwide witness a paradigm strategy shift in, and an increased appreciation of, the significance of mobile technology as a means of delivering banking services (Kesharwani & Radhakrishna, 2013:2).

Mobile banking denotes the provision of banking services by retail banks utilising wireless Internet gateway (WIG) and wireless application protocol (WAP) mobile applications on mobile devices, such as mobile phones, iPads/tablets and personal digital assistants (PDAs) (Nel *et al.*, 2012:30). Mobile banking is the consumer's utilisation of mobile devices to perform banking activities, such as balance enquiry, money transfers and account payments at anytime from anywhere (Dahlberg *et al.*, 2008:165-166).

Worldwide, mobile banking was first introduced in the early 1990s (KPMG, 2015a:1). Ernst and Young (2009:14) report that in 2005, South African based MTN (the largest mobile operator in Africa) collaborated with Standard Bank (the largest banking group in Africa) to introduce MTN Banking, which at the time was one of the first truly mobile banks worldwide. Maduku and Mpinganjira (2012:174) agree that mobile banking was first introduced in South Africa in 2005. However, Dagada (2012) argues that mobile banking was first introduced in August 2000, when the Amalgamated Banks of South Africa (ABSA) launched SMS-based mobile banking, followed by First National Bank (FNB), Standard Bank and Nedbank soon after.

Given the fact that access to a bank account and a handheld mobile device are essential enabling prerequisites for a consumer to undertake mobile banking transactions (Nel *et al.*, 2012:30), statistics on the banked population and mobile penetration demonstrate that South Africa is a fertile environment for adopting mobile banking. FinScope South Africa (2014:5) reports that in 2004, 46 percent of the total South African adult population (16 years and older) were banked. The African Executive (2008) indicates that in 2012, 40 percent of total South African adult population had a bank account. In 2014, however, FinScope South Africa (2014:5) highlights that 75 percent of the total adult population were banked, which is a significant increase from 2004. Moreover, Nel *et al.* (2012:30) note that the South African mobile penetration rate in 2010 was estimated at around 100 percent. In 2014, Fripp (2014) points out that mobile penetration reached 133 percent, suggesting that the majority of South Africans have more than one mobile device. Conversely, smartphone penetration in 2014 was recorded at 47 percent. Despite these positive statistics, KPMG (2015b:11) indicates that the South African mobile banking penetration rate stands at approximately 57 percent, which is a noteworthy increase from 37 percent in 2009, as reported by World Wide Worx (2009b). Notwithstanding the increase in mobile banking usage, retail banks and financial service providers alike have

an interest to see sustained growth in mobile banking adoption, as this will reduce operational expenditure (Nel *et al.*, 2012:30), justify the increased focus and investments around digital channels and channel strategy, and increase profitability (Kanchan *et al.*, 2012:12). This can be achieved through positively influencing attitudes towards mobile banking and mobile banking behaviour.

Ismail and Masinge (2012:99) opine that banking services are inaccessible to millions of people in South Africa and across emerging economies. This is because many individuals are challenged with barriers of cost, geography and education, excluding them from securely transferring funds, saving money or accessing credit. Meyer (2015) indicates that the banking system, owing to the exorbitant banking fees, Financial Intelligence Centre Act (FICA) requirements and a common lack of trust for retail banks discourages many people, resulting in a huge unbanked population. Ismail and Masinge (2012:99) note that one solution to this problem, which has captured specific attention from stakeholders in Africa, is mobile banking, as this digital channel of financial service delivery offers millions of people in emerging economies that have access to a mobile device the opportunity to connect to the financial mainstream. Retail banks that are committed to reaching and influencing the mobile banking behaviour of previously unbanked consumers will be successful in the future, as SouthAfrica.info (2012) points out that mobile banking will emerge as the driver for present and future retail banking revenues in South Africa and elsewhere. In addition to increased revenue, retail banks will also benefit from several other advantages associated with mobile banking.

Mobile banking mitigates retail banks' costs related to branch overheads and transaction costs (Rose & Hudgins, 2005:27; Yu & Guo, 2008:9); that is, digital channels are more cost effective compared to traditional channels (Pikkarainen *et al.*, 2004:225). Moreover, mobile banking creates potential for a feasible business model that presents an opportunity for retail banks to expand market penetration by connecting with previously unbanked consumers, including low-income markets (Lee *et al.*, 2007:2). Furthermore, mobile banking aids the facilitation of immediate two-way communication between retail banks and their consumers (Yu & Guo, 2008:9). In addition, mobile banking allows for the creation of consumer databases, which presents a further advantage of being able to provide personalised offerings to consumers (Yang & Fang, 2004:304), such as granting a temporary loan via mobile banking based on the consumer's unique financial position.

Moreover, Jayawardhena & Foley (2000:21-22) indicate that using multiple distribution channels, such as branch networks, Internet banking and mobile banking, retail banks benefit from an increased consumer base. This is because employing multiple channels amplifies market coverage, thereby allowing different products and services to be targeted at different demographic segments. Furthermore, with a larger consumer base, retail banks can benefit from marketing- and communication efforts, with the possibility of mass customisation for each group of consumers through offering innovative products. This is an important issue as many businesses today are saturated with mass automation and homogenised products and services. In the view of the consumer, there is an increase in autonomy, with less dependency on traditional channels and, accordingly, less time and effort is spent on performing banking transactions.

The convergence of telecommunication and financial services generated opportunities for the development of mobile banking solutions for mobile banking consumers as well (Nel & Raleting, 2012:51), with the primary purpose of increasing the satisfaction an individual gets by spending the least amount of effort in using a system or service. This is referred to generally as utility in mobile banking (Njenga & Ndlovu, 2013:45). Mobile banking provides consumers with convenience and efficiency, saving them time and money. Lin (2011:252) highlights that mobile banking provide consumers with value creation owing to it being inherently time and place independent, as well as effort-saving qualities. In addition, Yu and Guo (2008:9) indicate that mobile banking consumers can take advantage of attractive business terms, such as lower banking fee rates and can enjoy consistent service quality.

Notwithstanding the utility in mobile banking for both the retail bank and consumer, it remains cybernetic, lacks control and involves great uncertainty and risk and, therefore, trust plays a pivotal role in the adoption and use of mobile banking (Kim *et al.*, 2009:284; Lin, 2011:253; Zhou, 2011:528). With the advent of innovations such as mobile banking, consumers may experience feelings of fear when using this channel for banking transactions, especially because of wireless transaction security issues such as a lack of encryption of short message services (SMS) and the fact that personal data is distributed. Trust aids in decreasing these fears, mitigates potential risks and enables business transactions under uncertainty. Therefore, retail banks need to understand consumers' trust to attain and retain them, and to provide explanations and solutions to the problems

pertaining to mobile banking adoption (Lin, 2011:253; Zhou, 2011:528). A review of the literature reveals several studies (Bhattacharjee, 2002; Gefen, 2000; Gefen *et al.*, 2003a, Gefen *et al.*, 2003b; George, 2002; Jarvenpaa *et al.*, 2000; Pavlou, 2003; Sohail & Shanmugham, 2003) with empirical support indicating the significance of trust as a direct or indirect factor influencing individuals' behavioural intention to perform online economic activities. Therefore, it is of strategic importance that retail banks foster trust in mobile banking.

Abdalkrim and Khrais (2013:53) opine that mobile banking plays a critical role in retail banking distribution and, therefore, distribution strategies of retail banks will have a significant impact on the future of retail banking. Goswami and Raghavendran (2009:14) add that because mobile banking is evolving as the new retail banking distribution channel, this channel has become the focal point of growth strategies for the retail banking industry. Kanchan *et al.* (2012:15) argue that retail banks globally are directing their efforts at achieving a seamless multi-channel integration across all channel networks, shifting channel management from just being an operational function to becoming a tactical tool. As such, Kanchan *et al.* (2012:15) opine that retail banks have to rethink and develop distribution strategies that consider consumer segmentation and profiling for directing the right product and service to the right consumer through the right channel. As such, Kanchan *et al.* (2012:15) advise the integration of channel management with a successful overall business strategy, through reviewing the channel strategy before making a channel investment, shifting the right consumer to the right channel to optimise consumer satisfaction and retail banking profits and to design channel experience with a consumer-centric approach. Wannemacher (2013) opine that mobile banking is the most significant strategic change in retail banking over the last decade. The author attributes this to the fact that mobile banking is shifting consumers' banking behaviour, raising consumers' retail banking expectations, and is opening up new opportunities for retail banks, their competitors and new disruptors. Evidently, it is important that retail banks plan for change and uncertainty by incorporating strategic management and planning as a tool of monitoring performance and development, address problems that might arise when attempting to integrate new channels with existing channels, and to react to the ever-changing banking and technological environment.

Strategic management involves formulating, implementing, and evaluating cross-functional decisions that allows an organisation to realise its objectives. Strategic management concentrates on integrating management, information systems, finance, operations and research and development to exploit and create new and different opportunities for future success (David, 2011:37). Huang *et al.* (2004:365) emphasise the strategic importance of electronic readiness of banks. While electronic banking services can provide for enhanced efficiency and competitiveness, the reality is that they incur high levels of implementation risk. Therefore, Salhieh *et al.* (2011:326) highlight that it is essential that retail banks regularly assess the availability of the necessary information technology infrastructure, workforce, and banking functions, and subsequently evaluate whether these factors are operating at maximum efficiency to ensure that electronic banking systems remain up-to-date. Brews and Purohit (2007:64) add that the increasingly competitive banking environment, shorter product life cycles, and continuous changes in technology have forced retail banks to adjust their strategic plans to combat the adverse impacts of these challenging contexts. In addition, it is imperative that financial institutions' strategic plans account for changing consumer behaviours, needs and lifestyles, including those of the youth.

Masote and Shevel (2012:7) indicate that due to the significant growth in the youth market in South Africa, there are more subscriber identity module (SIM) cards and mobile devices per household. In generational studies, the youth are referred to as Generation Y and are demarcated by Markert (2004:21) as those individuals born between 1986 and 2005, which, in 2015, puts them at 10 to 29 years of age. Studies (Cui *et al.*, 2003:311; Kumar & Lim, 2008:571) focusing on higher education institution (HEI) students, generally define them as those individuals between the ages of 18 and 24 years.

Members of the Generation Y cohort are known to be confident, passionate, strong-willed, optimistic, adaptable to change, demanding, team players, independent, diverse and tend to voice opinions and set high levels of expectations (Cox *et al.* 2008:4-7; ; Pew Research Center, 2010). In addition, members of this cohort are perceived as technologically astute (Van Deventer *et al.*, 2014:117), inferring that they are likely to lead the way forward in new technology adoption and establish brand loyalty.

Being the first generation to have grown up in a period where computers, mobile devices, electronic devices and the Internet have been integral elements of everyday life has led to

Generation Y members thriving on technology and its innovations. Moreover, by employing laptops, mobile phones and an array of other technological gadgets, these individuals can be plugged in 24 hours a day, seven days a week, allowing them to learn, acquire information at exceptionally rapid speeds, excel in their jobs, and lead intense social lives (Kane, 2012; Schwalbe, 2009; Sheahan, 2005). Universally, nine out of ten individuals in the Generation Y cohort have a computer, while 82 percent are in possession of a mobile phone (Ferguson, 2008). The South African population totalled roughly 54 956 900 in 2015, of which an approximated 38 percent form part of the Generation Y cohort (Stats SA, 2015). The Generation Y cohort is perceived to be salient to the retail banking industry and their innovative developments, including mobile banking, given its significant size and its member's tendency to utilise technology to satisfy banking needs. Therefore, it is essential that retail banks continuously engage in the process of strategic management and planning concerning innovation as well as influence banking behaviour to ensure future success. Several researchers (Constantine, 2010:2; Cox *et al.*, 2008:15) uncovered that technologically advanced retail banks that take advantage of technology and that interact with these individuals in ways with which these individuals are accustomed to, such as online messaging, social networking and targeted offerings to mobile phones, will be prosperous in their dealings. Robson (2012) concurs, stating that technology will act as a catalyst in creating a distinguishing experience for Generation Y in satisfying their banking needs.

1.2 PROBLEM STATEMENT

Considering the high mobile penetration in South Africa (Fripp, 2014), the fact that 75 percent of the total South African adult population is banked (FinScope South Africa, 2014:5) and the low mobile banking penetration rate (KPMG, 2015b:11), it is reasonable to assert that sustained growth in mobile banking adoption in South Africa is necessary. Moreover, the establishment, maintenance, and delivery of banking services through electronic channels, such as mobile banking, comprise significant deployment of financial resources on the part of retail banks. Global information technology spending by financial services in 2010 was estimated at 357.4 billion American Dollars, with Europe accounting for the highest spending (36.1%), followed by North America (33.1%) and Asia and the Pacific markets (25.2%). Africa and Latin America together accounted for 5.7 percent of the spending (Alvarez, 2010). South African retail banks rank innovation of

maximum importance and as such each project to invest three to five billion South African Rand in technology and innovation. In 2013, the four largest retail banks were operating 2 877 bricks-and-mortar branches, expected to be reduced by 21 percent, hence to 2 285 branches by 2016. This is in-line with their stated objective to transition more consumers to digital distribution channels, such as mobile banking (PwC, 2013:9).

Various authors (Campbell & Frei, 2010:10; Ismail & Masinge, 2012:99; Nel & Raleting, 2012:51) argue that substantial consumer adoption of mobile banking is consequently important to secure healthy returns on investments made into mobile banking information technologies, to justify operational expenditure and to stimulate demand. As such, it is imperative that retail banks investigate and understand the factors that influence consumers' attitudes towards and usage behaviour of mobile banking in order to influence banking behaviour positively, thereby ensuring greater usage of mobile banking and retail banking success, specifically concerning electronic channels.

An extensive review of the literature on electronic banking indicates various studies pertaining to Internet banking in developed economies such as Australia (Heaney, 2007; Lichtenstein & Williamson, 2006; Sathye, 1999; Wright & Ralston, 2002), the United Kingdom (Agwu, 2013; Littler & Melanthiou, 2006) and the United States of America (Hernández-Murillo *et al.*, 2010; Vatanasombut *et al.*, 2008). In South Africa, a review of the literature points towards several Internet banking studies (Brown *et al.*, 2004; Green & Van Belle, 2003; Maduku, 2013; Redlinghuis & Rensleigh, 2010; Singh, 2004; Thatcher & Kruger, 2006; Wu, 2005). The number of studies pertaining to mobile banking in South Africa are limited, with studies uncovering mobile banking adoption predictors (Brown *et al.*, 2003; Ismail & Masinge, 2012; Nel *et al.*, 2012), attitudes towards mobile banking (Maduku & Mpiganjira, 2012; Nel & Raleting, 2012) and the influence of the perceived utility/risk trade-off in mobile banking (Njenga & Ndlovu, 2013). However, none of these studies examined the influence of the trust factor pertaining to system quality on consumers' attitudes towards and usage behaviour of mobile banking, which according to the findings of Zhou (2011) is an important factor to consider in predicting the adoption behaviour of mobile banking. Furthermore, none of these studies conducted research on the significantly sized Generation Y cohort in general, and Generation Y students in particular as the target population. As indicated in the introduction, the Generation Y cohort represents an important target market to the

retail banking industry. Their possible high future earning and trendsetting potential as well as influential role associated with the student portion of this cohort (Bevan-Dye & Suruijlal, 2011:49) may provide valuable insights into the wider South African Generation Y cohort's attitudes towards mobile banking and mobile banking behaviour.

Against this background, it is evident that there is a dearth of published research in this regard and a definite lack of empirical research on this topic in South Africa. This suggests that there is a need to propose and empirically test a model of potential factors that influence attitudes towards and usage behaviour of mobile banking amongst Generation Y students in South Africa.

The technology acceptance model (TAM), originally introduced by Davis (1986) in a doctoral thesis and formally published in 1989 (Davis, 1989; Davis *et al.*, 1989), is one of the most commonly tested models of technology acceptance and has become well recognised as a robust, parsimonious and influential model for predicting consumers' acceptance of innovative technology. However, because this study aims at investigating a more complete set of antecedents of attitudes towards and usage behaviour of mobile banking, the TAM was extended by adding utility related factors, subjective norms, perceived behavioural control, and trust related factors. Davis (1989:334-335), Gu *et al.* (2009:11606) as well as Maduku (2013:80-81) advise the incorporation of factors from other theories and models, as the TAMs principal constructs, namely perceived usefulness and perceived ease of use may not fully reflect users' acceptance of technological innovations. As such, the model delineated is an extension and adaption of the TAM, and will be tested empirically on the Generation Y student population in South Africa.

The underlying model will provide support for better comprehending the degree to which perceived utility and trust in mobile banking, as well as other factors predict Generation Y students' attitudes towards and usage behaviour of mobile banking. This will conceivably offer assistance in the diffusion of mobile banking, by proposing leverage points to improve mobile banking adoption through positively influencing attitudes towards mobile banking and mobile banking behaviour in South Africa and other retail banks operating in related contexts. Comprehending the predictors of consumers' attitudes towards mobile banking is important, as various authors (Hernandez & Mazzon, 2007:75; Sommer 2011:91; Eriksson & Nilsson, 2007:160) argue that attitude has a robust, direct, and positive influence on consumers' mobile banking behaviour. It would

also give an idea of how mobile banking innovation can be marketed to achieve critical mass, which is important given that a large proportion of the population remains unbanked. Moreover, assistance will be provided to marketers, strategists, financial- and business analysts in developing and adapting marketing- and strategic plans, business models, processes, awareness programmes and pilot projects to increase mobile banking uptake and satisfy the banking needs of the intended target markets. Through better understanding the Generation Y cohort's attitudes towards mobile banking and their mobile banking behaviour, retail banks will be in a better position to develop distribution mix strategies, particularly the digital channel strategy. This is likely to ensure the future success of retail banking.

1.3 OBJECTIVES OF THE STUDY

The following objectives were formulated for the study:

1.3.1 Primary objective

The primary objective of this study was to propose and empirically test an extended TAM that measures the extent to which Generation Y students' perceived utility and trust in mobile banking influences their attitudes towards and usage behaviour of mobile banking within the South African context.

1.3.2 Theoretical objectives

In order to achieve the primary objective, the following theoretical objectives were formulated for the study:

- Conduct a review of the literature on mobile devices generally used to conduct mobile banking activities, in particular mobile phones and its adoption and growth.
- Conduct a review of the literature regarding the use of mobile devices as marketing and business tools.
- Conduct a review of the literature on the changes brought about by advances in mobile communication.

- Conduct a review of the literature on mobile commerce.
- Conduct a review of the literature pertaining to the South African retail banking industry as well as the significance of strategic management and strategy within a retail banking context.
- Conduct a review of the literature on mobile banking, including the various types, the utility and trust in mobile banking as well as the growth and adoption of mobile banking internationally and in South Africa.
- Conduct a review of the literature on the Generation Y cohort, the characteristics of its members and the impact technology has had in this generation.
- Conduct a review of the literature regarding the various technology adoption theories and models.
- Conduct a review of the literature on the antecedents that may influence attitudes towards and usage behaviour of mobile banking.

1.3.3 Empirical objectives

In accordance with the primary objective of the study, the following empirical objectives were formulated:

- Determine Generation Y students' attitudes towards mobile banking.
- Determine Generation Y students' perceived utility in mobile banking in terms of perceived ease of use and perceived relative advantage.
- Determine Generation Y students' subjective norms concerning mobile banking.
- Determine Generation Y students' perceived behavioural control concerning mobile banking.
- Determine Generation Y students' trust in mobile banking in terms of perceived integrity and perceived system quality.
- Determine Generation Y students' mobile banking usage behaviour.

- Empirically test a proposed model of the extent to which perceived utility, trust, perceived behavioural control and subjective norms influence Generation Y students' attitudes towards and usage behaviour of mobile banking.
- Determine whether male and female Generation Y students differ in their attitudes towards mobile banking, perceived utility in mobile banking, subjective norms, perceived behavioural control, trust in mobile banking, and mobile banking usage behaviour.
- Determine whether different age groups of Generation Y students differ in their attitudes towards mobile banking, perceived utility in mobile banking, subjective norms, perceived behavioural control, trust in mobile banking, and mobile banking usage behaviour.

1.4 RESEARCH QUESTIONS

In order to operationalise the empirical objectives set out for this study, the following research questions were set:

- Do attitudes towards mobile banking have a significantly positive influence on South African Generation Y students' mobile banking usage behaviour?
- Does perceived ease of use of mobile banking have a significantly positive influence on South African Generation Y students' attitudes towards mobile banking?
- Do subjective norms have a significantly positive influence on South African Generation Y students' attitudes towards mobile banking?
- Does perceived behavioural control have a significantly positive influence on South African Generation Y students' attitudes towards mobile banking?
- Does perceived integrity have a significantly positive influence on South African Generation Y students' attitudes towards mobile banking?

- Does the perceived relative advantage of mobile banking have a significantly positive influence on South African Generation Y students' attitudes towards mobile banking?
- Does perceived system quality of mobile banking have a significantly positive influence on South African Generation Y students' attitudes towards mobile banking?
- Is there a difference between male and female Generation Y students' attitudes towards mobile banking, perceived ease of use, subjective norms, perceived behavioural control, perceived integrity, mobile banking usage behaviour, perceived relative advantage and perceived system quality?
- Is there a difference between different age groups of Generation Y students' attitudes towards mobile banking, perceived ease of use, subjective norms, perceived behavioural control, perceived integrity, mobile banking usage behaviour, perceived relative advantage and perceived system quality?

1.5 HYPOTHESES

In order to achieve the empirical objectives of the study, ten hypotheses were formulated. The ten hypotheses stated below were formulated in Chapter 5, subsequent to a review of the literature in Chapter 2 and Chapter 3, and the development of a matrix of construct correlations to evaluate the nomological validity between each pair of constructs identified.

- H₀1: Antecedents of mobile banking usage behaviour is not an eight-factor structure comprising attitudes towards mobile banking, perceived ease of use, subjective norms, perceived behavioural control, perceived integrity, mobile banking usage behaviour, perceived relative advantage and perceived system quality.
- H_a1: Antecedents of mobile banking usage behaviour is an eight-factor structure comprising attitudes towards mobile banking, perceived ease of use, subjective norms, perceived behavioural control, perceived integrity, mobile banking usage behaviour, perceived relative advantage and perceived system quality.

- H₀2: Perceived ease of use (+) does not have a significant direct influence on Generation Y students' attitudes towards mobile banking.
- H_a2: Perceived ease of use (+) does have a significant direct influence on Generation Y students' attitudes towards mobile banking.
- H₀3: Subjective norms (+) do not have a significant direct influence on Generation Y students' attitudes towards mobile banking.
- H_a3: Subjective norms (+) do have a significant direct influence on Generation Y students' attitudes towards mobile banking.
- H₀4: Perceived behavioural control (+) does not have a significant direct influence on Generation Y students' attitudes towards mobile banking.
- H_a4: Perceived behavioural control (+) does have a significant direct influence on Generation Y students' attitudes towards mobile banking.
- H₀5: Perceived integrity (+) does not have a significant direct influence on Generation Y students' attitudes towards mobile banking.
- H_a5: Perceived integrity (+) does have a significant direct influence on Generation Y students' attitudes towards mobile banking.
- H₀6: Perceived relative advantage (+) does not have a significant direct influence on Generation Y students' attitudes towards mobile banking.
- H_a6: Perceived relative advantage (+) does have a significant direct influence on Generation Y students' attitudes towards mobile banking.
- H₀7: Perceived system quality (+) does not have a significant direct influence on Generation Y students' attitudes towards mobile banking.
- H_a7: Perceived system quality (+) does have a significant direct influence on Generation Y students' attitudes towards mobile banking.
- H₀8: Attitudes towards mobile banking (+) do not have a significant direct influence on Generation Y students' mobile banking usage behaviour.

- H_a8: Attitudes towards mobile banking (+) do have a significant direct influence on Generation Y students' mobile banking usage behaviour.
- H_o9: There is no difference between male and female Generation Y students' attitudes towards mobile banking, perceived ease of use, subjective norms, perceived behavioural control, perceived integrity, mobile banking usage behaviour, perceived relative advantage and perceived system quality.
- H_a9: There is a difference between male and female Generation Y students' attitudes towards mobile banking, perceived ease of use, subjective norms, perceived behavioural control, perceived integrity, mobile banking usage behaviour, perceived relative advantage and perceived system quality.
- H_o10: There is no difference between different age groups of Generation Y students' attitudes towards mobile banking, perceived ease of use, subjective norms, perceived behavioural control, perceived integrity, mobile banking usage behaviour, perceived relative advantage and perceived system quality.
- H_a10: There is a difference between different age groups of Generation Y students' attitudes towards mobile banking, perceived ease of use, subjective norms, perceived behavioural control, perceived integrity, mobile banking usage behaviour, perceived relative advantage and perceived system quality.

The section to follow delineates the research design and methodology used in the study.

1.6 RESEARCH DESIGN AND METHODOLOGY

The study comprised a literature review and an empirical study. The study focused on comprehending and predicting consumer behaviour, and as such, a positivist approach was adopted for the study. Quantitative research, using the survey method, was applied for the empirical portion of the study. A descriptive research design with a single cross-sectional sample was followed.

1.6.1 Literature review

The empirical portion of this study was supported by reviewing South African and international literature, whereby secondary sources were used, which included pertinent

textbooks, the Internet, journal articles, business articles, academic articles, newspaper articles and online academic databases.

1.6.2 Empirical study

The empirical portion of this study comprises the following methodology dimensions:

1.6.2.1 Target population

The target population, relevant to this study were full-time Generation Y students, aged between 18 and 24, registered at South African public HEIs in 2015. The target population was defined as follows:

- Element: Full-time Generation Y students aged between 18 and 24 years.
- Sampling unit: South African registered public HEIs.
- Extent: Gauteng, South Africa.
- Time: 2015.

1.6.2.2 Sampling frame

The sampling frame comprised the 26 registered South African public HEIs (Universities South Africa, 2015). From this sampling frame, a non-probability judgement sample of three HEI campuses, a traditional university, a university of technology and a comprehensive university, located in the Gauteng province, was selected. The reason the Gauteng province was chosen as the main sample of this study is that it encompasses the largest share of the South African population. As indicated by Stats SA (2015), an estimated 13.2 million people, equal to 24 percent of the South African population, reside in Gauteng. Furthermore, CHE (2014:36-38) indicated that the Gauteng province has the highest percentage of student enrolment in public HEIs. The three HEIs were selected due to their close geographic proximity, which reduces cost and time and made the research more manageable.

1.6.2.3 Sample method

From the final sampling frame, a non-probability convenience sample of full-time Generation Y students, between the ages of 18 and 24, was selected. Demographic questions relating to province of origin, gender, ethnic group, mother tongue language and age were included in the questionnaire in an attempt to overcome the limitations of convenience sampling. This also assisted in determining the degree to which the sample is representative of the target population and, accordingly, the extent to which the findings of this study may be generalised to that population.

1.6.2.4 Sample size

A sample size of 450 full-time Generation Y students was selected for this study. This sample size is in the range of other studies of a similar nature, such as those conducted by Akturan and Tezcan (2012) (sample size of 435), Hanafizadeh *et al.* (2014) (sample size of 403), Kesharwani and Radhakrishna (2013) (sample size of 410), and Lee (2009) (sample size of 446) and, as such, was considered sufficiently large. The sample size of 450 full-time students was split evenly between the three selected HEI campuses, thereby allowing a sample size of 150 full-time students per campus.

1.6.2.5 Measuring instrument and data collection method

A structured self-administered questionnaire was utilised to gather the required data for this study. In order to measure the extent to which Generation Y students' perceived utility and trust in mobile banking influences their attitudes towards and usage behaviour of mobile banking, the Nor and Pearson (2008) Internet banking adoption scale, and the Zhou (2011) initial trust in mobile banking scale were adapted and utilised for the empirical portion of this study.

The students were requested to complete a questionnaire consisting of three sections. The first section (Section A) was designed to gather demographical data. The second section (Section B) was designed to gather background information, in view of mobile banking. The third section (Section C) of the questionnaire measured the extent to which Generation Y students' perceived utility and trust in mobile banking influences their attitudes towards and usage behaviour of mobile banking, and comprised eight antecedents.

All scaled responses were measured on a six-point Likert scale, ranging from strongly disagree (1) to strongly agree (6). In addition, the questionnaire was accompanied by a cover letter requesting participation from the students as well as explaining the purpose of the study and assuring the confidentiality of the participant's information together with the relevant contact details.

The questionnaire was piloted on a convenience sample of 59 students on a South African HEI campus that did not form part of the sampling frame, in order to ascertain its reliability. Subsequently, the results of the pilot test were coded and tabulated, and the results were considered when the final questionnaire was adopted.

To conduct this study, a structured format applied, where questionnaires were distributed to students at the HEI campuses that formed part of the sampling frame. Lecturers at each of the three HEI campuses were contacted telephonically and asked whether they would allow the questionnaire to be distributed to their students during class time. The questionnaires were hand-delivered to the participating academic staff members to be distributed to the students for voluntary completion. Prior to questionnaire distribution, the participating lecturers were shown the questionnaire accompanied by the ethics clearance certificate obtained from the Ethics Committee of the Faculty of Economic Sciences and Information Technology at the North-West University (Vaal Triangle Campus). Subsequently, questionnaires were distributed to the students for completion during class time. All participants were informed that the questionnaire is to be completed on a voluntary basis only and that no one was to be forced into completing the questionnaire. This approach was followed for all three participating HEI campuses in 2015.

1.6.3 Statistical analysis

The captured data were analysed using the statistical package IBM Statistical Package for the Social Studies (SPSS), Version 22 and Analysis of Moment Structures (AMOS). The following statistical methods were applied on the empirical data sets:

- Frequency analysis
- Factor analysis

- Reliability and validity analysis
- Descriptive statistical analysis
- Correlation analysis
- Collinearity diagnostics
- Structural equation modelling
- Two independent-samples t-test
- One-way analysis of variance (ANOVA)

1.7 ETHICAL CONSIDERATIONS

The research study conforms to the ethical standards of academic research. The necessary permission to perform the study was obtained from all participating lecturers and institutions involved. The identities and interest of the students were protected. Confidentiality regarding all of the information provided by the students was guaranteed. Participation in the survey was strictly voluntary and no individual person or institution was compelled to partake in it.

The North-West University's Ethics Committee reviewed the measuring instrument, together with a framework of the research methodology to be followed in the study. This was done to ascertain whether the questionnaire asked any sensitive questions and to ensure that the target population and sampling frame from which the sample of participants was to be selected did not comprise any persons that could be categorised as being vulnerable. The measuring instrument successfully passed the committee's standards and received the following ethical clearance number: **ECONIT-ECON-2014-005**.

1.8 DEMARCATION OF THE STUDY

This specific research project concerns Generation Y students between the ages of 18 and 24 years, registered at South African public HEIs in 2015. This study considered three public HEI campuses located in the Gauteng province of South Africa. The three

designated campuses chosen from the sampling frame included one traditional university campus, one comprehensive university campus, and one university of technology campus.

1.9 CLARIFICATION OF THE TERMINOLOGY

- **Generation Y:** Refers to individuals born between 1986 and 2005.
- **Perception:** The process by which an individual selects, organises, and interprets stimuli into a meaningful and coherent picture of the world.
- **Utility:** Refers to the satisfaction an individual gets by spending the least amount of effort to use a system or service.
- **Trust:** Refers to an individual's belief that others (people, organisations, systems) will behave according to an individual's expectation and not opportunistically by taking advantage of the situation.
- **Mobile banking:** Refers to a digital retail banking distribution channel used by consumers to conduct banking activities using a mobile device, such as a mobile phone or tablet/iPad.
- **Electronic commerce:** Refers to the exchange of information via electronic means employing information and telecommunication infrastructure.
- **Electronic banking/Digital banking:** Refers to the use of computers and mobile devices to receive and process banking data as well as initiate transactions directly with a retail bank or other financial services providers remotely via a telecommunications network.
- **Subjective norms:** Refers to an individual's perceptions that people who are important to him or her think he or she undertake a specific behaviour.
- **Perceived behavioural control:** Refers to the extent to which an individual perceive the ease or difficulty of performing a given behaviour and his or her perceived ability to produce a successful outcome when performing the behaviour.
- **Attitude:** Refers to learned predispositions to react to an object, person or idea in a positive or negative manner.

- **Behaviour:** Refers to an individual's undertaking of a particular course of action.

1.10 CONTRIBUTIONS OF THE STUDY

Notwithstanding technological advances and innovation in the retail banking industry, the adoption growth of self-service or digital banking channels, specifically mobile banking, have fallen below the expectations of pertinent academics and specialists in the banking industry. This supports the notion that innovations and the availability thereof do not necessarily translate into increased uptake and adoption. Furthermore, it implies that there is a lack of comprehension and insight into the factors influencing the adoption of and attitudes towards digital banking, as well as digital banking behaviour.

This study will contribute to filling the gaps that exist in understanding the extent to which Generation Y students' perceived utility and trust in mobile banking influences attitudes towards and usage behaviour of mobile banking; that is, the antecedents of attitudes towards and usage behaviour of mobile banking in South Africa by developing and empirically testing a conceptual model. An understanding of these antecedents will enable retail banks to tailor their mobile banking business- and marketing efforts towards the Generation Y cohort in South Africa. From a strategic perspective, marketers, policy makers, and strategists could use the results of this study as a guide for deploying strategies to promote increased consumer acceptance of mobile banking, influence consumer behaviour as well as transform and integrate the retail banking distribution mix, thereby delivering substantial returns on investment in providing these services.

In addition, the findings of this study will contribute to existing studies of mobile banking in South Africa, a subject matter that is largely under-researched, as well as the information systems knowledge base. Furthermore, the findings of this study will contribute to the literature on, and the development of, a profile of South African Generation Y students' consumer behaviour, which is in keeping with the objectives of a larger research project at the North-West University (Vaal Triangle Campus) called ProGenY (profiling the consumer behaviour of the Generation Y cohort in South Africa).

1.11 CHAPTER CLASSIFICATION

In line with the gap in the literature concerning the antecedents of attitudes towards and usage behaviour of mobile banking amongst the Generation Y cohort in South Africa,

Chapter 1 formulated one primary objective, nine theoretical objectives, and nine empirical objectives. To address these objectives, the remainder of this thesis integrates the following chapters:

Chapter 2: The mobile banking platform

The focus of this chapter is to provide an in-depth discussion on the mobile banking platform, including the different types of mobile devices used to conduct mobile banking and their prevalence as a marketing- and business tool. Changes brought about by developments in mobile communication are outlined subsequently. This is followed by a discussion on mobile commerce and an overview of the South African retail-banking environment, together with the importance of strategic management and strategy in retail banking. Chapter 2 concludes with a discussion on mobile banking, including the various types, utility in mobile banking, and the growth and adoption rates of mobile banking internationally and in South Africa.

Chapter 3: Attitudes towards and usage behaviour of mobile banking

This chapter comprises a comprehensive literature review on the Generation Y cohort, including a discussion on how the members of this cohort have grown up surrounded by technology and the impact this has had on this generation. In addition, a discussion on the South African Generation Y cohort and their importance as a strong marketing force is presented. Subsequently, the various theories and models scholars have used to predict the adoption of information technology are delineated. An outline of several factors thought to influence consumers' attitudes towards and usage behaviour of mobile banking is then provided. The chapter concludes with a proposed model of the antecedents that may influence Generation Y students' attitudes towards and usage behaviour of mobile banking in South Africa.

Chapter 4: Research design and methodology

In this chapter, the focus is on the theoretical background of the research design and methodology used in data collection and analysis and includes discussions of the research process, research design, research approach, sampling strategy, data collection method, pre-testing of the questionnaire, administration of the questionnaire and data preparation.

Furthermore, the data analysis and statistical procedures used in the study are discussed within this chapter.

Chapter 5: Results and findings

In this chapter, the research results of both the pilot study and the main survey are analysed, interpreted, and evaluated. This chapter describes the sample and summarises the mobile banking background information. Moreover, the results of the factor analysis as well as the internal-consistency reliability and validity analysis of the measurement instrument used in the main survey are presented. Furthermore, the results of the descriptive statistical analysis, correlation analysis and multicollinearity analysis are reported on. In addition, the results of the empirical testing of the model of the antecedents of South African Generation Y students' attitudes towards and usage behaviour of mobile banking are presented. The chapter concludes with a discussion of the results of the two independent-samples t-test and one-way analysis of variance.

Chapter 6: Conclusions and recommendations

Chapter 6 involves a review of the entire study and present conclusions drawn from the study, together with the consequent recommendations emanating from the findings. The limitations of the study are discussed, and suggestions for further research are proposed.

1.12 GENERAL

- Annexures are sited at the back of the thesis.
- Tables and figures are placed on the pertinent pages in the thesis.
- Where no source reference appears for figures and tables, it denotes own research.
- Referencing is based on the 2012 version of the NWU referencing guide: Harvard style.

1.13 CONCLUSION

Rapid advances in mobile technologies and the increase in mobile device usage and ownership, specifically mobile phones, have contributed to the introduction and development of mobile technology as a banking services delivery channel by retail banks.

As such, mobile banking has emerged as the focal point of growth strategies for the retail banking industry. In comparison to traditional in-branch banking, mobile banking offers various utility advantages for both retail banks and consumers. However, the slow adoption rate of mobile banking as an emerging banking service remains a dilemma for strategists, analysts and banking- and marketing managers in emerging economies, such as South Africa. Owing to perceptions of high risk and uncertainty, building consumers' trust in digital banking channels, including that of mobile banking is essential for retail banks. This highlights the importance of understanding the extent to which perceived utility and trust in mobile banking influence consumers' attitudes towards and usage behaviour of mobile banking.

Therefore, this chapter highlighted the study's context and background. The chapter introduced a brief outline of the present banking challenges retail banks face and introduced the solution of mobile banking. The advantages associated with mobile banking for retail banks include a potential market opportunity and a resultant competitive advantage. The research problem recognised in this study is that there is a dearth of published literature concerning the antecedents of attitudes towards and usage behaviour of mobile banking, particularly in the South African context. Owing to the youth leading the way forward in technology adoption and representing the future existence of retail banks, the study focuses on the country's Generation Y cohort. In line with the problem statement, one primary objective, nine theoretical objectives, and nine empirical objectives were formulated in this chapter. Subsequently, a brief outline of the research design and methodology followed in attaining those objectives was provided. The chapter concluded with a discussion relating to the ethical considerations and demarcation of the study, as well as a clarification of the contribution of the study and a classification of the chapters comprised in the thesis.

In the chapter to follow, Chapter 2, a review of the literature concerning the mobile banking platform is provided, which addresses the first six theoretical objectives set out for this study.

CHAPTER 2

THE MOBILE BANKING PLATFORM

“If we know where we are and something about how we got there, we might see where we are trending – and if the outcomes which lie naturally in our course are unacceptable, to make timely change”

— Abraham Lincoln

2.1 INTRODUCTION

In accordance with the first six theoretical objectives set out in Chapter 1, this chapter provides a discussion on the mobile banking platform. The purpose of Chapter 2 is to introduce mobile banking as a means of delivering retail banking services, as well as the key concepts of utility and trust in mobile banking. These discussions provide the basis for the antecedents of attitudes towards and usage behaviour of mobile banking amongst Generation Y students, as laid out in Chapter 3.

Wireless and mobile technologies are rapidly changing, pressurising society to adapt to and employ these emerging innovative technologies, particularly mobile technologies (Potgieter, 2007:4). The effective and efficient use of mobile technologies, however, depends largely on a user's specific purpose. As such, the adoption of a particular mobile technology will likely increase if its use will lead the way to attaining predetermined objectives and if various benefits can be enjoyed. Conversely, users may choose to reject the technology if various difficulties, in terms of its usability, are experienced. Users may also decide to partake in an appropriation process, whereby users adapt to the use of the technology or establish means of incorporating the technology into their everyday lives (Cleff, 2007:264; Dey *et al.*, 2011:51).

Chtourou and Souiden (2010:336) opine that although mobile technologies encompass certain technical drawbacks, their prevalent adoption indicates that there is substantial potential for the development of a wide array of mobility services, such as short message services (SMSs), multimedia message services (MMSs), mobile instant messaging (BBM, WhatsApp), search services (Google), mobile games and mobile banking. As such, Cleff (2007:262) postulates that the emergence and extensive adoption of mobile

communication technologies, together with the Internet, allows for information exchange with anyone at any given time and place. Consequently, these technologies, in particular mobile innovations such as mobile devices, facilitate the delivery of mobile banking services, which makes mobile innovations and networks a feasible mobile banking platform.

The ease of use and usefulness of mobile innovations are significant predictors of attitudes towards their usage (Chtourou & Souiden, 2010:340). Gao *et al.* (2010:580) highlight that generally, individuals are of the view that their mobile devices, specifically mobile phones, are a reflection of themselves and perceive it as a status-related accessory, which they utilise to express their personal identities. Balasubramanian *et al.* (2002:348:349) accentuate that as a result, mobile devices, as well as other mobile technologies and gadgets, have become second nature in individuals' daily lives, which according to Stewart and Pavlou (2002:376:377) has not only enhanced the speed, frequency and accessibility of communication but has also altered the manner in which individuals communicate, access and share information. IT news Africa (2015), Africa's technology news leader, opines that in 2015, digital finance services, such as mobile banking, will become increasingly tailored to the digital channel and will fulfil a noteworthy role in the lives of South Africans, as an increasingly number of South African consumers are exploring outside the traditional bricks-and-mortar financial institutions to meet their financial needs.

As indicated in Chapter 1, the purpose of this study was to propose and empirically test an extended technology acceptance model (TAM) that measures the extent to which Generation Y students' perceived utility and trust in mobile banking influences their attitudes towards and usage behaviour of mobile banking; that is, the antecedents of attitudes towards and usage behaviour of mobile banking. The primary aim of this chapter is to discuss the mobile banking platform in order to lay the foundation for the discussion of these factors. Therefore, Section 2.2 describes the mobile devices typically used to conduct mobile banking, together with a discussion on mobile phone adoption and growth. Section 2.3 discusses the use of mobile devices as a marketing and business tool. In Section 2.4, changes emanating from advances in mobile communication are discussed. Section 2.5 focuses on mobile commerce. In Section 2.6, an overview of the South African retail banking industry is given, together with the importance of strategic

management and strategy within a retail banking context. The chapter concludes with a discussion on mobile banking with a closer look at the various types of mobile banking, as well as the utility and trust in mobile banking and the growth and adoption of mobile banking internationally and in South Africa. The following section describes the different mobile devices available to undertake mobile banking and specifically explores mobile phone adoption and growth.

2.2 MOBILE DEVICES USED FOR MOBILE BANKING

A mobile device is defined as a small computing device or handheld computer, designed to be portable and as powerful as a personal computer, allowing users to perform the same tasks as when using a desktop or laptop computer. The mobile device has a display screen with touch input and/or a small keyboard, as well as an operating system, which can run various types of application software, generally referred to as applications. Most mobile devices are generally equipped with capabilities such as Wi-Fi and Bluetooth and are able to connect to the Internet (Goodwill Community Foundation, 2015). Mobile devices include, *inter alia* mobile phones, personal digital assistants (PDAs) (Cruz *et al.*, 2010:343), tablet computers or iPads, smart watches, handheld game consoles, digital video cameras and portable media players. For the purpose of this study and in light of mobile banking, specific reference is given to the tablet computer/iPad, the personal digital assistant (PDA) and the mobile phone.

The tablet computer, or iPad, is a portable device with a touchscreen display that allows a user access to the Internet owing to its Wi-Fi capability as well as third generation (3G) or fourth generation (4G) mobile telephony applications. As such, tablets allow for, amongst others, web browsing, playing games, watching videos, and reading electronic books (e-books). Mobile operating systems include Android and iOS. Furthermore, tablets are typically larger than PDAs and mobile phones (Goodwill Community Foundation, 2015). The PDA is a handheld organiser employed to store contact information, manage calendars, communicate via email, as well as manage documents and spread sheets. Most PDAs are easy to use and can feature a keyboard and/or a touch screen, as well as wireless Internet access and access to telephone networks, either via the Internet or through cellular telephone technologies (Encyclopaedia Britannica, 2015a). A mobile phone, also referred to as a cell phone, cellular telephone or mobile, is defined as a portable electronic telecommunications device that typically connects to a

telecommunication network to transmit and receive video, voice and/or other data. Generally, the majority of mobile phones offer SMSs, MMSs and voice communications (Encyclopaedia Britannica, 2015b). In addition to these offerings, more advanced mobile phones, referred to as smart phones, also offer Internet services such as email and web browsing. A smartphone can run a wide array of applications and its operations are generally identical to a tablet computer and PDA (Goodwill Community Foundation, 2015; Husted *et al.*, 2011). The steady adoption and growth of both feature and smart mobile phones, however, infers that mobile phones are likely to emerge as the preferred mobile device for the utilisation of mobile services (Encyclopaedia Britannica, 2015b), including mobile banking.

Kreutzer (2009:43) indicate that mobile phones were first introduced in the 1980s and were regarded as luxury technology items for the affluent and as essential gadgets for the metropolitan and trendy who were in need of instant communication while on the move. Kalba (2008:632), however, opines that mobile phones have come to light as a social phenomenon that is spreading ubiquitously across the globe since network operators and mobile phone manufacturers began targeting and meeting the demand for inexpensive communication by the world's phoneless majority.

By 2007, 49 percent of the world's population had mobile phone subscriptions, which is a significant increase from a mere eight percent in 1999 (Must *et al.*, 2010:27). The ITU (2010) reports that, in 2010, there were approximately five billion mobile connections globally, which translates into a global adoption rate of 74 percent. Furthermore, it is expected that the six billion global mobile connection milestone would have been reached in the first quarter of 2012. Murphy (2012) confirms the increase in mobile phone adoption at 87 percent in 2012. Therefore, Kalba (2008:632) postulates that the mobile phone has emerged as the most popular technology in history, outperforming practically every prior technology, including landline phones, wrist watches, radio, television and bicycles.

GSMA Intelligence (2010) reports that by the end of 2010, the Asia-Pacific region was identified as the region with the most continuous mobile phone growth, owing to this region accounting for 47 percent of global mobile connections, which is a significant increase from approximately five percent in 2008, when the four billion connection mark was achieved. The growth in this region can be attributed to the constant growth in both

China and India, which are known for being the two largest mobile markets worldwide and which offset growth in other parts in this region, such as the Pakistan and Philippines markets. Furthermore, growth in mature markets, such as North America and Europe was slower and accounted for roughly 27 percent of global connections. In terms of mobile penetration, Western Europe was highlighted as the region with the highest penetration at 130 percent, followed by Eastern Europe at 123 percent. These two global regions were the only global regions that surpassed 100 percent mobile penetration. Africa was identified as the region with the lowest mobile penetration at 52 percent. In Africa, however, many analysts foresee exceptional growth in mobile phone subscriptions. SouthAfrica.info (2012) notes that countries on the African continent have witnessed diffusion of advanced mobile devices such as tablets and smart phones in a variety of economic segments. Furthermore, KPMG South Africa (2014) anticipates that mobile subscriptions in Africa will undergo substantial growth, more than anywhere else globally will, owing to rapid developments in the telecommunications sector. Standard Bank (2015b) indicates that mobile subscriptions in sub-Saharan Africa will rise to 930 million by the end of 2019, from 635 million at the end of 2014. With specific reference to South Africa, Garg *et al.* (2014:4097) point out that South Africa has a successful and growing economy, with its telecommunication industry in an advanced stage. As such, from the time mobile telephony was introduced in South Africa in 1994, it has made noteworthy in-roads into the South African market.

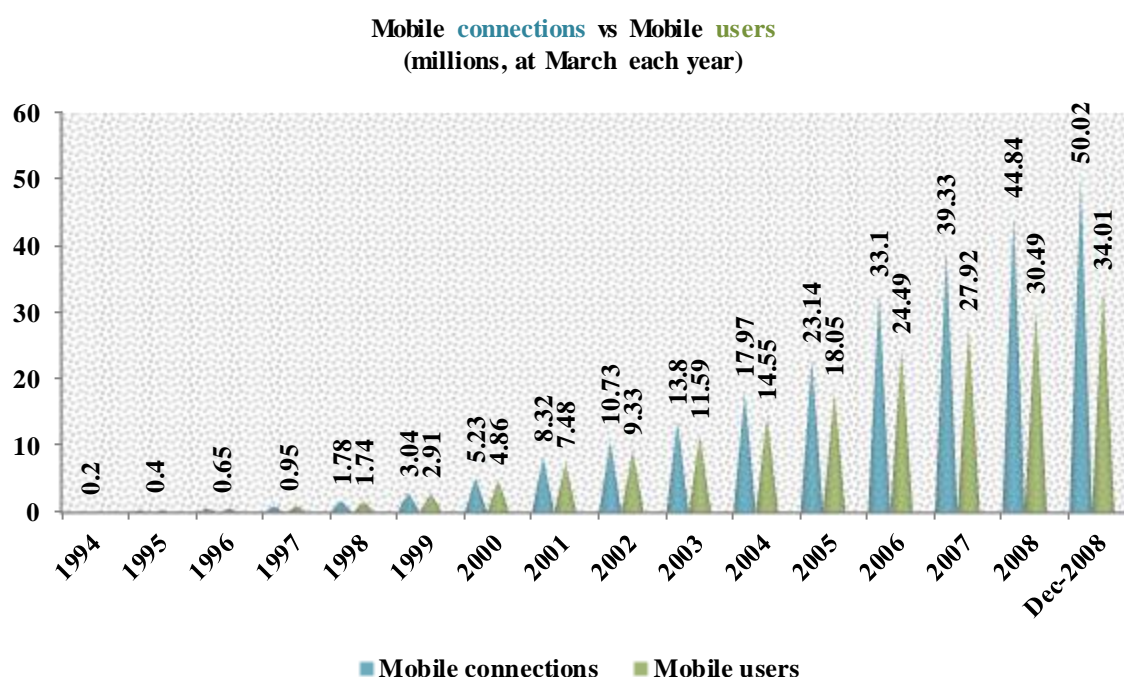


Figure 2.1 Mobile phone adoption in South Africa (World Wide Worx, 2009a)

Figure 2.1 depicts mobile phone adoption in South Africa and shows that the projected number of mobile phone users in 2008 was 34.01 million, whereas the projected number of mobile connections, which is the number of subscriber identity module (SIM) cards sold, was 50.02 million. BASA (2011:16) and Garg *et al.* (2014:4097) note that mobile penetration in South Africa by the end of June 2011 was 144 percent, which is an increase from 112 percent the previous year and 97 percent the year before, and is set to rise even further. In 2014, however, Fripp (2014) points out that mobile penetration reached 133 percent, suggesting that the majority of South Africans have more than one mobile device. Conversely, smartphone penetration in 2014 was recorded at 47 percent. Today, in 2015, Meyer (2015) reports that South Africa has one of the highest mobile penetrations worldwide, with 87 percent of individuals in possession of a mobile phone, of which 36 percent are smart phone owners.

Concerning the technology deployed and mobile services delivered, the South African telecommunication industry embodies the continent's most advanced networks, with Vodacom, MTN, Cell C and 8ta all contending for market share in the mobile service market (Budde, 2013). According to Masote and Shevel (2012:7), MTN's market share was 50 percent by the second half of 2011, totalling an estimated 22 million mobile subscribers from an approximated 18.8 million. By the end of September 2011, 8ta

accumulated 11 million mobile subscribers, which was preceded by Cell C with 8.2 million subscribers and Vodacom with 31.7 million mobile subscribers by the end of December 2011. This suggests that there were more than 72 million mobile subscribers and connections by the end of 2011 and this number is expected to increase over time. Thomas (2015) verifies the growth in mobile connections and indicates that by January 2015, South Africa had 79.1 million mobile connections.

Given the continuous development and increased popularity of mobile devices, it is expected that more businesses, including retail banks will employ these devices to their full potential in order to maximise every marketing and business opportunity presented.

2.3 MOBILE DEVICES AS A MARKETING AND BUSINESS TOOL

The introduction and development of the mobile innovation, whether it is a mobile phone, tablet computer or PDA, is creating many marketing and business opportunities. In addition to the Internet, mobile devices present unique opportunities for marketers as new possibilities for interacting with current and potential consumers are provided (Leppäniemi, 2008:18). Therefore, many companies, including retail banks, are leveraging mobile device technology in order to successfully market to their consumers (Dickinger *et al.*, 2004:1).

Dickinger *et al.* (2004:2) highlight that advertising is a main area in which mobile devices generally are employed. According to the Mobile Marketing Association (2009:3), mobile marketing is defined as a combination of practices that allow businesses to communicate and engage with their audiences in a manner that is interactive and relevant via any mobile device or network. Yunos *et al.* (2003:30) state that the terms mobile marketing and wireless advertising are used interchangeably. Wireless advertising is described as activities related to advertising and marketing that deliver advertisements to mobile devices utilising wireless networks and mobile advertising solutions in order to promote the sale of products and services and build brand awareness. Dickinger *et al.* (2004:2) explain that mobile marketing can pursue a push or a pull model, and describe push advertising as unsolicited messages that are sent, commonly through an SMS alert, and pull advertising as messages that add additional information, such as financial markets information, weather forecasts or traffic reports to the content requested by the consumer.

Mobile marketing is increasingly becoming a significant advertising and direct marketing tool in integrated campaigns, which comprise the utilisation of mobile or wireless media as a content and service delivery channel and direct response together with traditional media, such as print, radio and television, as well as in campaigns where mobile media stand alone (Leppäniemi, 2008:18). Moreover, mobile marketing is gaining more popularity over personal computers and other conventional platforms given its accessibility (mobile and wireless devices are personal devices and are portable and obtainable for use anytime), personalisation (mobile devices comprise the user's identity, which can be traced to an individual, whereas personal computers only carry a household's identity) and location awareness (as long as the mobile device is operating and connected, the user's physical location can easily be traced, which is particularly important for undertaking user-oriented marketing and advertising) (Yunos *et al.*, 2003:30-31).

Scharl *et al.* (2005:159) indicate that text messages or SMS is the most popular mobile application as well as the most popular mobile marketing platform. Murphy (2011) indicates that mobile messaging accumulated more than 179 billion American Dollars in revenue in 2010, and it is expected that this figure will increase to 200 billion American Dollars in 2011, 300 billion American Dollars in 2014 and by the end of 2015, an amount of 335 billion American dollars (approximately 450 trillion South African Rand) is anticipated. Despite the high revenue expectancy, mobile marketing via SMS is relatively expensive, as Dickinger *et al.* (2004:3) note that the price for 1000 numbers in the United States of America (USA) can reach an amount of 30 American Dollars (roughly 400 South African Rand) compared to one American Dollar (roughly 13 South African Rand) for 1000 email addresses. Nevertheless, it is inferred that the high price is compensated for by the effectiveness of the SMS in reaching the intended target groups and it is believed that mobile campaigns deliver a higher response rate of consumers in comparison to campaigns through other media.

The advent of smartphones, in particular into South Africa, has witnessed a significant uptake in the number of mobile Internet users due to cheaper Internet access. As a result, this has allowed marketers, including those in the retail banking environment and other industries alike, with an opportunity to create interactive mobile advertising campaigns, which will likely reach out to these specific individuals (Pater, 2011:1). Joss (2012) posits

that by the end of 2011, there were nearly 8.5 million South African Internet users, of which more than 2.48 million users were employing a mobile phone to gain Internet access. By January 2015, Thomas (2015) notes that there were approximately 24.9 million active Internet users and 20.9 million active mobile Internet users. This, and the fact that smartphones are becoming more affordable and data rates cheaper, makes it arguably the most influential force behind the increased growth in South African mobile and mobile advertising.

Dickinger *et al.* (2004:1) indicate that mobile marketing plays an essential role in reaching the intended target groups. This also applies in the context of retail banking. It is important that retail banks continuously inform consumers of new and innovative banking products and services in order to increase awareness and uptake of these products and services so as to recoup investments made into these innovations, including the mobile banking innovation (Ismail & Masinge, 2012:99; Nel & Raleting, 2012:51). Moreover, it is important that retail banks stay abreast of developments in mobile communication to ensure the future success of mobile banking and other innovations to be introduced in the near future (PwC, 2011:6).

2.4 CHANGES EMANATING FROM ADVANCES IN MOBILE COMMUNICATION

The most noteworthy changes in the technology domain are taking place in homes, in schools and in the work place environment, incited by the transformation of knowledge into digital form via progressively inexpensive ways of performing the alteration of information, coupled with the speed and ease at which information can be administered and conveyed. Therefore, technologies that are able to support computing on the move, employing mobile gadgets by means of wireless networks, have been identified as revolutionary in the information technology domain. This includes technological infrastructure for connectivity, such as general packet radio service (GPRS), wireless application protocol (WAP), 3G, Bluetooth, and mobile information applications such as, laptop computers, PDAs and mobile phones (Mayhew, 2013; Potgieter, 2007:3).

Bamba and Barnes (2007:815) point out that the development and advent of mobile computing, distributed networking, and mobile telecommunications has created substantial commercial opportunities. Hence, both Mayhew (2013) and Potgieter (2007:9)

stipulate that mobile technology is gaining popularity among many organisations, including retail banks, as they are beginning to realise and appreciate the value and significance mobile technology can offer.

The operations of organisations employing these mobile technologies may be influenced in two unique ways. First, business operations may be influenced through the revitalisation of business processing by modifying data access patterns. Secondly, business operations may be influenced through the enablement of communication among employees, consumers and suppliers, which subsequently may add to the improvement of information aptness and communication efficiency. As a result, organisational productivity and profitability are likely to increase (Liang *et al.*, 2007:1155). Mobile technologies that have been applied within organisations include, *inter alia* mobile access to business intranets, electronic procurement application systems, mobile brokerage services, and mobile payment and banking services, all of which are WAP-based with the utilisation of mobile devices such as mobile phones (Potgieter, 2007:9).

Mayhew (2013) and O'Doherty *et al.* (2007:262) opine that through the creation of business opportunities, enhanced competitiveness, cost reduction and increased access to and availability of information and systems, mobile and wireless communications and technologies have the potential of improving the quality of life of all individuals employing them worldwide. Gao *et al.* (2010:575) elaborate by stating that the momentous evolution in wireless and mobile communications and technologies has altered the manner in which individuals communicate and access information as well as share information.

In the past, mobile devices, specifically mobile phones, were not linked with the possibility of accessing information and applications at any time and place. The introduction of the smartphone, however, has seen this conception change swiftly (O'Doherty *et al.*, 2007:264; Paterson & Low, 2011:412). Before the introduction of the mobile phone, individuals had to go to a phone to conduct a telephonic conversation, whereas in modern day life, they carry their phone with them. This mobility, combined with the wide range of functions mobile phones offer, signifies that mobile telephony is filling an increasing variety of areas in the lives of individuals (Cleff, 2007:268). Mobile devices have gained popularity and the fact that individuals take them wherever they go creates numerous marketing and business opportunities, including advertising, customer

relationship development and obtaining direct responses from consumers (Bulander *et al.*, 2005:174; Li & Du, 2012:7; Merisavo *et al.*, 2007:43), as well as mobile banking.

O'Doherty *et al.* (2007:262) state that the function of mobile devices is a distinctive factor in the lives of consumers before and after engaging in the labour market, becoming an indicator for a significant development stage in modern day life. Furthermore, the mobile phone has emerged as a necessity in the working lives of an increasing number of individuals. Potgieter (2007:4) highlights that mobile technologies have provided society with more efficacy, proficiency and productivity as a result of instant and boundless provision of information, access to administrative tools, and applications and resources from around the world, consequently altering the manner in which individuals communicate, as well as how they go about conducting business, shopping and socialising.

One study carried out in Kenya that relates to the influence of mobile phones on consumer shopping behaviour found that 65 percent of consumers signified that their buying behaviours were influenced by their mobile phones when determining whether to acquire particular products and services. Of the total sample, 31 percent indicated using their mobile phones to improve their shopping experience when in shopping malls or department stores, whereas 34 percent used their mobile phone to enhance their shopping experience when shopping in speciality stores and boutiques. In addition, 29 percent of the total sample indicated using their mobile phones when shopping at street traders with the purpose of comparing prices of those retailers, determining availability, or checking for ingredients in products (Rubadiri, 2012). This is indicative of the fact that Internet-enabled mobile phones provide the consumer with the advantage of not having to visit the physical location when in the process of purchasing market offerings and that the power of choice is transferred to the consumer, owing to the easy accessibility of market-related information. Potgieter (2007:11) concludes that these advantages allow consumers to make informed and enhanced consumption-related decisions, pertaining to what, when, where and at what price to acquire a certain product or service.

Given the wide spectrum of available technology, there are several dominant players moving wireless technologies and solutions into different directions (Potgieter, 2007:165), including retail banks with the introduction and development of mobile banking. As such, analysts and marketers need to determine and decide on the most

relevant technology to appeal to their specific target audiences (Potgieter, 2007:165). Vatanparast and Butt (2009:4) believe that all these mobile technological innovations and advancements will considerably improve the lines of communication via the mobile medium, from the basic SMS to more resourceful communication forms such as MMS and Java-centred applications.

Owing to the development of mobile devices and networks, unconventional communication services, including presence, location and multimedia functionalities, are assisting the users of these devices and networks with communication and interaction between consumers and marketers (Jayawardhena *et al.*, 2009:479; Mafe *et al.*, 2010:69). Accordingly, various reasons, including the increase in device capabilities, familiarity, cost efficiency, productivity, and effectiveness has steered substantial investments in wireless and mobile technologies. Through extending computing and the Internet into a platform that is wireless, mobile innovation now provides consumers with the luxury of information that is easily accessible, as well as access to applications anytime and anywhere. Consequently, superior flexibility in communication, collaboration and information sharing is facilitated (Potgieter, 2007:61).

According to Gao *et al.*, (2010:574-575), the extensive development of wireless networks and mobile innovations, together with the momentous upsurge in the number of mobile devices available, have led to an increased demand for emerging mobile commerce applications and services. Therefore, Mafe *et al.* (2010:70) point out that services via mobile technologies are becoming increasingly significant for both businesses and consumers, and as such, labelled as the new service frontier.

A wide spectrum of marketing opportunities are created by mobile services (O'Doherty *et al.*, 2007:257), partly because these services are portable, ubiquitous and allow for the dissemination and receiving of personalised and localised information, which is in contrast with traditional systems (Mafe *et al.*, 2010:70), such as bricks-and-mortar banking and in-store shopping. Thus, as a result of technology, businesses are developed based on the flow of information, as well as an empowered and knowledgeable workforce (Potgieter, 2007:4). Businesses, therefore, are presented with an opportunity to build their brands on a platform that is completely innovative and independent from traditional means of conducting business. This includes the retail banking environment, whereby retail banks utilise mobile banking as an innovative way of meeting the banking needs of

increasingly demanding consumers and to build their brand as an innovative and cutting-edge retail bank.

Mafe *et al.* (2010:70,81) theorise that the adoption and acceptance of mobile data services, including communication services such as mobile chatting and email, SMS and MMS; information content services, including location-based information, headlines and news; transaction services, including performing financial transactions via mobile phones and booking of movie tickets, and entertainment services, such as daily horoscopes and mobile gaming, may be attributed to the assortment of mobile commerce services available to consumers, the underlying culture of mobile users or dissimilarities in mobile telecommunication infrastructure. As such, Potgieter (2007:150) concludes that mobility is starting to influence an intensifying set of business processes in the modern world.

2.5 MOBILE COMMERCE

Mobile commerce, also denoted as m-commerce, is a form of wireless electronic commerce (e-commerce) (Lee & Ahn, 2013:137), which in essence takes on the form of direct or indirect transactions utilised to purchase and sell products and services via wireless handheld devices such as mobile phones. In addition, m-commerce is considered the next generation of e-commerce (Kumar, 2012; Liang *et al.*, 2007:1154; Rouse, 2005).

According to Bruner and Kumar (2005:553) and Liang *et al.* (2007:1155-1156), the extent of exposure consumers have had to mobile devices, such as mobile device observation, communication, trials of new devices and the like, significantly influences a consumer's decision to adopt m-commerce. Consequently, the success of m-commerce is determined largely by consumers' willingness to adopt and accept this innovative technology and their interaction with the applications. Kumar (2012) highlights that the majority of the major mobile handset manufacturers are developing smartphones that are WAP-enabled and providing maximum wireless Internet and Web facilities, in order to capitalise on the opportunities offered by m-commerce. This is likely to cover official, personal and commerce requirements, as well as lead the way forward for m-commerce.

Traditionally, m-commerce was made possible via wireless point of sale (POS) swipe devices. However, through developments and enhancements in technology, m-commerce is gradually progressing into mobile devices such as mobile phones and PDAs. The first m-commerce enabling technologies included the i-Mode mobile Internet service and

WAP, which were built and introduced on second and a half generation (2.5G) digital phone technologies, with the primary purpose of allowing consumers with the necessary tools to browse the Internet. Rapid advances in communication technologies, however, have seen the application of 3G mobile communication technologies influencing the development of m-commerce. Various experiments are undertaken constantly in an attempt to upgrade the current version of m-commerce to introduce 4G mobile technology, representing an exceptionally optimistic future for m-commerce (Kumar, 2012; Zhou, 2011:527).

Okazaki and Taylor (2008:5) explain that, due to the distinctive environment offered by m-commerce, where a business's messages may elicit consumers to visit specific websites, search for certain information from different mediums, send text messages and make purchases, it has gained immense popularity and acceptance worldwide. Kumar (2012) agrees and adds that m-commerce will become more useful as a tool to conduct business as its introduction and implementation into various sectors, including finance services, telecommunications, retail and information technology services, increases.

In 2009, m-commerce produced global sales of one billion American Dollars, and by the year 2015, it is anticipated to increase to 100 billion American Dollars (Murphy, 2012). This is likely because m-commerce, compared to its fixed equivalents, has a number of distinctive advantages attributable to its specific inbuilt characteristics, namely flexibility and distribution, personalisation, higher efficiency and greater productivity, ubiquity and outstanding business market potential (Kumar, 2012). Furthermore, as content delivery by means of wireless devices becomes safer, accessible and faster, so m-commerce will surpass wireless e-commerce as the chosen method for digital commerce transactions (Oricha, 2013).

From a financial services perspective, m-commerce is described as any financial and/or business transaction undertaken via mobile communication networks or the Internet (Lee & Ahn, 2013:137) and offers various advantages to its users, such as convenience and flexibility by enabling time and place independence (Kim *et al.*, 2009:285; Wu & Wang, 2005:720). Mobile banking is an application of m-commerce allowing users to access bank accounts by means of mobile devices to carry out and complete banking transactions, including balancing cheques, checking account balances and statuses, transferring money and selling stocks (Kim *et al.*, 2009:286; Tiwari & Buse, 2007:64).

There are challenges associated with the m-commerce environment, including mobile banking. Mobile devices, specifically mobile phones, with a small screen size, limited screen resolution and uncooperative keypad may present the customer with difficulties when utilising mobile banking. Moreover, the mobile banking m-commerce platform may be subject to information and transaction eavesdropping risk, which is similar to other e-commerce applications such as Internet banking (Liarokapis & Conradi, 2007:353). Fortunately, the South African retail banking industry is well regulated and equipped with outstanding risk management practices, all in an effort to protect the retail banking consumer.

2.6 THE SOUTH AFRICAN RETAIL BANKING LANDSCAPE

The development of banks in Africa began with Africa's colonisation when the formation of trade agreements between Europe and Sub-Saharan Africa started (Appavoo, 2009:46). South African banking can be traced back to Cape Town and tracked back as far as the 1860s, where it was influenced by both British and Dutch traditions. Today, in 2015, the South African banking system is well developed and established and compares auspiciously with banking systems in many developed countries, such as the USA. Moreover, the South African banking system sets South Africa apart from several emerging market economies including Brazil and Egypt (Redlinghuis & Rensleigh, 2010:1; Singh, 2004:188) and is considered the best in Africa (Appavoo, 2009:46). The South African banking industry has established first-world clearing, settlements and default procedures, and markets related to derivatives, futures, options and swaps are also well regulated (Appavoo, 2009:46).

The South African banking industry has emerged into a mature sector as a result of moderate private sector indebtedness and a first-class framework in terms of regulations and legislations offering many domestic and foreign institutions a full spectrum of services (Mboweni, 2004:1; Redlinghuis & Rensleigh, 2010:2), including, amongst others, insurance and investment banking, commercial, retail and merchant banking and mortgage lending (Appavoo, 2009:46). Furthermore, banks in South Africa are well managed and conduct business using refined risk management systems and corporate government structures (Mboweni, 2004:1).

According to Redlinghuis and Rensleigh (2010:2), South African banks are regulated in line with the principles established by the Basel Committee on Banking Supervision and act in accordance with international best practise. Appavoo (2009:46) opines that this regulatory framework is on par with the world's top ten central banks. Redlinghuis and Rensleigh (2010:2) argue that in modern times, South African banking consumers have online, real-time and countrywide access to banking products and services, 24 hours a day during the year. This coupled with South Africa's relaxed exchange controls, makes South Africa a progressively significant financial centre. Table 2.1 outlines the South African banking structure comprising 38 registered South African banks of which 24 are South African controlled, seven foreign controlled, 14 are local branches of foreign banks, and two are mutual banks. Moreover, 44 international banks have authorised representative offices in South Africa (SA Financial Sector Forum, 2012).

The four banks that largely dominate the South African banking environment include the Amalgamated Banks of South Africa (ABSA), Standard Bank, Nedbank and First National Bank (FNB). Research conducted by Mittner (2008) indicates that ABSA consumes the largest market segment with 31 percent, followed by Standard Bank with 26 percent, Nedbank with 20 percent and FNB with 16 percent. The remaining seven percent comprise smaller banks offering products and services to niche markets. In 2012, BusinessTech (2013) reports that ABSA retained the largest portion of South Africa's 23.2 million banked population, covering 32.9 percent of the market. However, FNBs market share grew to 25.2 percent, while Standard Bank and Nedbank's market share decreased to 23.9 percent and 10.7 percent respectively. Surprisingly, Capitec's market share grew from 7.9 percent to 10.8 percent from January 2012 to December 2012, reporting 43 percent year-on-year growth for this retail bank.

Table 2.1 The South African banking structure

South African Reserve Bank					
Locally controlled banks		Foreign controlled banks	Branches of foreign banks	Mutual banks	Other banks
Nedbank Group	Absa Bank	Absa Bank	ABN AMRO Bank	GBS Mutual Bank	Development Bank of Southern Africa
Nedbank	African Bank	Albaraka Bank	Bank of Baroda	VBC Mutual Bank	
Old Mutual Bank	BoE Private Clients	Habib Overseas Bank	Bank of China		Land and Agricultural Bank of South Africa
Peoples Bank	Bidvest Bank	HBZ Bank	Bank of Taiwan		Postbank
Go Banking	Capitec Bank	Islamic Bank	Barclays Bank		
Rand Merchant Bank	Fairbairn Private Bank	Mercantile Bank	Calyon Corporate and Investment Bank		
Regal Treasury Private Bank	FirstRand Bank	South African Bank of Athens	China Construction Bank		
	First National Bank		Citibank		
Rennies Bank	Imperial Bank		Commerzbank Aktiengesellschaft		
RMB Private Bank	Investec Bank		HSBC Bank		
Sasfin Bank	Marriott Corporate Property Bank		JPMorgan Chase Bank		
Standard Bank			Société Générale		
TEBA Bank	MEEG Bank		Standard Chartered Bank		
Wesbank			State Bank of China		

Source: SA Financial Sector Forum (2012)

In order to uphold and increase market share, it is important that retail banks continuously address and invest in consumer education relating to new financial products and services. Education of consumers and the reputation of retail banks will likely play a key role in the future of retail banks, owing to the influence it may have on the future adoption of mobile banking and other innovations in South Africa. It is also important that retail banks continuously improve their self-service technologies, not only to satisfy the ever-changing demands and needs of consumers, but also to ensure future success (Cox *et al.*, 2008:12-13).

2.6.1 The future of South African retail banking

Great tenacity through several challenging economic market conditions has been demonstrated by the South African retail banking industry. In addition, the introduction and development of innovations such as the Internet and mobile technologies (Dzogbenuku, 2013:2; Wessels & Drennan, 2010:547), as well as the likelihood of the retail branch model becoming obsolete (PwC, 2014:3), has forced retail banks to find new solutions to provide banking services to their consumers and more significantly, reach new untapped markets within the emerging market (Arnaboldi & Claeys, 2008).

Retail bank heads constantly are faced with challenges such as improved business performance and having to drive revenue under vigorous economic pressures (PwC, 2014:1). As such, retail banks are regularly engaging in the process of strategic management and planning to drive changes in their business strategies (Kanchan *et al.*, 2012:15). However, consumers show little interest in and concern for business strategies. This is because consumers are primarily interested in what the retail bank can offer, such as lower service fees, which retail banks have started to address in fear of losing consumers. Consumers also demand to be offered services in their preferred language. In addition to these consumer demands, the introduction of mobile banking has led to increased pressure, and created even more expectations in terms of accessibility to banking services at anytime and anywhere, combined with security issues and responsible banking.

The retail banking environment is a heavy user of technology and is regarded as the leading sector in adopting and using the Internet and mobile technologies on consumer markets. Moreover, the manner in which banking services are delivered has undergone

changes unprecedented in its history. Garg *et al.* (2014:4097), therefore, highlight that retail banks of the future are embracing digital banking solutions to focus and capitalise on emerging technologies and to supplement traditional in-branch banking and ATMs. Garg *et al.* (2014:4097) state that ATM usage from 2005 to 2011 decreased significantly from 24.4 percent to 14.2 percent. This dramatic decrease can be attributed to factors such as the safety of ATMs, including fraud issues and concerns, consumers' inclination towards personal banking as well as the introduction of electronic banking systems. This is indicative of the future direction of retail banks. According to Nyamakanga (2007), retail banks invest heavily in marketing strategies to educate and inform consumers when completing banking transactions via a mobile device or the Internet. The degree to which these marketing strategies are successful remains questionable, given the fact that fraud still occurs. Therefore, answers to questions, such as will technological innovations always be inferior to the creativity of fraudsters and Internet hackers and is it the responsibility of the retail bank or consumer to ensure that banking activities are undertaken in safe banking conditions, remain unclear. Redlinghuis and Rensleigh (2010:6) highlight that the relationship between the retail bank and the consumer is becoming increasingly important and, as such, it is imperative that retail banks understand each consumer's banking pattern and trend, not only to identify and correct sudden changes in an account, but also prevent serious financial losses for both the retail bank and the consumer. Redlinghuis and Rensleigh (2010:6) elaborate and warn that the future of retail banking lies within the relationship between the retail bank and the consumer, whether this relationship is built through a physical channel such as a retail bank branch or a virtual channel such as mobile banking. Consequently, retail banks will tailor more solutions to meet the needs of consumers, particularly targeting consumers in the un-banked and under-banked markets, with paramount focus of fee and pricing structures.

Against this background, it is evident that factors such as mobility, accessibility, convergence, trust through appropriate security, excellent customer service and value for money will likely emerge as the cornerstones of retail banking in the future, while satisfying the needs of consumers across the respective market segments. Furthermore, banking products and services will likely remain jointly marketed with non-banking products, such as purchasing airtime through mobile banking.

The strategic importance of these cornerstones requires significant investment in order for retail banks to increase the uptake and adoption of banking products and services offered through digital and mobile technologies (Salhieh *et al.*, 2011:326). For example, consumers are not likely to undertake mobile banking transactions if the trustworthy relationship between a retail bank and the consumer has been broken due to, *inter alia* technology fraud. Consequently, it is important that retail banks continuously engage in the process of strategic management.

2.6.2 Strategic management within retail banking

In any business, including financial services providers such as retail banks, eight distinctive but interdependent functions exist, including the general management function, purchasing function, operations function, marketing function, financial function, human resources function, public relations function and the administrative function (Botha & Banhegyi, 2007:12-13). Innovative technology, such as electronic banking, including mobile banking, is related to the operations function, which involves the development of products and the delivery of services (Meintjes, 2008:106). According to Maseko (2012:43), the operations function within the retail banking environment encompasses the management of a transformation system whereby inputs such as employees, information technology, facilities, energy and financial resources are converted into outputs such as loans and deposits. Most importantly, within the operations function is the role of strategic management, as strategies will ensure optimal operations of the entire business and those of new technologies and information systems.

Strategic management is presented as the process general management utilise to generate and shape strategy, which is the management tool applied to guarantee the performance of the business (Nienaber, 2010:2). It is thus evident that strategic management is a process that encompasses broad strategic and fundamental questions in determining business prospects, namely: What is the business's present situation? Where does the business need to go from here? How the business should get there? And, how the business should align their strategies to ascertain a sustainable competitive advantage? (David, 2011:47; Hough *et al.*, 2008:3). These questions compel managers of various industries, including those of the retail banking industry, to consider industry conditions, competitive forces, the business's present performance and market standing, its resource strengths and capabilities, and its competitive weaknesses. In addition, managers need to take into

account changing consumer needs and groups to evaluate what changes are needed and what strategic outlook should be developed to ensure improved financial, market, consumer, and people performance (Louw & Venter, 2010:7). Pearce and Robinson (2011:4) concur that management is a process and add that it comprises a continuous cycle of four basic management functions, including planning, organising, leading and control of a business's strategy-related decisions and actions. Botha and Banhegyi (2007:13) opine that planning, the first step in the management process, involves the formulation and assessment of objectives, an identification of effective and efficient measures and strategies of achieving these objectives as well as an identification of available resources acquired to attain the set objectives. The second step in the management process is organising, which allows management to establish effective measures of utilising and allocating the business's resources to achieve objectives and execute planned strategies. According to Kroon (2008:54), leading, the third step in the management process, involves monitoring of performance standards and it influences employees' behaviour in such a manner that they will actively contribute towards the achievement of business objectives and successful execution of strategies. The fourth and last step in the management process is control, which is a process whereby the execution of plans and strategies is recorded and controlled through a management information system to ensure that the results are in line with the objectives. Additionally, control ensures that the business is going in the intended direction and that unnecessary problems are avoided.

Managing a business in the present competitive landscape is an extremely multifaceted task, and has an impact on managerial leadership, strategies, and organisational architecture (Louw & Venter, 2010:6). The increase in competitive business practices, the inclination towards strategic flexibility to accept and harness change, the growing surfacing of networked businesses, and the apprehension for sustainability and business ethics in the global business environment, are some of the reasons given for the heightened complexity (Pearce & Robinson, 2011:3). As such, it is imperative that leaders within any business need to comprehend where their business fits into the global competitive environment, what it means to be a sustainable international business, and how they can contribute towards strategic development, change and transformation (Louw & Venter, 2010:6). With specific reference to the retail banking industry, developments in technological innovations, in particular electronic banking such as

Internet and mobile banking, has increased rapidly in an effort to lessen escalating competition from incumbents, new entrants, increasing costs and the growing need and importance of banks to satisfy the ever-changing needs of consumers. These innovations have revolutionised and modernised this traditionally stagnant industry, and became a vital part of information and communications technology transformation (Ettlie, 2006:5). As such, strategy, as an integral part of strategic management, has become important within the retail banking environment.

2.6.3 The concept of strategy within the retail banking environment

Hough *et al.* (2008:4) and Thompson *et al.* (2010:6) define strategy as a business's action plan and comprises the competitive moves and business approaches managers utilise to grow and expand the business, attract and satisfy demanding consumers, compete effectively, conduct operations, as well as attain the targeted business performance levels. David (2011:38) concurs with this definition, while Louw and Venter (2010:10) elaborate that strategy is the pattern or plan that incorporates a business's main objectives, policies and action systems into a unified whole. Furthermore, as indicated by Ettlie (2006:97), well-formulated strategies help organise and allocate a business's resources into a unique and sustainable posture based upon its relative internal capabilities and limitations, expected changes in the environment, and contingent moves by competitors.

Henry (2011:4) states that strategy matches a business's internal capabilities and its external relationships with its relevant stakeholders such as employees, consumers, shareholders, and suppliers. In addition, strategy involves utilising analytical techniques to provide support with understanding and influencing its position in the highly competitive market. According to Clegg *et al.* (2011:4), strategy denotes foresight, having a holistic view and comprehending how to define objectives and attain them, even against resistance. Business strategies, as indicated by David (2011:45), may include geographic expansion, liquidation, joint ventures, retrenchment, acquisition, diversification, divestiture, market penetration and product development. The ultimate purpose of any strategy, however, is to gain and sustain a competitive advantage, which is defined as the superior performance relative to other competitors in a similar or identical industry or the industry average (Rothaermel, 2013:4; Thompson *et al.*, 2010:7; Walker, 2009:5). Therefore, strategy is an interdisciplinary practice that claims to transcend functional concerns such as human resources, marketing and accounting (David, 2011:37), all of

which are important to ensure the success of strategic management as well as the future success of technological innovations including mobile banking.

2.7 MOBILE BANKING

Retail banks and other financial institutions alike have depended in the past on their branch network to achieve and maintain a competitive advantage, secure market share and increase profits (Thornton & White, 2001:169). However, owing to rapid developments in technology in terms of the delivery of financial products and services, deregulation, growing information and communication technology, the traditional bricks-and-mortar branch model has transformed into a click-and-mortar business model which includes cheaper digital channels, such as mobile banking (Ho & Ko, 2008:427), which was first introduced in South Africa in 2005 (Ernst & Young, 2009:14; Goldstuck, 2005:219), suggesting that this innovation is still in its infant stage (Garg *et al.*, 2014:4097). Consequently, the market environment provided for new emerging competitors as well as different methods of accessing financial products and services (Thornton & White, 2001:169).

The utilisation of mobile devices to undertake banking transactions is an innovative approach to the delivery of financial services through information communications technology (Chung & Kwon, 2009:539), and is made possible owing to the convergence of mobile technology and financial services, which began after the introduction of wireless Internet and smart-chip-embedded handsets (Yoo *et al.*, 2008:120). The heightened increase in the use of mobile devices has changed the environmental context within which the retail banking sector operates and forced this sector to accept and harness change (Schaap, 2006:13), as new banking innovations via mobile devices, particularly mobile phones is gaining popularity and may converge into conventional banking in the future (Njenga & Ndlovu, 2013:43).

Various studies (Herzberg, 2003; Laukkanen, 2007; Laukkanen & Lauronen, 2005) have emphasised that mobile banking is one the most important innovations of recent years and that it is becoming an essential platform for expanding access to banking transaction through mobile or handheld devices. As such, mobile banking is likely the most significant event for the banking sector since the introduction of the automated teller machine (ATM).

Several authors (Barnes & Corbitt, 2003:275; Laukkanen & Passanen, 2008:87; Riquelme & Rios, 2010:329) describe mobile banking as a subset of electronic banking and functions as a platform that allows consumers with the opportunity to interact with a bank through mobile devices, such as mobile phones and PDAs. Tiwari and Buse (2007:73) define mobile banking as the delivery of banking and financial services, such as bank and stock market transactions, access to customised information and account administration, via mobile telecommunication devices. According to Krugel (2007:3), mobile banking is an extension of a bank's existing payment infrastructure whereby mobile devices are employed as a channel in which the reach of mobile networks can be leveraged in order to provide banking services to consumers. Numerous authors (Barnes & Corbitt, 2003:273; Laukkanen & Pasanen, 2008:87) concur and state that mobile banking is an extension of Internet banking. For the purpose of this study, mobile banking is defined as undertaking banking activities by communicating with a preferred retail bank using a mobile device, such as a tablet computer, PDA or mobile phone.

Sinisalo *et al.* (2007:772) regard mobile banking as a forceful marketing and customer relationship management tool owing to the increased number of mobile devices, which makes wide-scale communication with the target market easier, fostering healthier relationships between the retail bank and the consumer. Reedy and Schullo (2004:12) conclude that although mobile banking is not able to dispense money like ATMs, mobile banking is leading the way forward and quickly emerging as the next most feasible banking platform.

Advances in self-service technology, therefore, have revolutionised banking delivery systems making it possible for consumers to access financial services and information independently of service professionals thereby shifting the interactions between the consumer and the service provider (Meuter *et al.*, 2000:50). In addition, these developments have paved the way for innovations and value-added creation for consumers (Sangle & Awasthi, 2011:898-899). This is evident by the unremitting increase in retail banks presenting new mobile money methods, reducing the need for consumers to use physical cash.

2.7.1 Mobile banking methods

Mobile banking solutions or methods offered by financial services institutions include short message service banking (SMS banking), i-Mode banking, unstructured supplementary service data (USSD), WAP, Java 2 micro edition (J2ME) and SIM application toolkit (SAT) (Krugel, 2007:13; Mobile Marketing Association, 2009:2-3). According to the Mobile Marketing Association (2009:2), retail banks generally use a phased approach when applying mobile banking solutions; that is, implementing conventional solutions, such as SMS alerts and notifications first before progressing to more unconventional banking solutions.

2.7.1.1 Short message service banking (SMS banking)

Krugel (2007:14) and Rotimi *et al.* (2007:228) postulate that a SMS allow users to send and receive text messages on a handheld device, such as a mobile phone, utilising the numbered keypad on the particular device to input characters. Tiwari and Buse (2007:96) define SMS banking as the facilitation of financial and banking services via text messaging services, commonly denoted as SMS.

Two common SMS methods, namely push and pull methods are widely used in SMS banking applications. The push SMS is defined as sending a message from an application, the SMS server, to the mobile device of the user. It is a one-way communication channel where the mobile application, which is the SMS banking application, initiates the message. The push SMS includes a deposit and withdrawal alert, which informs the user whenever a deposit is made into and/or a withdrawal is made from the specific bank account (Rotimi *et al.*, 2007:227). The pull SMS method, conversely, is a two-way communication channel and involves a request sent by the user to the SMS banking application. Subsequently, the application responds with the information requested, such as a bank account balance (Rotimi *et al.*, 2007:228).

In order to perform SMS banking, a consumer must first register with the particular bank. The registration process starts when the consumer sends a structured SMS (SSMS) message to the mobile banking service. The first word in the SSMS, known as the tag identifier, then orders the SMS gateway to submit a message to the suitable SMS application. The balance of the SSMS will store the request from the consumer to the mobile banking application (Krugel, 2007:14). Krugel (2007:15) explains that the SSMS

will be sent to a SMS address or short code, which is typically a shorter version of a mobile phone number. The SSMS will pass from the consumer's mobile device through the GSM communication network to the mobile network operator short message service centre. The short message service centre holds and sends the SSMS to the SMS gateway assigned to the short code utilised by the mobile banking service provider. The consumer's mobile number, as forwarded by the short message service centre with the SSMS, will be used by the mobile banking service provider to ascertain and respond to the request of the consumer. The response will follow a return path and respond to the consumer with a SMS confirmation message. Figure 2.2 illustrates the SMS mobile banking process.

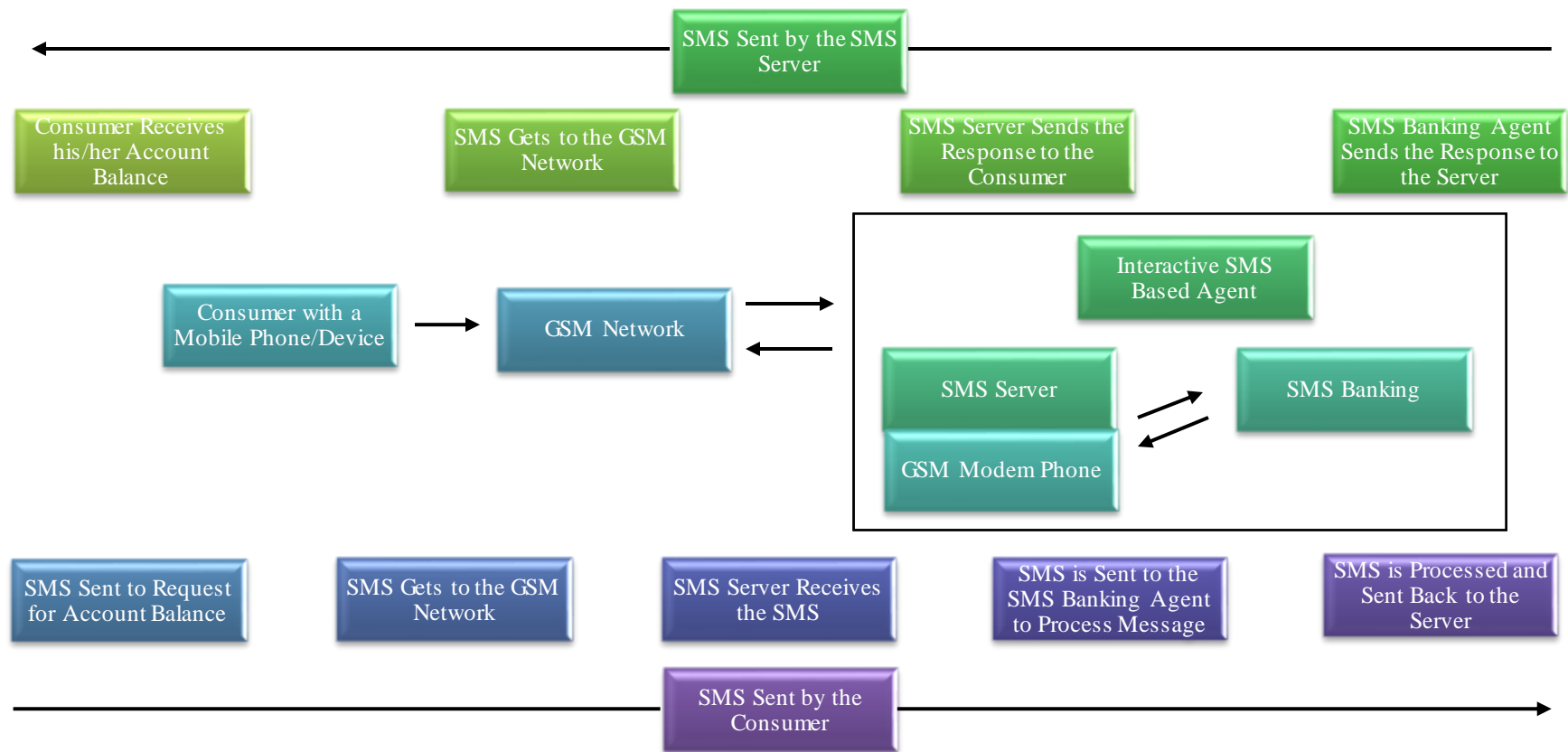


Figure 2.2 SMS mobile banking hardware architecture design (Rotimi *et al.*, 2007:230)

2.7.1.2 i-Mode banking

Tiwari and Buse (2007:90) note that mobile banking services provided through i-Mode is known commonly as i-Mode banking. This form of mobile banking is a rich client-based application that downloads directly onto the mobile device and operates similarly to that of other mobile application menus. Maduku (2011:37-38) states that i-Mode banking provides consumers with a convenient banking solution, given its newer functions, quicker navigation, smarter interface and improved functionality. In addition, it also allows consumers to purchase and pay for goods and services employing mobile devices. Tiwari and Buse (2007:90), however, maintain that i-Mode banking has not found much success outside its birthplace, Japan, owing to its proprietary nature and, therefore, a limited number of banks in Western Europe used i-Mode to deliver financial services. Maduku (2011:38) elaborates and attribute i-Mode banking's poor success to the advantage browser-based banking has over client-based banking. The key advantage of a browser-based application is that data is processed exclusively on and by the server. Moreover, no additional software and processing power on the mobile device is required, which makes browser-based application appropriate for mobile devices, specifically mobile phones, with low memory and/or processing power. Additionally, consumers do not have to be technologically astute to install the software on their mobile devices. To conclude, the predefined user interface of browser-based applications simplifies interaction with the application and as such promotes user-friendliness.

2.7.1.3 Wireless application protocol (WAP)

In its simplest form, WAP is defined as Internet on a mobile device. The WAP-Forum, a consortium of foremost manufacturers of mobile phones, such as Ericsson, Motorola and Nokia, developed WAP. The primary objective behind its development was to offer an industry-wide specification for developing applications that function on mobile telecommunications networks and transmit Internet content on mobile devices regardless of the transmission technology employed by network carriers (Maduku, 2011:35). Krugel (2007:18-19) states that WAP is an application with international standards in terms of wireless communication. Furthermore, the main application of WAP is to provide access to the Internet through a mobile device, particularly a mobile phone, or a PDA. Moreover, a WAP browser allows for all of the elementary services provided by a computer-based web browser, however, it is simplified so as to function with the limitations of a mobile

device. Pousttchi and Schurig (2004) opine that WAP is the most widespread solution for mobile banking.

According to Pousttchi and Schurig (2004), WAP-banking is comparable in many ways to the operation of electronic banking (e-banking), because the consumer will browse to a mobile Internet site by accessing the WAP browser on their mobile device and subsequently enter the website address of the specific bank. Krugel (2007:19) indicates that the mobile device and the bearer, such as GPRS, is utilised to display or transmit the data between the consumer and the particular bank. As such, it is important that the consumer use a mobile device that is capable in terms of its functionality and that it has the correct configuration, which is provided by the mobile network operator, to support the service.

2.7.1.4 Java 2 micro edition (JAVA/J2ME)

J2ME is a function that enables a mobile device to undertake small, user-installable software applications developed particularly for mobile devices such as mobile phones. In order to use a JAVA mobile banking application, the mobile device has to support GPRS downloading of the initial application (should the application not be pre-installed into the mobile device) (Krugel, 2007:20). Krugel (2007:20) highlights that user experience of the JAVA mobile banking application is similar to that of a website and states that it provides identical content and graphic-rich benefits of the Internet to the mobile device. However, the fact that not all mobile devices and/or networks have GPRS capabilities is noted as a possible drawback of this form of mobile banking, which will ultimately affect users' ability to download the application. Krugel (2007:20) explains that the JAVA mobile banking application can be used by browsing through the mobile device menu, finding the J2ME application, selecting, and running the application and then following the JAVA browser menus to conduct a transaction.

2.7.1.5 SIM application toolkit (SAT)

According to Pousttchi and Schurig (2004), SAT is a GSM standard for extended communication between a mobile device and a SIM card. Krugel (2007:21) indicates that the SAT enables a financial services provider or retail bank to accommodate a consumer's mobile banking menu within the SM card. The researcher elaborates by stating that several mobile operators worldwide have used the SAT for several

applications where a menu-based approach is a necessity, including mobile banking and content browsing. Nevertheless, the general challenge faced by the SAT, as with all SIM-based applications, is getting the application operational onto a SIM card that already exist in the market.

2.7.1.6 Unstructured supplementary service data (USSD)

Krugel (2007:17) posits that USSD is a SMS in the form of a menu where a consumer receives a text menu on their mobile device rather than a string of words. Furthermore, various banking processes, including airtime top-up, money transfers, bill payments, and balance enquiries via the mobile device can be process through this communication protocol. Moreover, USSD is comparable to SMS technology owing that it too has data payload restrictions between 160 and 182 alphanumeric characters in a single transmission. USSD, as indicated by Krugel (2007:17), is a data-bearing channel in the GSM network. In comparison with the SMS, Krugel (2007:17) point out that USSD delivers small messages up to 160 characters between the mobile device and the network. Moreover, USSD is session based that allows an interactive dialog between the consumer and a specific set of applications, which is dissimilar to the SMSs' 'store and forward'. As such, both sides of dialogue occur during a USSD session, while a SMS-based interaction is broken into communication segments between the consumer and the service. The difference between the USSD and the SMS can be compared to the difference between an email and instant messaging, owing to an email having to wait for the recipient to read and reply and instant messaging providing for immediate dialogue. Krugel (2007:17-18) highlights that a consumer that is registered will be required to dial a unique number that includes special characters, such as * and #. A typical USSD string would be *120*130#, where the 130 signifies the name of the particular bank. Table 2.2 displays a typical menu a consumer can expect with the mobile banking activity in USSD mode.

Table 2.2 On-screen display of mobile banking activity in USSD mode

Welcome to BANK, reply with:	
1	for balance enquiries
2	for inter-account transfers
3	for person to person payments
4	for bill payments
5	for airtime top-up

Source: Krugel (2007:18)

The previous section described the different types of mobile banking methods. In the following section, Section 2.7.2, the different South African mobile banking technology solutions are discussed.

2.7.2 South African mobile banking technology solutions

Three unique technology solutions exist through which mobile banking are implemented in South Africa, namely browser-based applications, messaging-based applications and client-based applications (Kim *et al.*, 2009:286; Tiwari & Buse, 2007:100-101). The browser-based application is fundamentally a WAP-based Internet, requiring a compatible mobile device, which is WAP-enabled. The mobile device is utilised to access banking portals via the Internet (Kim *et al.*, 2009:286).

The messaging-based application is essentially communication between the banking institution and the consumer by means of text messages. Using a registered mobile number, consumers send a predefined instruction to the bank, and subsequently utilises text messages to undertake transactions with the relevant bank. Messaging-based application includes USSD, which is compatible with most mobile devices. USSD mobile banking applications comprises Wizzit in South Africa (Wizzit, 2005), M-PESA in Tanzania (Camner & Sjöblom, 2009:2), M-PESA in South Africa (FA News, 2010) and FNB mobile banking (Ismail & Masinge, 2012:104).

The client-based application requires the installation of technical software in the mobile phone, such as the STK (SIM toolkit standard) (Tiwari & Buse, 2007:101). The M-PESA in Kenya utilises the STK technical platform (Camner & Sjöblom, 2009:2).

The section to follow describes the mobile banking technology solutions offered by key South African retail banks.

2.7.3 Mobile banking technology solutions offered by key South African retail banks

Various authors (Meyer, 2015; Van Wyk, 2010) believe that mobile banking in South Africa, specifically mobile banking via mobile phones, present a potentially lucrative opportunity to retail banks for mass marketing of banking services and, therefore, all South Africa's larger and key retail banks offer some form of mobile banking. Porteous (2007:28-29) highlights that developments in South African mobile banking emerged as banking industry competitors competed against each other for market share. According to Maduku (2011:43), international experience points out that retail banks must have additional service offerings to build a sustainable long-term mobile banking model. As such, retail banks in the South African context offering mobile banking services have noticed this call by diversifying their offerings. Ismail and Masinge (2012:105) posit that South African banking regulation necessitates a banking license from companies offering mobile banking services. As such, partnerships between companies offering mobile services and financial services institutions were prompted.

2.7.3.1 Nedbank mobile banking (M-PESA)

The money transfer service, M-PESA, which resulted from a partnership between Safaricom and Vodafone, was first presented in Kenya in 2007. This service allow users to conduct various transactions, including depositing, withdrawing and transferring funds using a mobile phone at M-PESA agents nationwide (Ismail & Masinge, 2012:105). Ismail and Masinge (2012:105) and Rizzo (2013) explain that the M-PESA application is installed on the mobile phone SIM card and operates on every handset brand. Camner and Sjöblom (2009:2) opine that M-PESA is extensively employed in Kenya and Tanzania, and as indicated by Ismail and Masinge (2012:105), its registration is free, and it is

available to use by non-bank account holders, suggesting a clear case of product innovation.

M-PESA money transfer was launched formally in South Africa in 2010 through a partnership between Nedbank and Vodacom (BusinessTech, 2014; Rizzo, 2013). M-PESA is grounded on the USSD technology and is available for Vodacom subscribers; that is, Vodacom SIM cardholders and ported SIM cards. Users that are registered for M-PESA do not need to be in possession of a bank account, no monthly fees are charged and no minimum balance is necessary (Ismail & Masinge, 2012:105; Rizzo, 2013).

2.7.3.2 Wizzit mobile banking

The Wizzit mobile banking system, an initiative by Wizzit bank, a division of the South African Bank of Athens, was launched in South Africa in 2004 in an effort to offer solutions to the previously unbanked society. Users of Wizzit mobile banking utilises the pay-as-you-go model; that is, users pay for every transaction (20c for every 20 seconds on the MTN and Vodacom network) and pay no monthly fees (Wizzit, 2005).

2.7.3.3 Standard Bank mobile banking

Standard Bank, in collaboration with the MTN network provider, prompted MTN banking, which is a mobile money service based on WIG technology. The client is required to install this technology on a SIM card. The mobile banking services are carried out employing two options. The first option is the WAP-based option (Internet through a mobile phone) and the second option is a new mobile phone banking option that operates on any type of mobile phone. In order to use Standard Bank mobile banking, the user is required to have a bank account with Standard Bank (Ismail & Masinge, 2012:106).

2.7.3.4 ABSA mobile banking

ABSA brought about two mobile banking options, namely WAP-based technology and WIG-based technology (mobile banking via secure SMSs). The WIG-based mobile banking downloads the banking menu to the SIM card, which subsequently provides for a convenient selection of transactions and the secure transmission of encrypted information between the mobile device and the bank. ABSA mobile banking is available to users subscribed to Vodacom and MTN (Ismail & Masinge, 2012:106).

2.7.3.5 FNB mobile banking

FNB mobile banking, grounded on the WAP-based- and USSD technology is accessible to all FNB account holders. Additional to FNB mobile banking is the introduction of eWallet, which is essentially a money transfer service and Pay Wallet, which allows FNB corporate, commercial and public sector consumers to make electronic and direct payments to their unbanked recipients' mobile phones. Consequently, recipients have immediate access to their funds at any full service FNB automated teller machine (ATM) without having to be in possession of a bankcard (Ismail & Masinge, 2012:106).

2.7.4 Utility in mobile banking

In everyday language, the word utility has rather broad connotations, meaning, roughly, benefit or well-being. Indeed, individuals obtain utility by acquiring things that give them pleasure and by avoiding things that give them pain (Pindyck & Rubinfeld, 2009:79). For the purpose of this study, utility is defined as the satisfaction an individual gets by spending the least amount of effort to use a system or service (Njenga & Ndlovu, 2013:45).

According to Akinci *et al.* (2004:212), the fast changes that occur in the technological space, combined with globalisation of financial markets, has compelled participants in the financial services industry to compete for market share and increased revenue. Saunders and Cornett (2006:388) elaborate that competition in the financial services environment is intensified further by the entry of businesses not related to banking such as food retailers gradually offering more financial products and services. As such, retail banking consumers are now demanding efficiency and flexibility in their financial transaction undertakings. Using mobile or Internet banking is less expensive than consumer's habitual usage of the customary branch channel, with respect to cheques and physical cash. Moreover, maintaining and servicing of conventional banking systems in terms of the physical branch and ATMs add to the heightened cost component of retail banks. To ensure the competitiveness of retail banks, they will need to focus attention on increased channel cost efficiency while at the same time satisfy the needs and wants of their consumers. Haytho and Simmers (2009:338) highlight that technological advancements of electronic banking have been the focus of retail banks in an attempt to improve efficiencies with the retail banking landscape. These technological advances include self-

services technologies such as mobile banking, which is believed to provide the retail bank and consumer with value and cost efficiency benefits, and has changed the manner in which the two parties interact with one another. MacDonald and Koch (2006:42) point out that these technological advancements of innovative banking delivery channels can be seen as a global phenomenon that has provided efficiency with regards to productivity as well as reduced delivery costs in terms of financial products and services. Moreover, Harrison (2000:25) notes that technological enhancements also resulted in decreased levels of human error and hence led to improved operational effectiveness.

As from the mid 1990s there has been a significant shift from traditional banking delivery channels to electronic banking channels that are self-service in nature (Pikkarainen *et al.*, 2004:224) not only to penetrate current markets, but to create new markets as well (Berndt *et al.*, 2010:48). The diffusion and adoption of mobile banking technologies will lead to efficiencies of banking systems, for both the retail bank and the consumer (Akinci *et al.*, 2004:212). Therefore, mobile banking has advantages and utility qualities for both the retail bank and the retail banking consumer. This is to ensure that both parties experience optimal satisfaction.

2.7.4.1 Utility in mobile banking for retail banks

Tiwari and Buse (2007:110) postulate that banks engage in mobile banking in order to benefit from an operational and strategic perspective. The researchers uncovered a number of reasons for retail banks to provide consumers with mobile banking services. First, mobile banking allows for the enhancement of a distribution network to reach its consumers. A key function of a distribution network is to increase the level of demand for banking products and services at commercial prices. Mobile banking can contribute to the achievement of this function as mobile banking provides time and place independence and convenience to accessing banking services. Push services offered by mobile banking can be employed to authorise transactions in case of emergencies, such as trading off shares in due course in the face of adversity, and mobile banking provides direct interaction with personal consultants via video telephony. Selebalo (2009) concurs and adds that mobile banking services offered by retail banks allow South Africans and the un-banked community in the lower income bracket to partake in the global economy. Ismail and Masinge (2012:100) agree and state that mobile banking can create a viable business model that may provide for expanded market penetration. Selebalo (2009)

elaborates and cite that mobile banking can overcome the challenges of accessibility and affordability, and hence market penetration opportunities are presented.

Secondly, Tiwari and Buse (2007:111) assert that mobile banking can assist with increased levels of consumer satisfaction through reorganising business practices to improve efficiency, offering additional support and sound advice to consumers owing to the automation of routine processes, utilising the innovative anywhere and anytime services to offer personalised services for individual preferences and using the consumer's geographic location to offer value-adding services to the consumer and gathering data that can be used to build consumer profiles. Yu and Guo (2008:9) reiterate by stating that mobile banking aids the facilitation of immediate two-way communication between retail banks and their consumers, which as indicated by Yang and Fang (2004:304) subsequently allows for the creation of consumer databases, which presents a further advantage of being able to provide personalised offerings to consumers.

Thirdly, Tiwari and Buse (2007:111) stipulate that apart from mobile banking operating as a supplementary distribution channel, it is identified as a source that can make a contribution to revenue. The researchers elaborate that mobile banking can be provided on a premium basis at an acceptable price to ensure consumer's willingness to pay for the services. However, the price should be high enough to compensate for the costs incurred by the retail bank. Various researchers (Ho & Ko, 2008:427; Ibrahim *et al.*, 2006; Polasik & Wisniewski, 2009:33) concur that mobile banking can improve the retail bank's profitability.

Lastly, Tiwari and Buse (2007:111) add that mobile banking can serve as an image product with which to gain a strategic advantage. Retail banks may portray or retain a positive image amongst technological innovative individuals and in doing so strengthen brand reputation for being innovative and visionary. This once again accentuates the importance of strategic management within retail banks and the key role it fulfils in terms of innovation and the future success thereof. Ibrahim *et al.* (2006:478) have also identified an enhanced corporate image as a benefit derived from and associated with mobile banking.

In addition, various researchers (Gan *et al.*, 2006:361; Hosein, 2010:4; Polasik & Wisniewski, 2009:33) posit that mobile banking reduces a retail bank's overheads and

transaction costs. Ho and Ko (2008:427) is of opinion that the use of this self-service technology enables retail banking employees to deal with and concentrate on more pressing service related issues. Moreover, Selebalo (2009) believes that it complements other banking services offered by the retail bank and argue that the frequent use of mobile banking by retail banking consumers will facilitate popular participation in the economy, which ultimately has a positive reflection on the national gross domestic product. Furthermore, this platform can contribute to the national saving rate, increase incomes and boost the resilience of the economy. At a broader level, it can enhance taxation and stimulate reinvestment of funds that is not in efficient circulation. All of these factors are likely to benefit the retail banks as well as the consumer.

2.7.4.2 Utility in mobile banking for retail banking consumers

Nel and Raleting (2012:51) indicate that the convergence of telecommunication and financial services generated opportunities for the development of mobile banking solutions and advantages for mobile banking consumers as well. Several authors (Akinci *et al.*, 2004:215; Laukkanen & Pasanen, 2008:87; Wessels & Drennan, 2010:548) highlight that mobile banking services allow consumers to complete a wide array of banking transactions, including checking bank account and other transaction balances, paying accounts both locally and internationally, transferring funds between accounts, credit card monitoring, enquiring when invoices are due, purchasing and selling shares as well as receiving information related to investment portfolios and prices. Consumers, therefore, according to Rotchanakitumnuai and Speece (2003:312), have direct access to their financial information and control over their financial transactions, without having to travel to a physical bank branch. With specific reference to mobile phones, Laukkanen and Pasanen (2008:87) point out that this innovation supports the provision of information when time is of the essence. Meyer (2015) indicates that mobile money via mobile phones allow consumers to pay for a taxi fare, purchase groceries at a local supermarket or corner shop and send money to relatives and/or friends without carrying money on them. As such, mobile money can provide consumers with a means of having money on them without the fear of loss or theft. Selebalo (2009) further explains that mobile banking eliminates the risk of bank account closure due to inactivity, enabling consumers that do not earn a regular income to do banking.

In addition, Yu and Guo (2008:9) indicate that attractive business terms such as subordinate commission rates and consistent service quality can be enjoyed. Van Wyk (2010) adds that the majority of consumers are constantly on the go and, therefore, mobile banking, in comparison to traditional delivery channels, provides for, and satisfies the anywhere and anytime need, which is commonly referred to as its ubiquity. As such, consumers who are not in possession of a personal computer may find mobile banking advantageous to complete banking transactions. Notwithstanding the utility in mobile banking, the importance of fostering trust in this self-service technology cannot be underestimated. Primarily, this is because of the cybernetic nature of mobile banking, its lack of control and the great uncertainty and risk with which it is coupled (Ismail & Masinge, 2012:111; Lin, 2011:253; Zhou, 2011:528).

2.7.5 Trust in mobile banking

Retail banks globally are looking at electronic or digital banking service channels, such as the mobile banking channel, as the next revolutionary technology that will enable cost reduction while at the same time maintain and improve customer service (Ernst & Young, 2015:24). In emerging economies, such as South Africa, low cost banking, including, amongst others, mobile banking, can provide retail banks with the opportunity to reach new consumers. However, it is imperative that retail banks comprehend that the intermediary use of technology increases interpersonal distance between themselves and the consumer, possibly decreasing trust and exacerbating distrust (Benamati & Serva, 2007:161).

Although growth in mobile retailing, including the use of mobile financial services, are expected, the lack of trust on the part of potential consumers can have a detrimental influence on this growth and seriously impede continuous growth. Therefore, as transactions through the mobile Internet develop and mature, success is likely to be largely dependent on gaining and maintaining a particular level of trust (Roy *et al.*, 2001:388-389). Smith (2005:300) posits that it is relatively difficult to define the concept of trust. Smith (2005:300) furthermore stipulates that theorists and researchers from various disciplines, including philosophy, economics and sociology, analyse trust in relation to specific aspects of institutional arrangements, personal motivation and social interactions. In majority of these cases, however, discussions focus on two prominent features of trust, namely the social conditions under which trust becomes a subject matter

that requires attention, and the types of cognitive, affective, and moral activities individuals engage with when evaluating the trustworthiness of someone or something. An evaluation of trustworthiness will inform actions grounded on trust or distrust; that is, a willingness to participate or withdraw respectively. According to Clarke (2001:291), trust takes on different definitions because it is dependent on the environment or situation with which the individual is confronted. Moreover, the author points out that trust can differ in terms of the relationship between the parties. Trust may seem somewhat unimportant in an environment where there is limited exposure to risk and where the elapsed time during the exposure is relatively short or where the risks are apparent and well known but insurance is taken into consideration to account for the costs. Conversely, trust tends to gain importance in an environment where the above-mentioned factors do not exist in order to facilitate transaction activity and relationship development.

Gefen *et al.* (2003b:54) and Lin *et al.* (2011:617) define trust as an individual's belief that others will behave as expected, without taking advantage of a given situation. Kim *et al.* (2009:287) define trust as a psychological expectation that a trusted party will not behave opportunistically. In other words, it denotes the willingness of a party to be susceptible to the actions of other parties. Yousafzai *et al.* (2003:851) define trust in electronic banking channels as a psychological state that affects a consumer's willingness to perform banking transactions via electronic means as well as their expectation that their retail bank will fulfil their commitments, regardless of the consumer's ability to monitor or control the retail bank's actions. According to Mayer *et al.* (1995:711), trust reflects a disposition to be in vulnerability grounded on the positive expectation toward another party's future behaviour.

Taking into account the above-mentioned thoughts, this study defines trust, as per the work of Araujo and Araujo (2003:3), as the assured reliance on the character, ability, strength, or truth of something or someone. In the context of mobile banking, trust can be seen as a judgement made by the user or non-user based on general experiences learned from being a consumer or word-of-mouth and from the perception of a particular retail bank.

Kim *et al.* (2009:287) suggest that risk and interdependency are the required conditions of trust and that trust is suggestively conducive to psychological forces such as perceived probability, expectations, willingness, and attitudes. Nor and Pearson (2008:37) as well as

Zhou (2013:1087) believes that trust is conceivably a more crucial element in building economic relationships in an online setting given a greater perception of risk and uncertainty, which can be attributed to a greater threat of potential incongruous opportunistic behaviours, such as failure to deliver adequate goods and services as promised and the misappropriation and unauthorised dissemination of personal information. The prominence of trust in mobile banking is expected, owing to it sharing characteristics alike to electronic commerce activities, suggesting that potential mobile banking adopters will also share the apprehensions individuals face in e-commerce. Nor and Pearson (2008:37) furthermore note that mobile banking, as with any electronic commerce service, use a similar platform in delivering its services; that is, activities are performed online and processed virtually, without any personal contact, which subsequently raises doubts whether the requested transactions were properly executed and processed. McKnight *et al.* (1998:334) concur and highlight that it is costly and time consuming to build consumer trust in the online environment. Coleman (1990) attributes this to the fact that this type of trust is based on prolonged and cumulative experience that equips consumers with a sense of familiarity, calculation and values. As such, a high level of trust is necessary to account for these concerns and to allow for peace of mind when starting to use mobile banking.

Luarn and Lin (2005:874-875) are of opinion that a lack of trust is manifested in individuals' concerns that the mobile banking system will hand over their personal information or money to third parties, without them being aware or without their permission. Suh and Han (2002:248) further state that this feeling of apprehensiveness may not only be attributed to the drawbacks of the Internet and electronic commerce, but also consumers' distrust in them. Yousafzai *et al.* (2003:851) point out that, generally, consumers are alarmed about payment security, reliability and lack of privacy policies when performing activities via electronic means. Trust in electronic banking and its infrastructure is likely to diminish consumers' transaction-specific uncertainty and associated risks related to the likelihood of opportunistic behaviours on part of the retail bank. Therefore, it can be said that when people trust others, they believe that those they trust will behave as expected, making the interaction less complex. As such, it can be postulated that trust has a significant influence on any electronic banking mechanisms' acceptance and usage.

In light of this discussion, it is evident that consumers, generally, are apprehensive about the security and privacy of their information (Lin, 2011:253). Trust leads to action, which comprises risk-taking behaviours. Indeed, trust is a significant element to take into account when studying the usage behaviour of electronic banking channels. As a bank revisits and changes its business model from a physical market to a virtual market, and as consumers gain confidence that their physical bank is trustworthy, they will likely hold a positive attitude towards using electronic banking. Moreover, it is argued that the trust in a physical bank will mitigate the uncertainty in usage behaviour (Lee *et al.*, 2011:117).

In addition to the other trust related issues, mobile devices generally have small screen sizes, a limited screen resolution and unrecoverable key words, consequently making it difficult for some consumers to use (Kim *et al.*, 2009:285), which impairs trust in the system. Therefore, fostering trust in mobile banking and improving its system quality will arguably mitigate these problems (Zhou, 2011:530). It is also important to address the issues of structural assurances in mobile banking; that is, mobile banking safeguards such as legal structures and technological advances, assuring the consumer that the system is safe (Nor & Pearson, 2008:45), as well as information quality, which is whether the mobile banking system can provide the consumer with relevant and accurate information (Zhou, 2011:529). By doing so, consumer trust is likely to increase.

Given the fact that online transactions are coupled with great uncertainty and risk, and because trust underlies what makes an enabling electronic services channel environment (Lee *et al.*, 2011:117), trust has received substantial attention in the context of electronic commerce (Lin *et al.*, 2011:616), as well as management (Mayer *et al.*, 1995) and marketing (Morgan & Hunt, 1994). Trust has been identified as a factor influencing user adoption of different services, such as online news services (Chen & Corkindale, 2008), Internet banking (Flavian *et al.*, 2005; Nor & Pearson, 2008; Vatanasombut *et al.*, 2008), health Websites (Fisher *et al.*, 2008), and mobile shopping (Lu & Su, 2009). Furthermore, research indicates that trust pertaining to Web systems has a significant influence on users' intention to perform online shopping (Friedman *et al.*, 2000), banking as well as exchange money and sensitive personal information (Lin & Tang, 2003).

Notwithstanding trust in mobile banking, Meyer (2015) maintains that limitations put in place by the regulating bodies are the greatest factors behind the slow growth and adoption of mobile banking in South Africa. Moreover, Meyer (2015) emphasises the

importance of mobile banking as a means of addressing the critical subject of financial inclusion.

2.7.6 Growth and adoption of mobile banking internationally and in South Africa

The mobile banking market is identified as one of the fastest growing markets worldwide and it continues to grow at a rapid pace (Balabanoff, 2014, 249). It is expected that the number of mobile banking users and its interrelated services will grow from 55 million users globally in 2009 to approximately 894 million users in 2015 (Francis, 2010). Balabanoff (2014:249) notes that the mobile banking market will experience a minimum annual growth rate of at least 14 percent globally. Maduku (2011:38) emphasises that consumers' need for instant access to financial data, together with the proliferation of mobile devices, will lead to a greater increase in the number of individuals using their mobile devices, particularly mobile phones for satisfying and performing banking activities. In fact, Standard Bank (2015b) opines that the majority of banking transactions will be performed on smart mobile devices in the next three to five years.

Several studies (Benamati & Serva, 2007; Tiwari & Buse, 2007) found that mobile banking experienced unprecedented growth worldwide, decreasing the global adult unbanked population to just under 50 percent (The World Bank, 2014). KPMG (2015b:11) notes that, in 2015, the global mobile banking penetration rate reached approximately 42 percent. A report by Bain and Company (2009:19) indicates that global mobile banking transactions amounted to roughly 12 billion American Dollars, with mobile contactless payments amounting to an estimated three billion American Dollars. The report further recognised Japan as the most developed mobile banking market, where the adoption rates of mobile contactless payments and mobile Internet shopping are considerably high. Moreover, significant growth in the coming years is anticipated, with forecasts of nearly 150 billion American Dollars in total transaction volume by 2012. This expected growth would translate into a substantial increase of more than 60 percent on a yearly basis.

According to Mazur (2009:58), mobile banking in the USA is desirable among 86 percent of adults. Mazur (2009:58) furthermore states that about 36 million American adults conduct banking activities through some form of mobile device, expected to increase to

100 million adults by 2014. However, KPMG (2015b:11) reports that, in 2015, the USA mobile banking penetration rate stands at approximately 35 percent, which is significantly less than the percentage reported by Mazur (2009:58). KPMG (2015b:16) points out that a major concern for USA banking users is the security and confidentiality of information while performing banking transactions on a mobile device, consequently hindering mobile banking growth. Across Europe, as indicated by KPMG (2015b:11), the current mobile banking adoption rate stands at 38 percent, with mobile banking adoption in the United Kingdom (UK) matching the average at 38 percent. Asian countries recorded some of the highest mobile banking penetration rates, with China recording the highest rate at nearly 62 percent compared to any other country (KPMG, 2015b:11). Figure 2.3 depicts the mobile banking penetration rate by country.

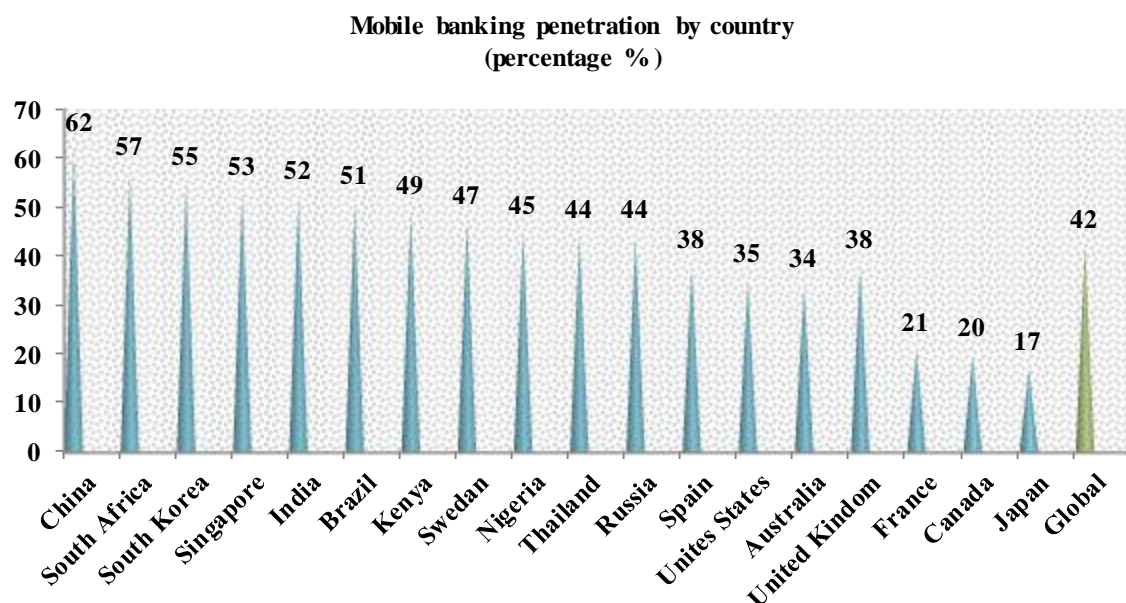


Figure 2.3 Estimated mobile banking penetration rates by country (KPMG, 2015b:11)

While retail banks in developed economies use mobile banking to provide convenience to their consumers, retail banks in emerging economies, such as South Africa, use the mobile banking innovation as a means of financial inclusion for those who are not able to use or do not have access to traditional banking services and methods (Panjwani & Cutrell, 2010). Maduku (2011:39) explains that the mobile banking innovation originally started in Kenya, the emerging country with a reputation for being the world's mobile

money pacesetter, when they introduced M-PESA to the market. Since its introduction, it was disseminated to several countries in Asia and other African countries, including South Africa, the Democratic Republic of the Congo, as well as the Philippines, Pakistan and India. As a result, Panjwani and Cutrell (2010) posit that mobile banking has emerged as a significant channel for the flow of funds in many nations. In light of this, Maduku (2011:40) indicates that Kenya's M-PESA alone contributes ten percent to this country's gross domestic product (GDP) via its banking network and the Philippines' G-Cash transacts 100 million American Dollars daily.

In 2009, the South African mobile penetration rate reached 37 percent (World Wide Worx, 2009b). Research conducted by World Wide Worx (2011), a research study backed by FNB, shows that, in 2011, 44 percent of urban South Africans completed banking transactions via mobile devices, compared to approximately 27 percent in small centres and towns, suggesting that considerable interventions is required to uptake mobile banking adoption in rural areas. The report further indicates that 37 percent of South Africans in urban and rural areas aged 16 and above utilised mobile banking. The main mobile banking transactions undertaken, according to Van Wyk (2010), generally include balance enquiries, mini-bank statement requests, inter-account transfers, third party payments, and the purchasing of prepaid airtime. In 2015, KPMG (2015b:11) indicates that the South African mobile banking penetration rate stands at approximately 57 percent (refer to Figure 2.3), which is a significant increase from 37 percent in 2009. As such, South African consumers are gaining confidence in their mobile devices as a means for both communications and banking efficiency and effectiveness.

With the increased expansion of mobile device usage, in particular mobile phone usage in African countries where inadequate banking infrastructure exists, the utilisation of mobile devices, specifically mobile phones for banking purposes are becoming increasingly relevant. Krugel (2007:1) points out that early initiatives embarked upon by MTN banking, Smart, Globe, Celpay and Wizzit bank are considered as revolutionary as these technologies allow unbanked and under-banked consumers in African economies access to financial services. In this regard, the introduction of mobile banking in South Africa has been successful, given the increase in the South African banked population.

FinScope South Africa (2014:5) reports that in 2004, 46 percent of the total South African adult population (16 years and older) were banked. Ismail and Masinge (2012:99)

indicate that in 2012, 40 percent of total South African adult population had a bank account. In 2014, however, FinScope South Africa (2014:5) highlights that 75 percent of the total adult population were banked, which is a significant increase from 2004. In 2015, Abbott (2015) reports that just under a quarter, signifying 23.5 percent of the adult population in South Africa remains unbanked. This, according to both Meyer (2015) and Selebalo (2009), may be attributed to affordability, owing to high bank charges, accessibility and the terms and conditions that apply for opening bank accounts, which are often prohibitive.

In addition, Tiwari and Buse (2007:3) identified several key drivers for the increased adoption of mobile banking, including mobile penetration that has reached a record high and the integration of global markets resulting in increased mobility. Therefore, access to mobile services is no longer a luxury but a necessity for many consumers. Furthermore, the younger generation (Generation Y) appeal for modern data and telecommunications services and mobile devices are becoming more powerful in terms of faster data transmission and new standards, such as the Universal Mobile Telecommunications System (UMTS), are launched constantly. Despite these drivers, Garg *et al.* (2014:4097) mention key barriers that derail mobile banking adoption in South Africa, including uncertainties about consumer adoption and specific regulatory issues such as remote customer due diligence requirements and access to the payment system. In addition, usage barriers come to the forefront when an innovation is incompatible with existing habits, workflows or practices. Therefore, for consumers to adopt a new system, including mobile banking, it is important that the system be free of defects, user-friendly, of a good quality, simple and easily understandable in terms of its contents.

2.8 CONCLUSION

Since the early days of South African banking, retail banks have played an essential role in society. Retail banks have not only affected society from a wealth management perspective, but also in various other ways, such as providing consumers with the resources to purchase their first home and/or vehicle.

As with other industries, however, the evolution and influence of technology on the retail banking sector could not be halted. Technology, particularly the development of mobile communication devices into full-scale Internet-enabled mini computers, as well as the

introduction and wide-scale adoption of mobile communication technologies and the Internet, has fulfilled a significant role in providing mobile banking consumers with simpler and more efficient ways of interacting with their retail bank. This commonly is referred to as the utility in mobile banking. Conversely, growth and development of innovations also give rise to difficulties that have to be addressed.

Despite substantial efforts on the part of retail banks to limit or combat Internet threats, nothing can really be done if consumers are not adequately educated and aware of new threats. As such, it is of utmost importance that retail banks focus on developing relationships with their consumers in order to foster their trust in mobile banking services. This will likely happen over time as levels of service consistency are maintained and the level of service quality is improved. As such, the purpose of this study is to test a model that measures the extent to which perceived utility and trust influences attitudes towards and usage behaviour of mobile banking.

The next chapter, Chapter 3, discusses the Generation Y cohort as a whole and the South African Generation Y cohort in particular as well as the various technology adoption theories and models. In addition, the proposed model together with the antecedents that likely influences attitudes towards and usage behaviour of mobile banking are outlined. The chapter includes results from previous research that have shaped the typical innovative consumer.

CHAPTER 3

ATTITUDES TOWARDS AND USAGE BEHAVIOUR OF MOBILE BANKING

“You’re talking about a younger generation, Generation Y, whose interpersonal communication skills are different from Generation X. The younger generation is more comfortable saying something through a digital mechanism than even face-to-face”

— Erik Qualman

3.1 INTRODUCTION

In Chapter 2, the mobile banking platform was discussed in accordance with the first six theoretical objectives formulated in Chapter 1. In this chapter, the seventh, eighth and ninth theoretical objectives are addressed. As such, the purpose of this chapter is to review the literature pertaining to the utility and trust factors that influence attitudes towards and usage behaviour of mobile banking in order to propose a model of the antecedents of Generation Y students’ attitudes towards and usage behaviour of mobile banking. Therefore, this chapter delineates the characteristics of the Generation Y cohort in general and the impact technology has had on this generation, and the South African Generation Y cohort is discussed. Moreover, the different technology adoption theories and models are reviewed.

The substantial developments in, and rapid adoption of, mobile technologies have led to the development and introduction of several mobile service delivery platforms (Sharp & Bevan-Dye, 2014:90), such as the mobile banking platform, which has transformed the retail banking environment in many ways (Akinci *et al.*, 2004:212). Retail banks are increasingly steering away from the conventional branch banking channel linked with high employee overheads and services cost to digital and branchless banking channels to ensure that retail banks achieve their, *inter alia* profitability and cost reduction targets and to provide retail banking consumers with more control and convenience (Akinci *et al.*, 2004:214). However, despite the evident advantages of digital banking channels, globally, the adoption of digital channels, including mobile banking is proceeding more slowly than anticipated (Maduku, 2013:94-95; Nel & Raleting, 2012:51; White & Nteli, 2004:50). In order to address this managerial dilemma, a need is highlighted for retail

banking role players, such as strategists, technologists, business and financial analysts, and the like, to determine the factors influencing consumer attitudes towards and behaviour of mobile banking in general and those of the youth market in particular.

Thornton and White (2001:170) postulate that retail banks can only benefit from comprehending what types of banking service channels consumers employ as well as the reasons why they prefer to use a particular banking channel. Gounaris and Koritos (2008:283) opine that significant change in consumer transactional banking behaviour is necessary before retail banks can enjoy the potential benefits associated with digital banking channels. Ibrahim *et al.* (2006:478) note that there is insufficient knowledge about how retail banking consumers perceive and assess any service delivered via electronic or digital means. As a result, Grabner-Kräuter and Faullant (2008:485) indicate that questions on the behavioural determinants of consumer adoption of digital channels, including mobile banking have become of great interest to researchers.

The rate of mobile banking adoption is influenced by several consumer factors or variables. This study proposes that, based on an extended technology acceptance model (TAM) (Davis, 1989, Davis *et al.*, 1989), there are utility, normative, behavioural control and trust factors influencing consumers' attitudes towards and usage behaviour of mobile banking. The utility related factors pertain to the ease of use and relative advantage of mobile banking. Subjective norms relate to the opinions of significant others such as friends, family and peers concerning mobile banking usage, whereas perceived behavioural control relates to the self-efficacy and facilitating conditions required to use mobile banking. The trust related factors pertain to the perceived integrity of retail banks providing mobile banking as well as the perceived system quality of mobile banking, which includes issues pertaining to structural assurances and information quality.

As stated in Chapter 1, the purpose of this study is to propose and empirically test the extent to which Generation Y students' perceived utility and trust in mobile banking influences attitudes towards and usage behaviour of mobile banking; that is, testing a model of the antecedents of Generation Y students' attitudes towards and usage behaviour of mobile banking in the South African market. Therefore, a discussion pertaining to the Generation Y cohort, including the characteristics of its members and the impact technology has had on the generation, as well as the significance of this cohort in the South African market is provided in Section 3.2. In light of mobile banking technology

adoption, Section 3.3 delineates the various technology adoption theories and models. Section 3.4 is concerned with the proposed model of the antecedents of attitudes towards and usage behaviour of mobile banking. Consumer demographics, in particular age and gender used to predict technology adoption are discussed in Section 3.5. Section 3.6 outlines the possible factors that influence Generation Y students' attitudes towards and usage behaviour of mobile banking.

Members of the Generation Y cohort are viewed as the largest generation to date. Being recognised as the future leaders of the world, this generation signifies a remarkable target market for marketers, business and financial analysts of several domains, including those in the retail-banking context. The following section discusses the Generation Y cohort with an emphasis on technology and South Africa.

3.2 GENERATION Y

When conducting generational studies, it is important not to stereotype any generational cohort, which can easily occur given that older generations are influenced by the same permeating conditions shaping younger generations (Nicholas *et al.*, 2011:30). Rather, the aim of generational research is to explain the extent to which the average individual in one generational cohort differs from the individual in another generational cohort (Twenge & Cambell, 2008:863).

The terminology used by researchers to define the various generations is generally inconsistent, owing to the lack of agreement about the exact start and end dates of any one generation, which consequently makes defining of any one generation a difficult task (Reeves & Oh, 2007:296). Constantine (2010:3) highlights that the term Generation Y was coined in the early 1990s. The author points out that a marketing trade magazine, Advertising Age, has been credited with first using the term in an editorial in 1993 in order to differentiate the group from Generation X. According to Markert (2004:21) and Eastman and Liu (2012:94), the youth of today is classified as Generation Y and is defined as those individuals born between 1986 and 2005. Several published studies (Cui *et al.*, 2003; Kumar & Lim, 2008) generally define Generation Y students enrolled at a HEI as those individuals between the ages of 18 and 24 years. Generation Y members are also labelled as the echo boomers, the millennium generation and the Net generation (Cudmore *et al.*, 2010:4; Schiffman *et al.*, 2010:410; Schlitzkus *et al.*, 2010:108) and

comprise more than 70 million individuals (Kane, 2012; Sox *et al.*, 2014:247; Wolburg & Pokrywczynski, 2001:33), representing more than 50 percent of the world population (Harrington *et al.*, 2011:436). As such, they are the largest generation worldwide since the baby boomers (Koutras, 2006:106).

Members of the Generation Y cohort comprise characteristics that distinguish them from previous generations (Wolburg & Pokrywczynski, 2001:33). These consumers have a vigorous sense of independence and autonomy (Williams *et al.*, 2010:9), are education-directed, confident, technologically innovative (Brier, 2004:16-19), passionate, strong-willed, optimistic, adaptable to change, demanding, have a high expectation level, and they generally voice their opinions (Cox *et al.*, 2008:4-7; Du Plessis *et al.*, 2009:2; Pew Research Center, 2010). Moreover, these individuals are ambitious, self-reliant, individualistic, entrepreneurial, achievement-oriented, are socially and culturally aware (Kane, 2012; Sheahan, 2005:59), career-oriented (Wilson & Gerber, 2008:31) and are highly motivated (Bevan-Dye *et al.*, 2012:5578; Bevan-Dye & Surujlal, 2011).

Worldwide, an estimated 70 percent of the Generation Y cohort complete their secondary education, of which an estimated 30 percent will pursue tertiary education, and an approximated 40 percent will go on to study towards some form of post-secondary certification. As a result, this generation is becoming the most formally trained generation to date and represent a large and growing portion of the workforce today (Schlitzkus *et al.*, 2010:108; Sheahan, 2005:10). Owing to a high skills requirement that abound in the labour market, Generation Y members are forced to build impressive resumes at a fast pace (Wilson & Gerber, 2008:31) and as such, more than one third of this generational cohort are multi-tasking, having to work part-time while at school. Consequently, it is unlikely that they enter the working environment without having experienced the Internet and networked computers (Sheahan, 2005:10).

Unlike other generations, Schlitzkus *et al.* (2010:108) and Shaw and Fairhurst (2008:366) highlight that the members of the Generation Y cohort were the first generation to enjoy exposure to the Internet, mobile phones, convergent technologies and numerous multimedia platforms, including computer-generated social media networks such as Facebook, computer-generated social reporting such as Twitter and computer-generated social media such as YouTube. Therefore, these individuals are growing up in a period where they are surrounded by the Internet, have the luxury of having a computer at home

as well as having access to mobile phones and other electronic devices. For that reason, these individuals expect to acquire information at exceptionally rapid speeds (Kane, 2012; Schwalbe, 2009; Sheahan, 2005). These elements forming part of Generation Y individuals' everyday life has led to them flourishing on technology and its innovations. Using laptops, mobile phones and mobile and electronic devices together with a wide range of other technological gadgets and the World Wide Web, allows these individuals to learn, lead social lives and achieve career goals (Ellis-Christensen, 2013; Kane, 2012; Schlitzkus *et al.*, 2010:108; Schwalbe, 2009:59-60; Sheahan, 2005:59-60).

Research shows that more than 90 percent of individuals from this generational cohort are continuously online (Hawkins & Mothersbaugh, 2010:133). According to Sheahan (2005:64), these individuals spend on average five hours daily in front of a computer screen. The author elaborates by stating that by the time they enrol for university, the amount of hours spent talking on their mobile phones and playing video games and the amount of hours spent watching television will have been at least twice as much and at least four times more than the amount of hours spent reading books respectively. Moreover, these individuals' sent and received text messages and electronic mails will have amounted to more than 200 000. Therefore, both Kane (2012) and Schwalbe (2009:61) indicate that communication via mobile phones and other mobile devices are gradually becoming the preferred method of communication, in contrast to traditional face-to-face communication, with the Internet identified as the preferred tool for an information search.

Growing up in an era where sporadic media and a prevalent emphasis on materialism dominate (Hawkins & Mothersbaugh, 2010:132), allow Generation Y members to stay well-informed and up-to-date with the fast pace of technological and social change, resulting in them being labelled as the elusive fresh youth market segment (Sheahan, 2005:5; Smith, 2012:89-90; Wolburg & Pokrywczynski, 2001:33-34). Furthermore, Generation Y consumers are not easily persuaded by conventional marketing approaches (Hawkins & Mothersbaugh, 2010:132), motivating marketers of various industries, including those in the retail banking industry, to contemplate a more innovative approach to relate to, communicate and connect with and deliver banking services to these consumers. In addition, it is important that key role players within retail banks, including strategists, marketers, policy makers and business and financial analysts, develop, rethink,

and adapt mobile banking marketing and strategic plans, business models, processes, awareness programmes, and pilot projects geared towards these individuals.

The Generation Y market segment is viewed by many organisations as homogenous, when, in fact, the literature reveals that it is more of a heterogeneous market segment (Foscht *et al.*, 2009:224). Furthermore, Wolburg and Pokrywczynski (2001:35) indicate that these individuals' purchasing behaviours will have a noteworthy impact in the years to come. Malarchy (2006) attributes this to the fact that these individuals' purchasing habits are very computer-oriented, inferring that the implementation and utilisation of digital media may create a more alluring overall image of a product or service offering, including those offered by retail banks.

It is clear that the members of this cohort are perceived as the plugged-in citizens of a global community (Kane, 2012; Schwalbe, 2009; Sheahan, 2005) and the most Internet-savvy generation alive today, leading the way in technology adoption (Ferguson, 2008). Universally, nine out of ten individuals in the Generation Y cohort have a computer, while 82 percent are in possession of a mobile phone (Ferguson, 2008). FinScope South Africa (2014:5) reports that, in 2014, 75 percent of the total adult population (16 years and older), which includes members of the Generation Y cohort were banked. Moreover, Fripp (2014) points out that mobile penetration reached 133 percent in 2014, suggesting that the majority of South Africans, including Generation Y individuals have more than one mobile device.

Generation Y consumers are soon to be the most important consumers of retail banks and as such, many financial institutions, including retail banks will have to rethink their channel, marketing and product strategies (Cox *et al.*, 2008:2-3). This is because the Generation Y cohort is widely considered the next big generation with powerful aggregate spending (Cui *et al.*, 2003:310) and is positioned to become the wealthiest generation thus far. Annually, it is projected that these individuals influence 300 to 400 billion American Dollars in family purchasing and spend between 153 and 155 billion American Dollars themselves (Bleedorn, 2013:24; Lazarevic, 2012:45; Martin & Turley, 2004:464). Furthermore, Generation Y's income is estimated to reach 6.2 trillion American Dollars by 2020 (Braccia, 2013). In addition, this cohort's affluence and influence is growing significantly, and with that, their financial appetite, owing to more consumers owning a cheque and credit card (Cox *et al.*, 2008:3). Braccia (2013) opines

that members of the Generation Y cohort are more inclined to do thorough research before making big life decisions and are more focused on investing and saving than their predecessors are. Therefore, they have aggressive financial goals and generally look for information, guidance and access to financial planning tools to assist with financial decision-making. Braccia (2013) further notes that Generation Y members rely on family and friends for financial advice and subsequently turn to online communities to verify the information and advice gathered from their significant others.

Although Generation Y consumers prefer to undertake banking transactions electronically and in a self-service mode, Braccia (2013) emphasises that the retail bank branch is still of high importance. These consumers look to their branch for financial guidance and consultation. This represents opportunities to build long-term relationships with these otherwise digital consumers. Cox *et al.* (2008:8-9), therefore, conclude that retail banks need to be able to serve the needs of these consumers, both online and through the branch, in a manner that is consistent and transparent. The Generation Y cohort is on the leading edge of trends that are sweeping across older generations as well, such as comfort with banking online, resistance to traditional marketing, and concern for the environment. As such, strategies that successfully meet the needs of this group will also provide benefits in serving the broader market.

KPMG South Africa (2014) points out that the South African banking sector is leading technology and innovation by providing consumers with the latest with respect to modern technology, including mobile banking, specialised banking applications for mobile devices and mobile phone based money transfer and micro-financing services. KPMG South Africa (2014) further states that the behaviour of the retail banking consumer is changing and opines that new consumers, particularly members of the Generation Y cohort, who are generally also first-time bankers, are highly technologically astute and demand the latest technological delivery channels. Therefore, mobile banking offers an opportunity for retail banks, internationally and in South Africa, to extend banking services to both current and new customers, such as Generation Y.

3.2.1 Generation Y in South Africa

As highlighted in Chapter 1, the South African population amounted to approximately 54 956 900 in 2015, of which a projected 38 percent (roughly 20 797 341) is represented

by the Generation Y cohort (Stats SA, 2015). The members of this cohort were the first generation to attend multicultural schools, freely socialising with individuals from different backgrounds, and enjoying more career opportunities and wealth-creation possibilities (Bevan-Dye *et al.*, 2012:5582; Du Plessis *et al.*, 2009:2; Puybaraud, 2010). As such, these individuals have a high future earning potential and consequently a higher social standing within a community (Shiffman *et al.*, 2010:410). Moreover, these individuals are perceived to be culturally tolerant, open-minded, and socially conscious and tend to embrace diversity (Jordaan *et al.*, 2011:3).

Smith (2012:86) notes these individuals tend to value the opinions of and information generated by their peers and reference groups more than those of mass media or sales personnel. This is predominantly true regarding Generation Y members, owing to them often looking to their peers to establish the merits of a product or service offering (Smith, 2012:86), suggesting that marketers should attempt to influence this group's opinion leaders (Hawkins & Mothersbaugh, 2010:237).

Jordaan *et al.* (2011:3) posit that members of the South African Generation Y cohort exhibit trends comparable to those of international youth consumers, such as the usage of mobile phones and other technological gadgets by consumers from the United Kingdom (UK), Greece, Germany, the United States of America (USA), and Spain. Jordaan *et al.* (2011:6) furthermore indicate that the use of mobile phones and Internet surfing by South African consumers rank sixth worldwide. Further similarities as highlighted by Jordaan *et al.* (2011:3) include common leisure activities, favourite movie stars and interest in sports. Nonetheless, the researchers point out that the youth in developed and emerging markets display distinguishable differences concerning personal spending capacity, interaction with media – particularly with Internet and video and/or photo-sharing websites, as well as attitudes towards several societal, political, and environmental matters.

Generation Y members are driving digital finance services in South Africa, owing to this generation being classified as early adopters, accustomed to convenient and transparent self-service digital channels and preferring to take more active control of the transaction process (IT news Africa, 2015). Moreover, the significant size of the Generation Y cohort and the future higher earning potential of role model status of graduates make Generation Y students an important target segment for retail banks. Given that this generational

cohort are known to be technologically astute and comfortable using online and mobile communication, retail banks should incorporate new digital platforms to reach this target segment. Establishing a Facebook page and designing mobile telephone advertisements that appeal specifically to this age cohort, whether it be in terms of the music and visual copy or even the use of a local celebrity, will help retail banks engage better with this segment. In this regard, many retail banks are in the process of trying to move their consumers online, and this cohort is likely to be much easier to convert to such technological advancements as online trading, mobile banking, and online credit card and loan applications (Van Deventer *et al.*, 2014:117).

The limited published literature on the South African Generation Y cohort's mobile banking behaviour and understanding of this cohorts' attitude predictors towards mobile banking, created a need to propose and empirically test a model of potential factors that may influence attitudes towards and usage behaviour of mobile banking amongst these individuals.

3.3 TECHNOLOGY ADOPTION THEORIES AND MODELS

Research focused on the adoption of information technologies can be tracked back as far as the late 1980s (Ismail & Masinge, 2012:107). The dearth of grounded theory in the field of information technology, however, resulted in an increased appreciation of theories and models that have been developed in other research areas (Nor & Pearson, 2008:31). Most of these theories and models assist with explaining and understanding consumer behaviour or behavioural intentions and accentuate the significance of attitudes in understanding behaviour or behavioural intentions (Maduku & Mpinganjira, 2012:174). A review of the literature reveals that the adoption of information technology can be predicted by making use of several theories and models, including the theory of reasoned action (TRA) (Fishbein & Ajzen, 1975), the innovation diffusion theory (IDT) (Rogers, 1983), the technology acceptance model (TAM) (Davis, 1989, Davis *et al.*, 1989), the theory of planned behaviour (TPB) (Ajzen, 1991), the decomposed theory of planned behaviour (DTPB) (Taylor & Todd, 1995a; Taylor & Todd, 1995b), the extended technology acceptance model (TAM2) (Venkatesh & Davis, 2000) and the unified theory of acceptance and use of technology (UTAUT) (Venkatesh *et al.*, 2003).

The following sections briefly explain the different technology adoption theories and

models. For these sections, it should be noted that the terms innovation and technology are used interchangeably, given that new ideas are generally referred to as technological innovations. It should also be noted that where reference is made to attitude, as is the case in majority of the theories and models outlined below, a definition given by Schiffman *et al.* (2010:246-247), stating that an attitude is the manner in which an individual acts towards an object and is generally learned, motivational in nature and may elicit a particular consumer behaviour, is used for the purpose of this study.

3.3.1 Theory of reasoned action (TRA)

The theory of reasoned action (TRA) (Fishbein & Ajzen, 1975), as illustrated in Figure 3.1, is the earliest theory on technology adoption (Nor & Pearson, 2008:32) and embodies a widespread integration of attitude components into a structure that is designed to lead to both improved clarification and predictions of behaviour (Schiffman *et al.*, 2010:253). According to Gu *et al.* (2009:11606), as reported in Fishbein and Ajzen (1975) as well as Nor and Pearson (2008:32), the TRA examine the beliefs within the individual in order to explicate the adoption behaviour and theorises that a behaviour is predicted by an individual's intention to engage in a given behaviour. In other words, as highlighted by Taylor and Todd (1995a:139), behaviour is a direct function of behavioural intention. Fishbein and Ajzen (1975:302) explain that this behavioural intention, in turn, is predicted by two prominent factors, namely the individual's attitude towards the behaviour and subjective norms, which is described as social pressures to perform the behaviour. Fishbein and Ajzen (1975:302) define subjective norms as an individual's perception that the majority of people who are important to him or her think he or she should or should not undertake the behaviour in question.

Fishbein and Ajzen (1975:89) postulate that the TRA is widely considered to have a noteworthy theoretical and practical approach and argues that this theory is designed to explain virtually any human behaviour. As such, this theory has been employed in a wide range of contexts, including, *inter alia* recycling (Jones, 1990), nutrition (Shepherd & Towler, 1992), public land management (Bright *et al.*, 1993), voting (Singh *et al.*, 2001), condom use (Bosomprah, 2001) and alcohol abuse (Codd & Cohen, 2003). In addition, the TRA has been employed in the information technology field (Davis *et al.*, 1989; Karahanna *et al.*, 1999; Liker & Sindi, 1997; Nysveen *et al.*, 2005).



Figure 3.1 Research theory - TRA (Taylor & Todd, 1995a:138)

3.3.2 Innovation diffusion theory (IDT)

The framework for evaluating consumer acceptance of innovations is drawn from the diffusion of innovations research area. Understanding two closely related processes, namely the diffusion and adoption processes, is of particular importance and interest to consumer behaviour researchers involved in the diffusion of innovations (Schiffman, 2010:450). In the broadest sense, diffusion in innovation diffusion theory (IDT) is defined as a macro process (Schiffman, 2010:450) by which innovation is communicated through specific channels over time among members of a social system (Wu & Wang, 2005:721) so as to spread the innovation from its source to the ultimate user. Adoption, conversely, is a micro process that centres on the phases through which an individual passes when assessing to accept or reject an innovation (Schiffman, 2010:450).

While the TRA examine beliefs within the individual to explain adoption behaviour, the IDT (Rogers, 1983) attempts to explain technology adoption behaviour by drawing on the perceived characteristics of technology (Morris & Dillon, 1997:59). Initially, Rogers (1983:213) suggested three characteristics of innovations, namely relative advantage, compatibility and complexity. However, grounded on three decades of innovation study, and owing to adopters invariably being found to have dissimilar perceptions regarding these characteristics in comparison with non-adopters, five key attributes, including relative advantage, compatibility, complexity, trailability and observability were identified as the antecedents influencing attitudes towards any innovation (Lichtenstein & Williamson, 2006:51; Lin, 2011:253; Luo *et al.*, 2010:223-224; Rogers, 1995; Rogers, 2003).

Relative advantage (or usefulness) is described as the degree to which an individual perceives an innovation as offering an advantage over traditional or previous ways of performing an identical task. Compatibility refer to the degree to which an innovation is perceived as being in line with existing values, previous experiences and needs of the individual. Complexity (analogous to ease of use, although in an opposite direction) denotes the degree to which an innovation is viewed as somewhat challenging or easy to understand and use. Trailability refers to the degree to which individuals would value an opportunity to experiment with the performance of the innovation before committing to its usage (Brown *et al.*, 2003:383; Rogers, 1995), and observability as the degree to which the outcomes of an innovation can be observed or are visible to others (Rogers, 1995).

A review of the literature reveals that among these innovation characteristics, relative advantage, complexity or ease of use, and compatibility were found to be the most commonly identified statistically significant factors for technology adoption (Liao *et al.*, 1999; Nor & Pearson, 2008; Papies & Clement, 2008; Thong, 1999; Vijayasarathy, 2004; Wu & Wang, 2005). As such, this study investigates the extent to which these three perceived innovation attributes can predict attitudes towards the adoption of mobile banking. Several studies have been conducted in the area of information technology by making use of the IDT (Agarwal, 2000; Bradley & Stewart, 2003; Brown *et al.*, 2003; Gerrard & Cunningham, 2003; Karahanna *et al.*, 1999; Lin, 2011; Roy & Ghose, 2006; Wu, 2005; Wu & Wang, 2005; Yi *et al.*, 2006).

3.3.3 Technology acceptance model (TAM)

The technology acceptance model (TAM) (Davis, 1989; Davis *et al.*, 1989), propounded as a result of the success of the TRA in predicting consumer behaviour across a wide variety of contexts, is less general and designed specifically to explain the acceptance of new information technology (Gu *et al.*, 2009:11606; Maduku, 2013:80). The TAM is primarily used to determine the influence of two salient internal beliefs, namely perceived usefulness and perceived ease of use on individuals' attitudes and behavioural intention towards using new technologies (Davis, 1989). Usefulness in information systems, such as Internet- and mobile banking, implies that a system can be utilised expediently and that the user has confidence in the existence of a favourable user-performance relationship. Ease of use, which is similar to the complexity attribute in the IDT, refers to freedom from difficulty or great effort in using or understanding a system (Davis, 1989:320;

Maduku, 2013:82; Nel & Raleting, 2012:52). Consequently, if a system is viewed as easier to use compared to other systems, the more likely it is to be accepted by users (Davis, 1989). The ease of use of a system also improves the usefulness of the system; hence, perceived ease of use positively influences perceived usefulness (Davis, 1989). This model is illustrated in Figure 3.3.

Davis *et al.* (1989:985-986) highlight that the TAM has been tested in several studies and argue that its ability to explain attitude towards technological innovations is better compared to other models. This may be because it consistently explains a significant amount of variance in usage intentions and behaviour. Therefore, various studies (Arunkumar, 2008; Gu *et al.*, 2009; Laforet & Li, 2005; Lee, 2009; Lee *et al.*, 2011; Lin *et al.*, 2011; Luarn & Lin, 2005; Maduku, 2013; Maduku & Mpinganjira, 2012; Nel *et al.*, 2012; Nel & Raleting, 2012; Njenga & Ndlovu, 2013; Walker & Johnson, 2005; Yang *et al.*, 2005) have employed the TAM to predict customers' attitude towards information technology. Nel *et al.* (2012:31) and Pikkarainen *et al.* (2004:226) opine that the TAM is a popular choice among information system researchers given that it is arguably one of the most parsimonious, widely accepted and functional models for predicting consumers' acceptance of new technology. Gu *et al.* (2009:11606) state that the TAM allows for the fast and inexpensive data gathering of individuals' perceptions of a system. According to Sharp (2007:3), the success and continuous use of the TAM can be attributed to the reality that the TAM affords specific focus on information technology, has demonstrated adequate validity and reliability, and has accumulated a research tradition. Polančič *et al.* (2010:576) add the TAMs capability to be utilised in both adoption and post-adoption behaviour as an additional attribute.

However, Maduku (2013:80-81) advises that factors, such as subjective norms, demographic variables, self-efficacy and the like, from other theories and models, should be included in the TAM, as the TAMs principal constructs do not fully reflect the specific influences of technological and usage context factors that may alter the users' acceptance. Gu *et al.* (2009:11606) concur, stating that the TAM may not truly reflect users' acceptance of technological advances and explain that it may provide an inadequate understanding of behavioural intention to use technological innovations and may ineffectively identify the drivers of technological innovation acceptance, and, therefore, suggest the integration of factors from various models.

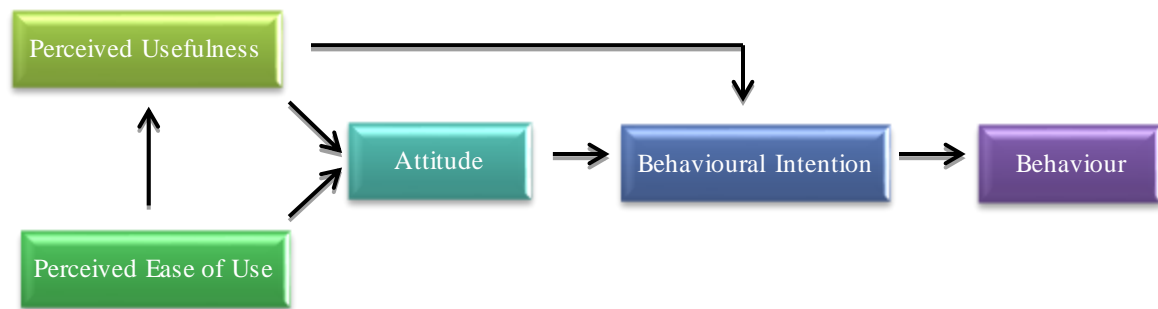


Figure 3.2 Research model - TAM (Davis *et al.*, 1989:984; Taylor & Todd, 1995b:146)

3.3.4 Theory of planned behaviour (TPB)

The theory of planned behaviour (TPB) (Ajzen, 1991), as an extension of the TRA (refer to Section 3.3.1) (Ajzen, 1991:181; Venkatesh *et al.*, 2003:429), includes an additional construct explaining behavioural intention, namely the construct of perceived behavioural control. This construct accounts for conditions where individuals do not have complete control over their behaviour (Taylor & Todd, 1995b:149). As such, this theory assumes three independent determinants of behavioural intention, including attitudes towards the behaviour, subjective norms and perceived behavioural control (Nor & Pearson, 2008:33).

Perceived behavioural control refers to consumers' perception of whether the behaviour is or is not within their control (Schiffman *et al.*, 2010:254). Martins *et al.* (2014:2) explain perceived behavioural control as the perceived ease or difficulty of performing the behaviour. In other words, as noted by Taylor and Todd (1995a:139), perceived behavioural control includes two components, namely self-efficacy, which is described as an individual's self-belief in his or her capability to undertake a behaviour, and facilitating conditions, which refers to the resources and opportunities required to perform a behaviour. According to Taylor and Todd (1995b:149), the TPB assert that behaviour is a direct function of behavioural intention and perceived behavioural control and that behavioural intention is formed by an individual's attitude, subjective norms and perceived behavioural control. Furthermore, perceived behavioural control will influence both behaviour and behavioural intention. The TPB has been applied in a wide variety of information technology research (George, 2002; Hu & Chau, 1999; Lee, 2009; Limayem

et al., 2000; Luarn & Lin, 2005; Mathieson, 1991; Riemenschneider *et al.*, 2002; Taylor & Todd, 1995a; Taylor & Todd, 1995b). This theory is illustrated in Figure 3.4.

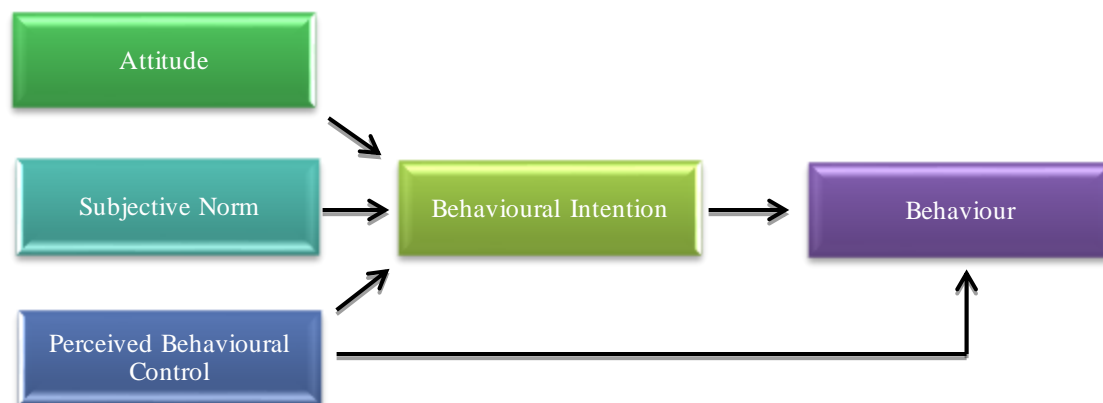


Figure 3.3 Research theory - TPB (Taylor & Todd, 1995b:146)

3.3.5 Decomposed theory of planned behaviour (DTPB)

The decomposed theory of planned behaviour (DTPB) is a theory postulating that attitude, subjective norms and perceived behavioural control may influence the behavioural intention to use a technology. Hence, this theory combines factors of the TPB (refer to Section 3.3.4) with factors of the IDT (refer to Section 3.3.2) and follows the same explanation as these two theories (Nor & Pearson, 2008:33-34). A study by Taylor and Todd (1995a) decomposed these attitudinal, normative and perceived behavioural control beliefs into multi-dimensional constructs (refer to Figure 3.5), as this allowed for higher explanatory power and a more detailed understanding of the antecedents of behaviour.

Taylor and Todd (1995a:141) suggest that attitude is decomposed into relative advantage, complexity and compatibility, all of which are innovation characteristics derived from the IDT. Although there are five innovation attributes as indicated in Section 3.3.2, Taylor and Todd (1995b:152) uncovered, by means of a meta-analysis, that only these three have been found to be consistently related to technology adoption decisions. Taylor and Todd (1995b:152) also note that the complexity dimension is analogous, although in an opposite direction, to the ease of use construct in the TAM. As perceived relative advantage and compatibility of innovation usage increase, and as complexity decreases or ease of use increases, attitude towards innovation usage should become more positive.

Therefore, Taylor and Todd (1995a:141) opine that these three constructs are expected to be positively related to attitude, except when the opposite of ease of use (complexity) is used (negatively related to attitude). Taylor and Todd (1995b:152) propose the decomposition of subjective norms owing to the likely divergence of opinion among different reference groups on the use of technology. The Nor and Pearson (2008) study decomposed subjective norms into three groups, namely friends, family and peers. Nor and Pearson (2008:43) believe that these three groups are likely to positively affect subjective norms. Perceived behavioural control is decomposed into self-efficacy and facilitating condition (Taylor & Todd, 1995a:141), which follows the same explanation as delineated in Section 3.3.4.

Taylor and Todd (1995b:151) outline various advantages of the decomposition approach. First, it has been argued that it is improbable that monolithic belief structures, signifying a range of dimensions will be consistently linked to the factors of intention. By decomposing beliefs, those associations should become apparent and more easily and readily understood. Secondly, decomposition can produce a stable set of beliefs, which can subsequently be employed across a variety of research settings, which additionally overcome some of the drawbacks in operationalisation that have been identified pertaining to the traditional intention models. Finally, the model becomes more managerially relevant as attention is focused on specific beliefs, pointing to specific factors that may influence adoption and usage. Taylor and Todd (1995b:151) further explain that the DTPB is more complex than other theories and models due to a larger number of factors that may influence usage. A review of the literature reveals that various studies in the innovation field have used the DTPB as a research framework (Bhattacharjee, 2000; Chau & Hu, 2001; Lau, 2002; Nor & Pearson, 2008; Pedersen, 2005; Shih & Fang, 2004; Tan & Teo, 2000; Taylor & Todd, 1995a; Taylor & Todd, 1995b).

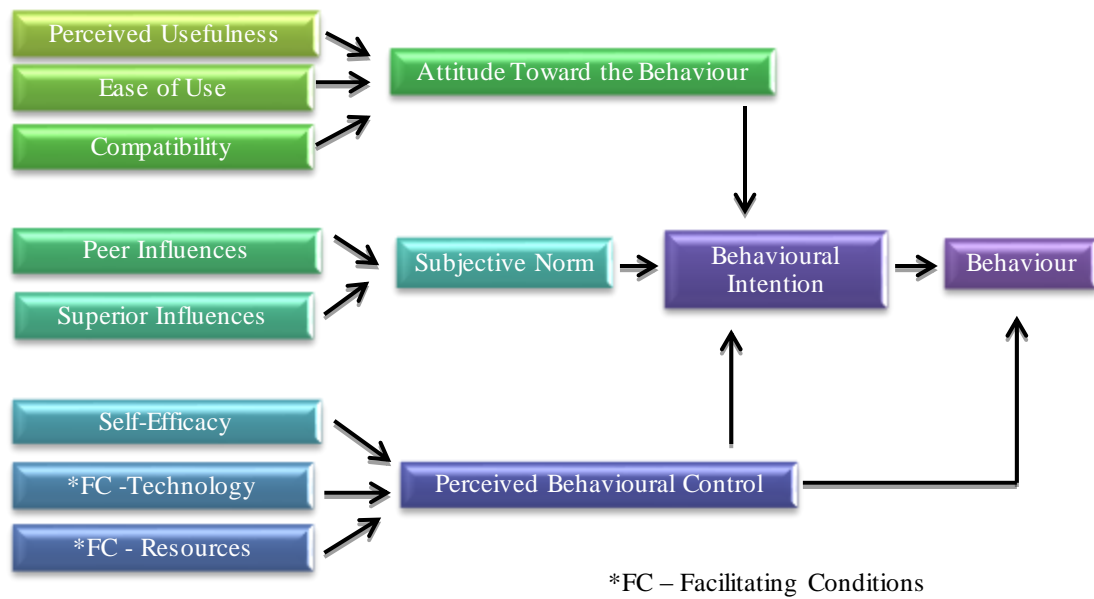


Figure 3.4 Research theory - DTPB (Taylor & Todd, 1995b:146)

3.3.6 Extended technology acceptance model (TAM2)

The so-called extended technology acceptance model (TAM2) (Venkatesh & Davis, 2000) was proposed as a result of many researchers suggesting the incorporation of additional factors into the original TAM to increase its explanatory power (Legris *et al.*, 2003:197). These additional factors serving as an extension include social influence processes (subjective norm, image and voluntarism) and cognitive instrumental processes (quality of output, work relevance and result demonstrability) (Ismail & Masinge, 2012:108; Venkatesh & Davis, 2000:187).

Subjective norm is consistent with the TRA owing to it having a direct effect on behavioural intention (Venkatesh & Davis, 2000:187). The voluntariness variable, which is a moderating variable, is defined as the degree to which potential adopters perceive the adoption decision to be non-mandatory. TAM2 hypothesises that voluntariness may moderate the effect of subjective norms on intention to use (Venkatesh & Davis, 2000:188). If a significant other suggests that a specific system might be valuable and helpful, an individual may come to believe that it actually is useful, and as a result may form an intention to use it. As such, the theory also theorises that subjective norms will have a positive direct effect on perceived usefulness (Venkatesh & Davis, 2000:189). Image is defined as the extent to which the use of a particular innovation will be

perceived as an improvement of one's status in one's social system. In terms of the TAM2, subjective norms will positively influence image because, if an individual's social group believe that a particular behaviour should be performed, then performing it will likely elevate his or her standing within the group (Venkatesh & Davis, 2000:189). The model postulates that the direct effect of subjective norms on intentions for mandatory usage contexts will be strong before implementation and during early usage, however, will weaken due to increasing direct experience with a system providing a growing basis for intentions toward on-going use. Likewise, the effect of subjective norms on perceived usefulness is likely to weaken since increased direct experience will provide for concrete sensory information, superseding reliance on social cues as a foundation for usefulness perceptions. Conversely, the model posits that the influence of image on perceived usefulness is likely not to weaken over time as status gains from system use will linger as long as group norms continue to favour usage of the intended system (Venkatesh & Davis, 2000:190).

Job relevance is defined as the extent to which an individual perceives the intended system to be applicable to his/her job and the set of tasks the system is able to support. Hence, the model postulates that job relevance will have a positive effect on perceived usefulness (Venkatesh & Davis, 2000:191). The model also theorises that individuals will take into consideration how effectively the system performs those tasks, which is referred to as perceived output quality. Therefore, output quality will have a positive effect on perceived usefulness (Venkatesh & Davis, 2000:191-192). Result demonstrability is defined as the tangibility of the results of employing the innovation. It is expected that individuals will form more favourable perceptions of the usefulness of a system if the covariance between usage and positive results is readily evident. As such, results demonstrability will have a positive effect on perceived usefulness (Venkatesh & Davis, 2000:192). For the remaining TAM constructs, the same explanation as outlined in Section 3.3.3 is followed.

Other studies extended the TAM by including additional variables such as perceived credibility, self-efficacy and perceived financial cost (Luarn & Lin, 2005) and perceived benefit and perceived risk (Lee, 2009). Even though the TAM2 comprise of the original antecedents of TAM, which are perceived usefulness and perceived ease of use (Ismail & Masinge, 2012:108), it omits attitude due to it being a weak predictor of either

behavioural intention or actual usage of a technology (Wu & Wang, 2005:721), which is consistent with previous research findings (Taylor & Todd, 1995a). Hence, according to the TAM2, the additional factors extending the TAM influence user acceptance and perceived usefulness and perceived ease of use indirectly influence actual usage through behavioural intention (Wu & Wang, 2005:721). Several studies (Ismail & Masinge, 2012; Lee, 2009; Luarn & Lin, 2005; Masinge, 2010; Wu & Wang, 2005) have used this model in the information technology research field. Figure 3.6 depicts the TAM2.

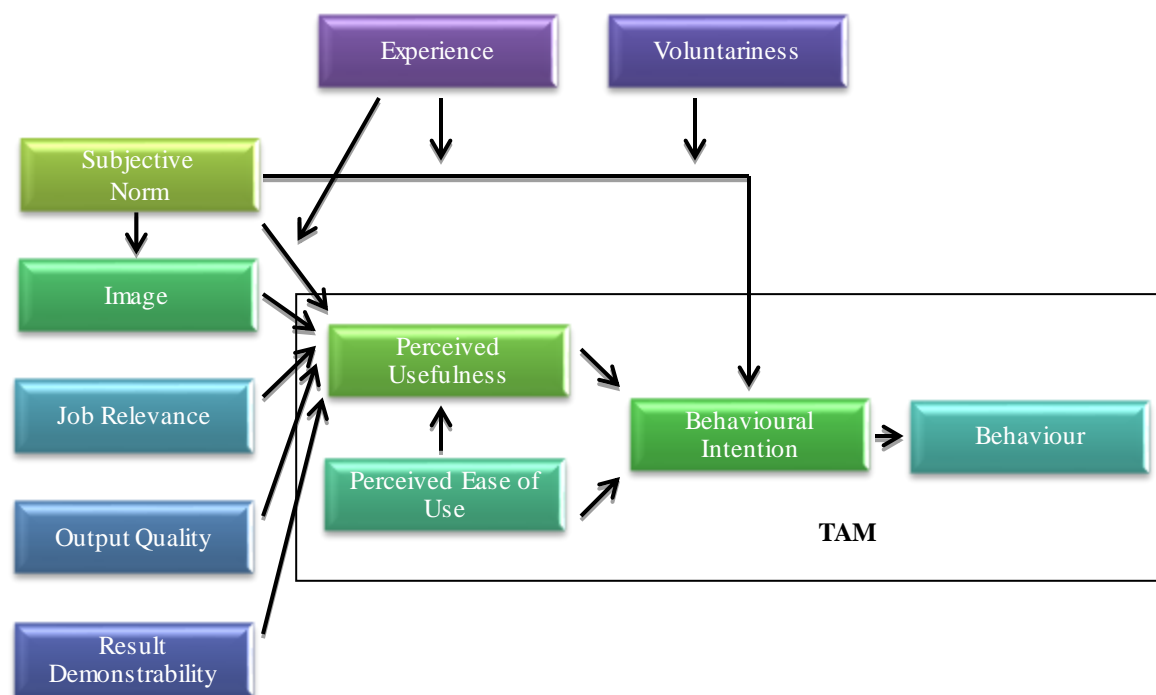


Figure 3.5 Research model - TAM2 (Venkatesh & Davis, 2000:188)

3.3.7 Unified theory of acceptance and use of technology (UTAUT)

Following the review of eight information technology adoption theories and models, namely the TRA, the TAM, the motivational model, the TPB, the PC utilisation model (PCUM), the social cognitive theory (SCT), and the integrated model of technology acceptance and planned behaviour, Venkatesh *et al.* (2003) proposed the unified theory of acceptance and use of technology (UTAUT) (refer to Figure 3.7). In the UTAUT, four factors, including performance expectancy, effort expectancy, social influence, and facilitating conditions influence the adoption and usage of information technology (Venkatesh *et al.*, 2003:446-447). Additionally, the UTAUT posits the role of four

fundamental moderator factors, which are gender, age, experience and voluntariness of use (Martins *et al.*, 2014:3).

Venkatesh *et al.* (2003:447) as well as Zhou *et al.* (2010:762) define performance expectancy as the degree to which a consumer believes that using a system will assist with the achievement of improved results on the task, effort expectancy as the degree of ease associated with the use of the system, social influence as the degree to which a consumer perceives that important others believe he/she should use the new system, and facilitating conditions as the degree to which a consumer believes that an organisational and technical infrastructure exists to assist with the use of the system. According to Zhou *et al.* (2010:762), the UTAUT postulates that effort expectancy positively influences performance expectancy. That is, when consumers are of opinion that an innovation is easy to use and requires little effort, they will have a high expectation towards attaining the expected performance; otherwise, their performance expectancy will be low. Venkatesh *et al.* (2003:467) note that performance expectancy seems to be a determinant of intention in most circumstances. This is because of the variations in the strength of the relationship with gender and age. Moreover, the effect of effort expectancy on intention is also moderated by gender and age, with the effects decreasing with experience. Furthermore, the effect of social influence on intention is dependent on all four moderators. In addition, the effect of facilitating conditions on usage is significant when studied in collaboration with the moderating effects of age and experience. Venkatesh *et al.* (2003:450-451) posit that effort expectancy from the UTAUT, perceived ease of use derived from the TAM and complexity from the IDT are considered analogous. Likewise, relative advantage from the IDT and performance expectancy from the UTAUT is regarded as similar to perceived ease of use from the TAM and social influence, which is also a direct determinant of behavioural intention, is represented as subjective norm in the TRA and TAM2.

According to Martins *et al.* (2014:2-3), the UTAUT is arguably the most important theory for information technology adoption research in the information systems field in the future, as the empirical findings of Carlsson *et al.* (2006) indicate that it outperforms the other eight individual theories and models, including the TAM. Venkatesh *et al.* (2003:467) attribute this theory's significance to the fact that it can explain as much as 70 percent of the variance in intention. Various studies (Carlsson *et al.*, 2006; Chiu & Wang,

2008; Im *et al.*, 2011; Lin & Anol, 2008; Luo *et al.*, 2010; Marchewka *et al.*, 2007; Martins *et al.*, 2014; Min *et al.*, 2008; Tan *et al.*, 2010; Zhou *et al.*, 2010) have employed the UTAUT as research framework in the information technology domain.

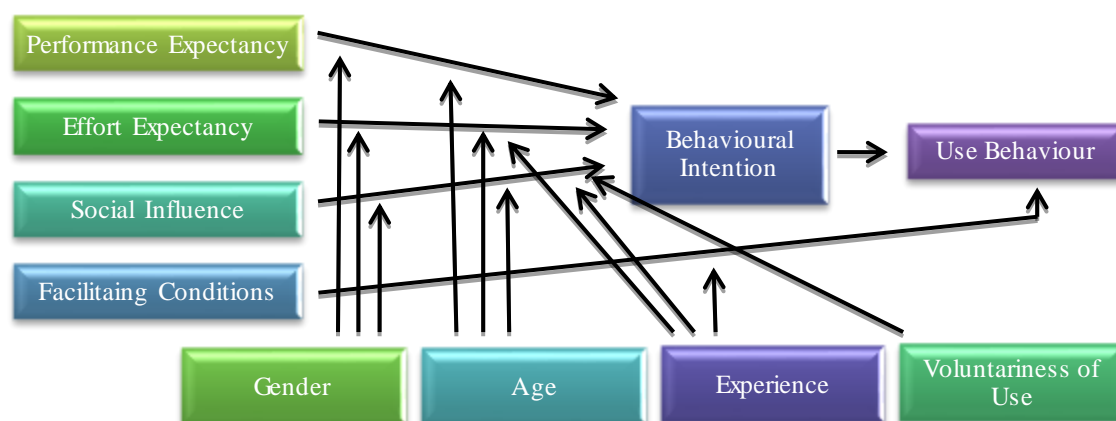


Figure 3.6 Research theory - UTAUT (Venkatesh *et al.*, 2003:447)

Table 3.1 provides an outline of studies previously conducted on the adoption of information technology employing different technology adoption theories and models.

Table 3.1 Summary of previous research on the adoption of information technology using different theories and models

Theory/Model	Researcher/s
TRA	Davis <i>et al.</i> (1989); Karahanna <i>et al.</i> (1999); Liker and Sindi (1997); Nysveen <i>et al.</i> (2005)
IDT	Agarwal (2000); Bradley and Stewart (2003); Brown <i>et al.</i> (2003)* ; Gerrard and Cunningham (2003); Karahanna <i>et al.</i> (1999); Lin (2011); Roy and Ghose (2006); Wu (2005) ; Wu and Wang (2005); Yi <i>et al.</i> (2006)
TAM	Arunkumar (2008); Gu <i>et al.</i> (2009); Laforet and Li (2005); Lee (2009); Lee <i>et al.</i> (2011); Lin <i>et al.</i> (2011); Luarn and Lin (2005); Maduku (2013) ; Maduku and Mpinganjira (2012)* ; Nel <i>et al.</i> (2012)* ; Nel and Raleting (2012)* ; Njenga and Ndlovu (2013)* ; Walker and Johnson (2005); Yang <i>et al.</i> (2005)
TPB	George (2002); Hu and Chau (1999); Lee (2009); Limayem <i>et al.</i> (2000); Luarn and Lin (2005); Mathieson (1991); Riemenschneider <i>et al.</i> (2002); Taylor and Todd (1995a); Taylor and Todd (1995b)

Table 3.1 Summary of previous research on the adoption of information technology using different theories and models (continued...)

Theory/Model	Researcher/s
DTPB	Bhattacharjee (2000); Chau and Hu (2001); Lau (2002); Nor and Pearson (2008); Pedersen (2005); Shih and Fang (2004); Tan and Teo (2000); Taylor and Todd (1995a); Taylor and Todd (1995b)
TAM2	Ismail and Masinge (2012)* ; Lee (2009); Luarn and Lin (2005); Masinge (2010)* ; Wu and Wang (2005)
UTAUT	Carlsson <i>et al.</i> (2006); Chiu and Wang (2008); Im <i>et al.</i> (2011); Lin and Anol (2008); Luo <i>et al.</i> (2010); Marchewka <i>et al.</i> (2007); Martins <i>et al.</i> (2014); Min <i>et al.</i> (2008); Tan <i>et al.</i> (2010); Zhou <i>et al.</i> (2010)
South African studies are indicated in bold	
* South African study on mobile banking	

For the purpose of this study, an extended theoretical model, based on the TAM, was used as the guiding framework. Moreover, in this study, the TAM was adapted as attitude serves as a determinant of actual usage behaviour and not behavioural intention. Not only is this in line with many other studies, but an extensive review of the literature also demonstrates the importance of the influence of attitudes on behaviours (Alsajjan & Dennis, 2009:958; Nel & Raleting, 2012:52).

The extended TAM was employed over the other theories and models because this study aims at examining a more complete set of antecedents that may influence attitudes towards and usage behaviour of mobile banking. Moreover, evidence suggests that the TAM is not only reliable and valid in comprehending and predicting consumers' behaviour towards the use of information technology, but it can also be applied in a wide range of contexts (King & He, 2006; Legris *et al.*, 2003; Schepers & Wetzels, 2007; Yousafzai *et al.*, 2010).

By extending the TAM, it is expected that a higher explanatory power and a more precise understanding of the antecedents of attitudes and behaviour can be achieved. The specific factors tested in this study should provide value to retail banks in their efforts to influence positively attitudes towards mobile banking and mobile banking behaviour among the Generation Y cohort.

3.4 ANTECEDENTS OF ATTITUDES TOWARDS AND USAGE BEHAVIOUR OF MOBILE BANKING

As indicated in Chapter 2, an increasing number of South African consumers are exploring outside the traditional bricks-and-mortar financial institutions to meet their financial needs. In order to address these needs, mobile banking has been introduced. However, significant uptake in its adoption is necessary. Therefore, many researchers have been enticed to explore the factors that predict attitudes towards and behaviour of mobile banking. Understanding the determinants of attitudes towards and usage behaviour of mobile banking will not only assist in differentiating mobile banking users from non-users but also inform the design of marketing- and strategic plans, business models, processes, awareness programmes and pilot projects to persuade the non-user consumer segment to adopt usage behaviour. Several studies have proposed and tested a wide-array of factors thought to influence consumers' attitudes towards and usage behaviour of mobile banking.

Compared to other electronic banking platforms, such as Internet banking and e-commerce platforms, such as online shopping, the mobile banking platform has similar characteristics, advantages and disadvantages. Therefore, the utility, normative, behavioural control and trust factors influencing perceptions of, attitudes towards and usage behaviour of mobile banking and other technologies are likely to be the same. Schiffman *et al.* (2010:175) define perception as "the process by which an individual selects, organises, and interprets stimuli into meaningful and coherent pictures of the world". In other words, perception is described as how individuals see the world around them.

This section reviews the potential antecedents of consumers' attitudes towards and usage behaviour of mobile banking.

3.4.1 Attitudes towards and usage behaviour of mobile banking

It is evident from Section 3.3 that there are various technology adoption theories and models that can assist with understanding behavioural intention and consumer behaviour and that most of these theories and models accentuate the importance of attitudes in understanding behaviour. Attitude is defined as an individual's positive or negative

evaluation, feeling, and tendency towards an idea or object (Kotler & Armstrong, 2012:174). Fielding *et al.* (2008:319) highlight that an attitude simply denotes an individual's overall favourable or unfavourable evaluation of undertaking behaviour. Eagly and Chaiken (1993:1) define attitude as a psychological tendency that is expressed by assessing a specific object or aspect with some degree of approval or disapproval. Zikmund and Babin (2013:260) elaborate that an individual's attitude has a deeper social psychology nature. This is because attitudes are viewed as a continuous and consistent response process towards different aspects of the world. These aspects consist of affective, cognitive, and behavioural components. This is consistent with the proposition of Kotler and Armstrong (2012:174) in that an individual's attitude cannot be easily swayed, due to the fact that a change in one simple attitude may necessitate complex alterations in many others. According to Waarts *et al.* (1997:37), attitude is an acquired, rather long-term stance an individual may take concerning a particular organisation, product, person or activity. Kirchheimer (2013) believes that attitudes comprise a combination of values, beliefs and perceptions. Himansu (2009) opines that individuals are not born with attitudes, but develop attitudes as they progress and learn in life. This postulation supports the definition of Schiffman *et al.* (2010:247), as they state that an attitude is the manner in which an individual acts towards an object and is generally learned, motivational in nature and may elicit a particular consumer behaviour.

While attitudes develop over time, they are generally consistent. However, certain exogenous factors may influence and change an individual's attitude (Hanna & Wozniak, 2001:175). This suggests that although attitudes are enduring, they can change (Schiffman *et al.*, 2010:247). Therefore, Himansu (2009) advises making changes to certain aspects of the business and marketing strategy in an attempt to ensure that consumer attitudes towards product and service offerings are positive, as opposed to negative. Schiffman *et al.* (2010:260) opine that altering consumer attitudes is an important strategy consideration for, amongst others, most marketers.

Ajzen (1991:188) point out that an attitude towards the adoption of a particular innovation is derived from an individual's belief that adopting the innovation will result in specific consequences. Ajzen (1991:188) further notes the intention to undertake behaviour will occur if the individual has a positive evaluation of undertaking the behaviour. Therefore, Albarracin *et al.* (2005:826) as well as Thornton *et al.* (2007:443)

postulate that the more positive the attitude towards a particular behaviour, the greater the individual's intention to adopt the behaviour should be. Bhattacharjee (2001:203) uncovered that a positive attitude towards a service or service provider typically is related to a positive behavioural intention, including the willingness to recommend the service or service provider.

An individual's behavioural intention is described as the degree of an individual's readiness or willingness to perform a particular behaviour (Niaura, 2013:74). It is suggested that behaviour is a function of intention, which, in turn, is a function of several other factors (Chan & Bishop, 2013:96; Polonsky *et al.*, 2012:240), such as attitudes (Nor & Pearson, 2008:39; Oreg & Katz-Gerro, 2006:436), subjective norms, perceived behavioural control and trust (Nor & Pearson, 2008:39). Although several scholars have aimed at determining the factors that constitute behavioural intentions, three key influential factors always prevail, namely attitudes, subjective norms and perceived behavioural control (Ajzen, 1991; Al-Debei *et al.*, 2013; Fielding *et al.*, 2008).

Empirical research findings (Al-Somali *et al.*, 2009; Al-Sukkar, 2005; Chang & Cheung, 2001; Davis, 1989; Hu & Chau, 1999; Karjaluoto *et al.*, 2002; Lee, 2009; Pikkarainen *et al.*, 2004; Taylor & Todd, 1995b) have demonstrated the significance of attitude in determining behavioural intention to use information technology, and as such, it is expected that an individual's attitude towards mobile banking will also have a noteworthy influence on their intention to start or continue using this self-service technology. Moreover, numerous studies (Gupta & Ogden, 2009:377; Polonsky *et al.*, 2012:240; Rex & Baumann, 2007:569) support that intention is a function of behaviour. However, this study aims to investigate the usage behaviour of mobile banking, and as such, behavioural intention was not measured. Alsajjan and Dennis (2009:958) highlight that attitudes serves as an antecedent of actual behaviour in many other studies and indicate that an extensive body of the literature highlights the significant influence of attitudes on behaviour. In addition, the studies of Garg *et al.* (2014), Lin (2011), Mazhar *et al.* (2014), and Tan and Chung (2005), theorise that attitudes influence actual usage behaviour. As such, this study postulates that attitudes towards mobile banking positively influence mobile banking usage behaviour.

Based on the TAM, and for the purpose of this study, attitudes towards mobile banking are influenced by utility in mobile banking, subjective norms, perceived behavioural

control and trust in mobile banking. The utility related factors are discussed in the subsequent section.

3.4.2 Utility factors

For the purpose of this study, the utility in mobile banking comprise factors such as perceived ease of use and perceived relative advantage, which are commonly referred to as the innovation attributes, derived from the IDT (refer to Section 3.3.2).

3.4.2.1 Perceived ease of use

Davis (1989:320) state that, perceived ease of use, a construct that is analogous to the complexity construct of using an innovation, although in an opposite direction, refers to the extent to which an individual believes that utilising a specific system would be free of physical and mental effort. Nor and Pearson (2008:42) assert that an innovation that is perceived to be easy to use would possibly reassure individuals to use the innovation by developing a positive attitude towards it. Maduku and Mpinganjira (2012:176) concur and further state that an innovation or system that necessitates little technical skills and operational efforts is more likely to be adopted, which, in turn, generates better performance.

A consumer's perception of ease of use pertaining to electronic banking channels, whether it is, amongst others, Internet banking or mobile banking, may be predicted by several factors. For example, numerous studies (Al-Somali *et al.*, 2009; Pikkarainen *et al.*, 2004; Sathye, 1999) uncovered a significant positive relationship between the quality of Internet connectivity and perceived ease of use of electronic banking channels. Research done by Nel *et al.* (2012) and Nel and Raleting (2012) found that perceived ease of use of mobile banking is influenced by self-efficacy, which refers to an individual's belief whether he or she is capable of undertaking a course of action to perform a particular behaviour, which, in turn, influences perceived ease of use. Another study (Hsu *et al.*, 2009) undertook a survey on 207 MBA students from an AACSB accredited university in the Midwest of the USA. The results suggested a significant positive relationship between self-efficacy and perceived ease of use.

Several studies (Aboelmaged & Gebba, 2013; Akturan & Tezcan, 2012; Hu *et al.*, 1999; Kleijnen *et al.*, 2004; Sayid *et al.*, 2012; Shanmugam *et al.*, 2014) found perceived ease

of use to have no significant influence on attitudes. In addition, Legris *et al.* (2003:196) performed a comprehensive review of the literature and identified three more studies indicating a non-significant relation between perceived ease of use and attitudes. However, the influence of perceived ease of use on usage behaviour has been validated (Daneshgadeh & Yildirim, 2014). Furthermore, the influence of perceived ease of use on attitudes has been tested and validated by most studies (Akturan & Tezcan, 2012; Bhattacharjee, 2000; Hsu, 2004; Keil *et al.*, 1995; Lee *et al.*, 2011; Lin, 2011; Maduku, 2013; Maduku & Mpinganjira, 2012; Morris & Dillon, 1997; Nor & Pearson, 2008; Olatokun & Owoeye, 2012; Taylor & Todd, 1995a; Taylor & Todd, 1995b). Therefore, in line with these studies and for the purpose of this study, it is theorised that individuals who perceive mobile banking as easy to use will display a positive attitude towards using the technology. Hence, perceived ease of use positively influences attitudes towards mobile banking.

3.4.2.2 Perceived relative advantage

According to Nor and Pearson (2008:41), perceived relative advantage, also referred to as perceived usefulness, refers to the extent to which an innovation is perceived as being more effective and superior than its precursor. Frangos (2009:157) point out that consumers use electronic banking channels, including mobile banking, because they find the systems useful for conducting banking transactions. Ndubisi (2006:12) add that consumers anchor their behavioural intention to use electronic banking channels to the possible advantages the systems may be able to provide.

Lee (2009:132) classifies the perceived relative advantages into two groups, namely direct advantages and indirect advantages. Direct advantages refers to those concrete and instantaneous advantages that consumers enjoy from electronic banking channels and includes quicker completion of a wide-array of banking activities and more transparent financial information. Moreover, self-service technologies offer convenience, a speedier processing time, and owing to the elimination of paper use, it negates the issue of errors and delays that regularly occur during paper document processing. Furthermore, consumers are able to scrutinise processing performance and can confirm delivery automatically. As such, relevant information is readily accessible and transparent to mobile banking consumers. The indirect advantages, as indicated by Lee (2009:133), refer to advantages that are imperceptible and rather complicated to quantify. These

advantages include access to additional information related to investment opportunities and services, such as news updates and stock quotations.

Mobile banking is able to satisfy banking needs and, therefore, Pikkarainen *et al.* (2004:224) explain that a self-service technology's success can be assessed by how well it satisfies a customer's banking needs. Nor and Pearson (2008:41) note that, theoretically, it is expected that individuals perceiving mobile banking as an innovation that could provide all these advantages and uses, would display a positive attitude towards using the technological innovation.

Various studies (Chau & Hu, 2001; Gerrard & Cunningham, 2003; Kleijnen *et al.*, 2004; Lin, 2011; Nor & Pearson, 2008; Olatokun & Owoeye, 2012; Sayid *et al.*, 2012; Shanmugam *et al.*, 2014; Sohail & Shanmugham, 2003; Suh & Han, 2002) have tested and validated the influence of perceived relative advantage on attitude in the information technology domain. These studies have uncovered that perceived relative advantage has a significant positive influence on attitudes towards using the technology. As such, this study posits that perceived relative advantage of using mobile banking positively influences attitudes towards using the technology.

3.4.3 Subjective norms

Subjective norms is a concept that has been extensively used in several research studies (Ajzen, 1991; Greaves *et al.*, 2013; Han *et al.*, 2010; Maduku, 2013; Maduku & Mpinganjira, 2012; Martins *et al.*, 2014; Nor & Pearson, 2008; Polonsky *et al.*, 2012). Subjective norms is described as an individual's perception of important others' (family, friends, colleagues and peers) attitudes towards a particular behaviour (Fielding *et al.*, 2008:319; Greaves *et al.*, 2013:110). Greaves *et al.* (2013:110) as well as Niaura (2013:75) posit that subjective norms refers to the social pressure an individual experiences from significant and relevant others to perform a behaviour in question. Bearden *et al.* (1986:78) describe subjective norms as an individual's perceived social pressures to adopt or not to adopt an innovation. In addition, social influences lead to a normative influence that occurs when an individual conforms to the expectations of significant others. Ajzen and Fishbein (1980:5) as well as Gu *et al.* (2009:11610) agree that subjective norms underscore the influence of the social environment on behaviour and a person's motivation to comply with a specific referent's beliefs.

The influence of subjective norms on behavioural intention has been studied extensively, such as in the studies of Khanna *et al.* (2009), who investigated the factors that influence physicians' use of a suggested child obesity tool and found that subjective norms significantly predicted physicians' behavioural intention to measure Body Mass Index (BMI) in children and adolescents, as well as Tsai *et al.* (2010), who determined the influence of subjective norms on consumers' behavioural intention to purchase nutraceuticals. Studies done by Al-Debei *et al.* (2013) and Liao *et al.* (2010) also uncovered that subjective norms significantly influenced behavioural intention. This is relevant to the general rule of Ajzen (1991:188), which is that the more positive the attitudes and subjective norms concerning behaviour, the stronger should be an individual's intention to carry out the behaviour in question. Therefore, it is inferred that attitudes and subjective norms are interrelated when attempting to predict behavioural intentions. Moreover, subjective norm is a function of intention, which, in turn, is a function of behaviour (Gupta & Ogden, 2009:377; Polonsky *et al.*, 2012:240; Rex & Baumann, 2007:569).

Numerous studies (Burnkrant & Page, 1988; Oliver & Bearden, 1985; Shimp & Kavas, 1984) have proposed the decomposition of the normative belief structures (subjective norms) into appropriate reference groups. Taylor and Todd (1995a:141) assert that the importance of this decomposition lies within the possible difference in opinion among the different reference groups. Taylor and Todd (1995b:152) argue that an individual's peers may be opposed to the adoption and use of a specific innovation, whereas an individual's family may encourage the adoption of the innovation.

Friends, family and peers were identified as reference groups influencing consumers forming their initial adoption decisions in the online environment (Limayen *et al.*, 2000; Nor & Pearson, 2008; Parthasarathy & Bhattacharjee, 1998). However, because this study's proposed model is based on an extended TAM and follows the postulations of previous published studies of a similar nature (Kleijnen *et al.*, 2004; Maduku, 2013; Maduku & Mpinganjira, 2012; Sayid *et al.*, 2012; Schierz *et al.*, 2010), this study theorises that subjective norms, which can include the opinions of significant others, such as friends, family or peers, will positively influence attitudes towards mobile banking.

3.4.4 Perceived behavioural control

Perceived behavioural control attempts to determine both behavioural intentions and behaviour (Niaura, 2013:75). Ajzen (1991:183-184) defines perceived behavioural control as the degree to which an individual perceives the ease or difficulty of performing a particular behaviour and his or her perceived capability to produce a successful outcome when performing that behaviour. According to Nor and Pearson (2008:43), perceived behavioural control refers to an individual's beliefs of their capability to undertake a behaviour. These beliefs are influenced by both internal and external factors. The internal factor relates to an individual's self-belief in his or her ability to perform the behaviour. This is referred to as self-efficacy, suggesting that an individual's behaviour is strongly influenced by their confidence to carry out the behaviour. The external factor relates to facilitating conditions, which reflects an individual's belief pertaining to the availability of resources, such as a reliable Internet connection, required to engage in the behaviour.

Various authors (Ajzen, 1991:181-182; Chan & Bishop, 2013:96; Greaves *et al.*, 2013:110; Gupta & Ogden, 2009:378; Han *et al.*, 2010:327; Kalafatis *et al.*, 1999:445) explain that intentions describe the motivational factors influencing behaviour. These factors indicate the degree to which individuals are willing to undertake the behaviour. As such, it can be inferred that the stronger the intention to undertake the behaviour, the higher the performance behaviour will be. However, it is worth noting that intention can only predict behaviour if the behaviour is under volitional control, meaning, if an individual can make a decision whether or not to perform the behaviour. The authors furthermore add that even if an individual's behaviour is in line with this requirement, additional non-motivational factors, such as availability, skills, time and money may also play an important role in the behaviour being carried out. Collectively, these situational elements signify an individual's actual control towards the behaviour.

A study done by Martins *et al.* (2014) show that the perceived behavioural control, in particular facilitating conditions directly influenced the usage behaviour of Internet banking. Moreover, a study conducted by Bailey (2006) identified that there is a direct link between perceived behavioural control and intentions to engage in retail employee theft. In particular, the researcher found that the degree to which employees perceive that they can engage in retail theft with ease would have a positive influence on their

intentions. Moreover, Lee (2009) uncovered that perceived behavioural control directly influenced Internet banking usage intentions.

Ajzen (1991:188) proposes that, generally, the more positive the subjective norms and attitudes pertaining to the behaviour of interest, as well as the greater the perceived behavioural control, the more robust an individual's intention to undertake the behaviour. In addition, perceived behavioural control is able to explain behaviours that are more complex, owing to it being a proxy for actual control and its likely direct influence on behaviour. Based on this conceptualisation, this study included questions relating to perceived self-efficacy and facilitating conditions as part of perceived behavioural control. Madhavan and Philips (2010:199) denote that the term self-efficacy is derived from social psychology that explains an individual's perception of his or her capability to perform a particular behaviour. Gu *et al.* (2009:11610) concur with this description. In view of mobile banking or any other electronic system, Scott and Walczak (2009:221) describe self-efficacy as an individual's assessment of his or her ability to use a specific system. According to Torkzadeh and Van Dyke (2002:480), self-efficacy can provide significant insights towards understanding how individuals go about in rapidly adopting an innovation or system and acquire the necessary skills to use these systems without any difficulty. Torkzadeh and Van Dyke (2002:480) further elaborate that self-efficacy is an important concept that supports the comprehension of technology acceptance, implementation and use.

The self-efficacy concept has been widely applied in understanding information technology adoption and usage. Research conducted by Compeau and Higgins (1995) demonstrated that self-efficacy significantly influences user's anxiety towards using computers and their actual use of computers. Hassan (2003) revealed self-efficacy as an antecedent of computer-related ability and computer usage. Studies undertaken by Nel *et al.* (2012) and Nel and Raleting (2012) hypothesise that perceived self-efficacy influences the perceived ease of use of mobile banking. This study anticipates that individuals who perceive themselves as having high self-confidence (self-efficacy) to perform mobile banking will also perceive themselves as having the ability to use mobile banking (perceived behavioural control).

Gu *et al.* (2009:11610) define facilitating conditions as the availability of external conditions to assist users of a system with overcoming barriers and hurdles of using the

particular system. Nor and Pearson (2008:44) state that, in terms of mobile banking, facilitating conditions refers to beliefs about the availability of resources required to engage in mobile banking activities, such as access to a reliable Internet connection and network coverage. Venkatesh *et al.* (2003:453) highlight that facilitating conditions reflect the influence of organisational and technical infrastructure to support the use of electronic banking systems, such as user knowledge. Zhou *et al.* (2010:762) postulate that if users of a specific information system do not have the required financial resources and operational skills, they may not adopt nor use the system.

A number of studies (Bhattacharjee, 2000; Lau, 2002; Nor & Pearson, 2008; Taylor & Todd, 1995b) support the influence of facilitating conditions on perceived behavioural control. Consequently, this study assumes that those individuals who believe they have the necessary resources to undertake mobile banking (facilitating conditions) will perceive themselves as having the ability to use mobile banking (perceived behavioural control).

Therefore, this study theorises that perceived behavioural control, which includes questions relating to perceived self-efficacy and facilitating conditions, will positively influence attitudes towards mobile banking. This postulation is consistent with previous research findings (Crabbe *et al.*, 2009; Saibaba & Murthy, 2013).

3.4.5 Trust factors

Several studies (Gefen, 2002; McKnight & Chervany, 2001; Nor & Pearson, 2008) have empirically validated the multi-dimensionality of the trust construct and, therefore, it is suggested that trust should be viewed as a multi-dimensional construct. Zhou (2013:1086) opines that trust generally includes three beliefs, namely competency, integrity and benevolence. However, the research of Lin (2011) and Nor and Pearson (2008) revealed that competency and benevolence do not significantly affect trust, and as such, these constructs were not tested in this study. Therefore, for the purpose of this study, trust in mobile banking comprises factors such as perceived integrity and perceived system quality.

3.4.5.1 Perceived integrity

The mobile banking environment is to some extent greatly grounded on technology, security, authentication and trust principles. Trust, in the form of integrity, is increasingly playing an important role in influencing consumers' beliefs or perceptions of mobile banking. Integrity is essential for building consumer relationships, given that consumers deposit their hard-earned money in the bank, and consequently, allowing retail banks control over their assets. A relationship between the retail bank and the consumer is not likely to exist if consumers did not trust the undertakings of their retail bank (Lin, 2011:254). Virkkunen (2004:22) asserts that integrity is a fundamental source of trust in mobile banking services. Virkkunen (2004:22) further notes that integrity on the part of retail banks is expected to foster trust in new banking channels, including mobile banking. Therefore, it is crucial that retail banks pay attention to the integrity aspect in order for consumers to gain confidence in using different channels of financial service delivery as well as assurance that the new channels are safe and reliable.

Nor and Pearson (2008:46) explain perceived integrity as retail banks' truthfulness in their dealings with their consumers, keeping commitments, acting ethically and fulfilling promises in terms of a safe and secure virtual environment. Therefore, it can be said that consumers that have used a bank's physical infrastructure or services prior to the employment of mobile banking will find it easier to progress to and trust the new service as they have built up a level of trust in the service history of the financial institution. Lin (2011:254) points out that, in terms of mobile banking, rules governing integrity include providing timely and accurate information, upholding consumer commitment and maintaining confidentiality of personal information. The researcher further notes that these rules of integrity deliver an image of objectivity and encourage consumers to view retail banks as exhibiting high integrity. Lin (2011:254) believes that a retail bank is considered to have high integrity when the consumer is of opinion that the retail bank exhibits strong justice, honesty and objectivity. Aldás-Manzano *et al.* (2008:689) suggest that retail banks should practice sincerity and transparency in terms of being able to fulfil commitments and promises made. Banks' communication policies should transmit a message that promotes the achievement of objectives that are complementary to those of the consumer and that provide him or her with a greater sense of well-being. Considerable

resource investment is needed to ensure that consumers perceive greater competence and skill in the financial institution with whom they are interacting.

A review of the literature revealed a number of studies (Cheung & Lee, 2006; Hong & Cho, 2011; Mayer *et al.*, 1995; Nor & Pearson, 2008; Sharif *et al.*, 2005; Ya'gobi & Rad, 2015; Yousafzai *et al.*, 2003) that included perceived integrity as an antecedent of overall trust, advocating that trust is likely to be a function of perceived integrity. In this study, however, it is theorised that perceived integrity positively influences attitudes towards mobile banking, which is in keeping with previously published studies of a similar nature (Delafronz *et al.*, 2013; Galadima *et al.*, 2014; Lin, 2011).

3.4.5.2 Perceived system quality

System quality reflects the speed of access (Kleijnen *et al.*, 2004:208), ease of use, navigation and visual appeal of mobile banking (Gu *et al.*, 2009:11610; Zhou, 2013:1087). Zhou (2011:530) posits that users of mobile banking may have trouble in searching for information due to the constraints of mobile devices, such as small screens and inconvenient input. As such, Zhou (2011:530) accentuates the importance of an interface with a powerful navigation, clear layout and prompt responses for adequate system quality. Zhou (2013:1087) elaborates that if mobile banking systems are difficult to use and have poor interface design, users may be of opinion that the retail bank lacks the ability and integrity necessary to provide quality services. In addition, Zhou (2011:530) points out that users may feel that retail banks have not invested enough time and effort into the mobile banking system. This, in turn, will influence user trust in mobile banking (Zhou, 2011:530; Zhou, 2013:1087).

A study by Vance *et al.* (2008) also noted that system quality, including the navigational structure and visual appeal influences users' trust in mobile commerce technologies. Various other studies (Kim *et al.*, 2004; Lee & Chung, 2009; Teo *et al.*, 2009; Zahedi & Song, 2008; Zhou, 2011; Zhou, 2013) confirm the influence of system quality on trust.

As part of system quality, this study seeks to determine whether the mobile banking system can provide relevant and accurate information (information quality) and whether the mobile banking system is safe, in terms of legal structures and technological advances (structural assurances). Zhou (2011:529) explains that, because of a lack of direct experience, users likely rely on their own perceptions such as perceived information

quality and perceived system quality to develop their trust in mobile banking. Zhou (2011:529) also believes that both information quality and system quality are factors influencing the success of an information system. Furthermore, Talukder *et al.* (2014:87) assert that system quality signifies both the technical quality of the mobile system itself as well as the quality of the information being provided to the consumers.

Information quality reflects information relevance, sufficiency, accuracy and timeliness. Users expect to use mobile banking to make, amongst others, mobile bill payments and acquire their payment information at anytime from anywhere. If this information is irrelevant, inaccurate or out-of-date, users may doubt service providers' ability and integrity to offer quality mobile banking services. This may affect their trust in service providers as well as the system (Zhou, 2011:529; Zhou, 2013:1087). Information quality has been identified as a factor affecting user trust in health infomediaries (Zahedi & Song, 2008) and inter-organisational data exchange (Nicolaou & McKnight, 2006). Additionally, the studies of Kim *et al.* (2004), Lee and Chung (2009), Lin *et al.* (2011), Teo *et al.* (2009), Zhou (2011) and Zhou (2013) have verified the influence of information quality on trust and found that information quality positively influences trust.

Kim *et al.* (2009:293) point out that structural assurances in the form of contracts, policies, agreements, regulations, feedback forums and laws improve initial trust between the parties involved in a relationship. Pavlou and Gefen (2004:672) concur and add that structural assurances foster trust and diminish perceived risks between relevant parties involved in the relationship. According to Nor and Pearson (2008:45), electronic banking systems, including the mobile banking self-service technology, may be viewed as risky by consumers, and before it can be adopted, some assurances that it is safe have to be provided. The researchers, furthermore, state that structural assurance is established when guarantees, technological and legal safeguards enhance the trustworthiness of the virtual environment. According to Zhou (2011:530), structural assurance refers to the existence of legal and technological structures to guarantee secure mobile banking transactions. Kim *et al.* (2009:290) advise the availability of these formalised structural assurances, not only to depress opportunistic behaviours, but more importantly, to build confidence in mobile commerce services, including mobile banking.

Compared to other electronic banking channels, mobile banking is built on mobile networks, which are believed to be more susceptible to hacker attacks and information

interception. Moreover, viruses and Trojan horses may also exist in mobile devices (Zhou, 2011:530). Consequently, it is important that adequate structural assurance be provided in order to foster trust in mobile banking and mitigate these system concerns (Gu *et al.*, 2009:11611). Several studies (Flavian *et al.*, 2005; Gefen *et al.*, 2003b; Gu *et al.*, 2009; Kim *et al.*, 2009; Kim & Prabhakar, 2004; McKnight *et al.*, 2002; Nor & Pearson, 2008; Ratnasingam & Pavlou, 2003) support the association between structural assurance and trust.

Evidently, the literature reveals that in most studies, perceived system quality, together with the information quality of the system and structural assurances, influences trust. However, the DeLone and McLean (1992; 2003) studies suggest that usage behaviour is a function of perceived system quality. In addition, an extensive review of the literature revealed two studies (Kleijnen *et al.*, 2004; Olatokun & Owoeye, 2012) with empirical support that perceived system quality positively influences attitudes. In accordance with their findings, this study seeks to determine whether perceived system quality has a positive influence on attitudes towards mobile banking.

The subsequent section considers the literature on the effect of consumer demographics on technology adoption.

3.5 CONSUMER DEMOGRAPHICS

Kleijnen *et al.* (2004:216) indicate that, in particular, age may be a lucrative criterion on which to base segmenting decisions, considering that the majority of companies in the current day and age have demographic information about their consumers. The literature proposes that demographic variables, such as age, gender, level of education and level of income have an influence on attitudes towards electronic banking services. The study of Al-Somali *et al.* (2009) maintains that demographic factors play an important role in influencing consumers' attitude towards Internet banking. Porter and Donthu (2006:1004) suggest that the Internet usage rate for older, less educated, minority and lower income individuals are lower compared to younger, highly educated, white and wealthier individuals. This proposition seemingly holds true for Internet banking primarily because Internet banking applies Internet technology to banking. Some studies (Karjaluoto *et al.*, 2002; Sathye, 1999) uncovered that a typical user of Internet banking is highly educated,

relatively young and wealthy with adequate knowledge about computers in general and the Internet in particular.

A study conducted by Maduku (2013) on South African users of Internet banking found that demographic factors, including age, level of education, and level of income were poor predictors of attitudes towards Internet banking, as poor results were obtained. In addition, the study of Muduku and Mpinganjira (2012) revealed that the same demographic variables were poor predictors of attitudes towards mobile banking, as no significant relationship between age and attitudes were recorded, and owing to weak relationships between attitudes towards mobile banking and level of education as well as level of income.

While empirical research findings of the Kleijnen *et al.* (2004) study suggests significant differences in the effects that perceived usefulness and perceived system quality have on attitudes between younger and older consumers, no significant difference in the effect that perceived ease of use has on attitudes between younger and older consumers was found. In addition, the Gan *et al.* (2006) study found that older and high-income consumers are less likely to use electronic banking compared to younger consumers and consumers from a lower income level.

Concerning gender, Hwang (2010:1753) asserts that gender has been recognised as a central factor in moderating beliefs concerning the use of information technology related innovations. Lichtenstein and Williamson (2006:60) highlight that some experts are of opinion that females have a greater fear and less interest in new technologies. Moreover, empirical research findings of Im *et al.* (2008) and Nysveen *et al.* (2005) indicate that the influence of perceived usefulness and perceived ease of use is stronger for males than for females. While Ong and Lai (2006) found the opposite influence, two studies (Lai & Li, 2005; Venkatesh & Morris, 2000) identified that gender does not moderate the perceived ease of use and perceived usefulness association, whereas the studies of Ong and Lai (2006), and Riquelme and Rios (2010) found the opposite. Nel and Raleting (2012) uncovered that perceived usefulness is a stronger predictor of attitudes towards mobile banking for males than for females, whereas perceived ease of use is a stronger predictor of attitudes for females.

Evidence from previously published research suggests that there may be gender and age differences concerning technology acceptance issues. As such, this study seeks to determine whether there are gender and age differences concerning Generation Y students' attitudes towards mobile banking, perceived ease of use, subjective norms, perceived behavioural control, perceived integrity, mobile banking usage behaviour, perceived relative advantage and perceived system quality.

3.6 PROPOSED MODEL OF THE ANTECEDENTS OF GENERATION Y STUDENTS' ATTITUDES TOWARDS AND USAGE BEHAVIOUR OF MOBILE BAKING

The literature reviewed in Chapter 2 and Chapter 3 provided a useful foundation for investigating the mobile banking self-service technology and the factors that likely influence attitudes towards and usage behaviour of mobile banking. The primary purpose of this section is to propose a model of the antecedents influencing attitudes towards and usage behaviour of mobile banking. Furthermore, the preceding literature review outlines existing theories, models and empirical studies that may aid in supporting the postulated model. Figure 3.8 depicts the proposed model and theorises a number of factors that serve as the antecedents for attitudes towards and usage behaviour of mobile banking. Note that the proposed model is based on an extended and adapted version of the TAM and that its postulation is in line with previous studies of a similar nature (Galadima *et al.*, 2014; Garg *et al.*, 2014; Maduku, 2013; Maduku & Mpinganjira, 2012; Mazhar *et al.*, 2014; Sayid *et al.*, 2012; Shanmugam *et al.*, 2014).

The proposed model seeks to investigate whether the utility related factors of perceived ease of use and perceived relative advantage are significant predictors of attitudes towards mobile banking. Furthermore, the model seeks to determine whether subjective norms and perceived behavioural control are significant predictors of attitudes towards mobile banking. Moreover, the model seeks to determine whether the trust related factors of perceived integrity and perceived system quality are significant predictors of attitudes towards mobile banking. In addition, the model seeks to examine whether attitudes towards mobile banking is a significant predictor of mobile banking usage behaviour.

The proposed model depicted in Figure 3.8 illustrates the antecedents that influence Generation Y students' attitudes towards and usage behaviour of mobile banking.

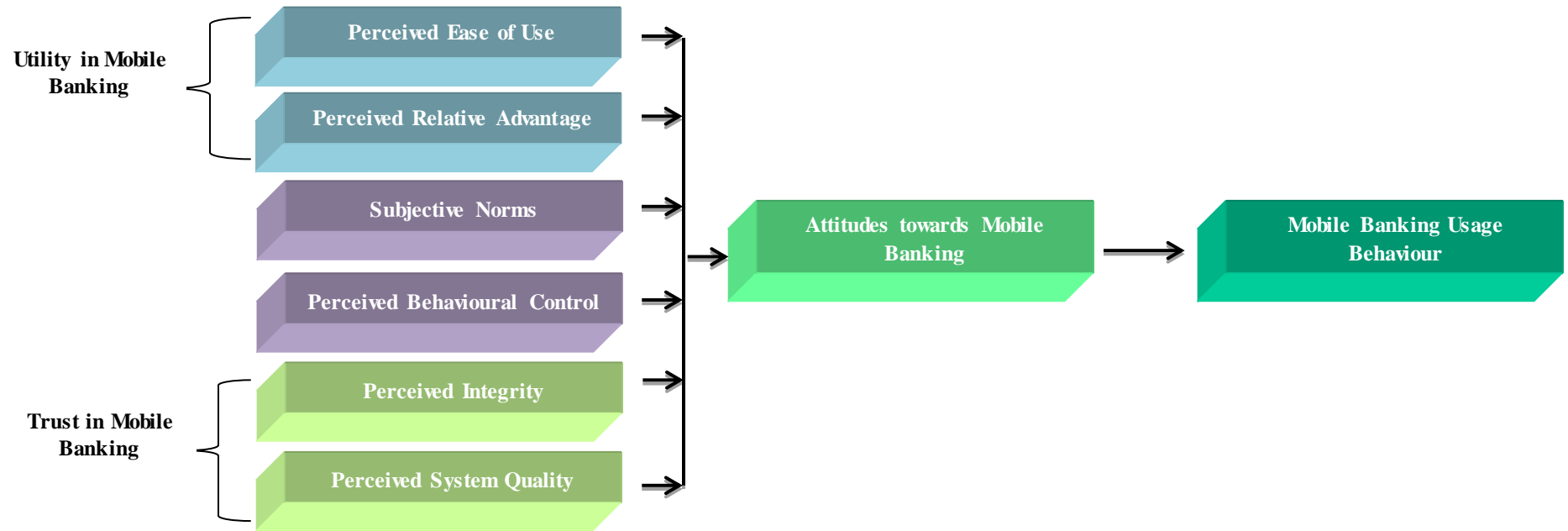


Figure 3.7 Proposed model of the antecedents of Generation Y students' attitudes towards and usage behaviour of mobile banking

To evaluate the relevance of these factors in determining attitudes towards and usage behaviour of mobile banking, the postulated relationships suggested by the research model in Figure 3.8 will be tested empirically, as reported on in Chapter 5.

3.7 CONCLUSION

This chapter comprised a literature review of the Generation Y cohort and the various technology adoption theories and models. In addition, the chapter included a literature review relating to the possible factors that may determine attitudes towards and usage behaviour of mobile banking.

The Generation Y cohort, dubbed the elusive new youth market segment, is able to stay abreast of the rapid rate of technological and social change, owing to them growing up in a media-saturated and brand-conscious world. Consequently, organisations, including retail banks, will need to embrace these individuals to guarantee future success, emphasising the significance of connecting with this new generation of consumers on their own turf. This has created the need for strategists, technologists, and marketers to rethink and possibly adapt marketing and strategic plans, business models, processes, awareness programmes and pilot projects geared towards these individuals.

Utility and trust in mobile banking play an influential role in the formation of consumer perceptions and attitudes and makes for important consideration in determining the impact of technology adoption in general and particularly in the development of this self-service technology. This highlights the need for the role players of retail banks to understand the factors influencing consumers' attitudes towards mobile banking in order to influence positively mobile banking behaviour. Therefore, utility factors such as perceived ease of use and perceived relative advantage, as well as subjective norms, perceived behavioural control, and trust factors, such as perceived integrity and perceived system quality are believed to be the factors that influence Generation Y consumers' attitudes towards and usage behaviour of mobile banking.

The research methodology employed in this study to test empirically the degree to which the abovementioned factors influence Generation Y students' attitudes towards and usage behaviour of mobile banking is discussed in the subsequent chapter, Chapter 4. In this chapter, the sampling procedure is described, as well as the research instrument and the

statistical analysis techniques employed in this study. Chapter 5 reports on the empirical testing of the proposed model of factors of Generation Y students' attitudes towards and usage behaviour of mobile banking presented in Figure 3.8.

CHAPTER 4

RESEARCH METHODOLOGY

“My intention is not to replace one set of general rules by another such set – my intention is, rather, to convince the reader that all methodologies, even the most obvious ones, have their limits”

— Paul Feyerabend

4.1 INTRODUCTION

The previous chapter, Chapter 3, introduced a model of the antecedents, in particular perceived utility and trust, of attitudes towards and usage behaviour of mobile banking based on the literature. The aim of this chapter is to describe and explain the research methodology that was followed in order to test empirically that model on Generation Y students in South Africa, as per the primary objective of this study.

Research, whether it is related to business, business finance and/or marketing, involves a systematic and objective process of design, collection, analysis and use of data to provide paramount support in determining and solving issues related to business and/or marketing (Burns & Bush, 2010:35; Cant *et al.*, 2008:3). The information emanating from the research may be used by and communicated to management who interpret the data to identify new uncharted business opportunities and threats in the market and to assist decision-makers in exploring, generating, refining, and assessing business decisions and activities (Kolb, 2008:7).

As indicated in Chapter 1, the primary objective of this study was to propose and empirically test an extended technology acceptance model (TAM) that measures the extent to which Generation Y students’ perceived utility and trust in mobile banking influences their attitudes towards and usage behaviour of mobile banking. The following aspects were examined from the literature, thereby laying the foundation for the research instrument and the research methodology:

- Mobile devices generally used to conduct mobile banking, with a specific emphasis on mobile phones.

- Mobile devices as a marketing and business tool as well as changes brought about by developments in mobile communication and mobile commerce.
- The South African retail banking industry together with the importance of strategic management and strategy within the retail banking context.
- Mobile banking, with specific reference to the different types, the utility and trust in mobile banking, as well as the growth and adoption of mobile banking, internationally and in South Africa.
- Generation Y - the characteristics of its members and the impact technology has had on this generation.
- Technology adoption theories and models.
- Antecedents of attitudes towards and usage behaviour of mobile banking.

Moreover, in accordance with the primary objective, the following empirical objectives were formulated (refer to Section 1.3.3), which necessitates the collection of the following data:

- Determine Generation Y students' attitudes towards mobile banking.
- Determine Generation Y students' perceived utility in mobile banking in terms of perceived ease of use and perceived relative advantage.
- Determine Generation Y students' subjective norms concerning mobile banking.
- Determine Generation Y students' perceived behavioural control concerning mobile banking.
- Determine Generation Y students' trust in mobile banking in terms of perceived integrity and perceived system quality.
- Determine Generation Y students' mobile banking usage behaviour.

- Empirically test a proposed model of the extent to which perceived utility, trust, perceived behavioural control and subjective norms influences Generation Y students' attitudes towards and usage behaviour of mobile banking.
- Determine whether male and female Generation Y students differ in their attitudes towards mobile banking, perceived utility in mobile banking, subjective norms, perceived behavioural control, trust in mobile banking and mobile banking usage behaviour.
- Determine whether different age groups of Generation Y students differ in their attitudes towards mobile banking, perceived utility in mobile banking, subjective norms, perceived behavioural control, trust in mobile banking and mobile banking usage behaviour.

This chapter delineates the research methodology, particularly the methods used for gathering and analysing the required data as well as the justification for the selection of the chosen methods. Moreover, the research design, sampling strategy, and data collection process, together with the techniques employed to analyse the data are described in this chapter. The section to follow, Section 4.2, describes the research process.

4.2 RESEARCH PROCESS

Most scientific inquiries comprise a sequence of highly interrelated undertakings. The order in which the steps or stages of the research process are undertaken, however, varies, owing to the stages of each research design continuously and constantly overlapping each other (Shukla, 2008:19; Zikmund & Babin, 2013:50). Although disagreement about the exact steps to be followed in a research process exists and while no universal approach is available (Shukla, 2008:19), Malhotra (2010:41-42) suggests a six-step process to undertake research, as depicted in Figure 4.1.



Figure 4.1 Research process (Malhotra, 2010:41-42)

The six proposed steps illustrated in Figure 4.1 denote the order in which the activities should be performed when a research study is conducted. These steps comprise defining the problem that created a need for the study, developing an approach to the problem; that is, setting out objectives to be attained by the study, deciding on a research design to be followed in the study, gathering the necessary data, editing, coding and analysing the gathered data. The sixth step in the research process encompasses report preparation and presentation of the study's findings (Malhotra, 2010:41-42).

Under the problem statement section in Chapter 1, this study identified there was a need to propose and empirically test the antecedents to attitudes towards and usage behaviour of mobile banking amongst South African Generation Y students. Following this problem definition, one primary objective, nine theoretical objectives and nine empirical objectives were set out (refer to Chapter 1, Section 1.3).

The subsequent section describes the research design utilised to confirm that the study made use of reliable procedures and methods of enquiry.

4.3 RESEARCH DESIGN

Cant *et al.* (2008:3) present certain guidelines for obtaining research information. This includes the careful planning and execution of the research, clearly stating the purpose, developing the design and deciding on the mode of analysis in advance, clearly specifying the data requirements of the research process, conducting the research in a scientific manner, and ensuring that the research is unbiased and that emotions do not affect the research. However, to ensure the successful execution of these guidelines, Berndt and Petzer (2011:31) advise that a research design be followed. A study's research design is a structured plan used to gather and analyse data and to provide answers to the research objectives (Iacobucci & Churchill, 2010:58; Malhotra, 2010:102) and are typically categorised into three main categories, namely exploratory research, causal research, and descriptive research (Kotler & Armstrong, 2012:127; McDaniel & Gates, 2013:37,43; Silver *et al.*, 2013:54), as delineated in Figure 4.2.

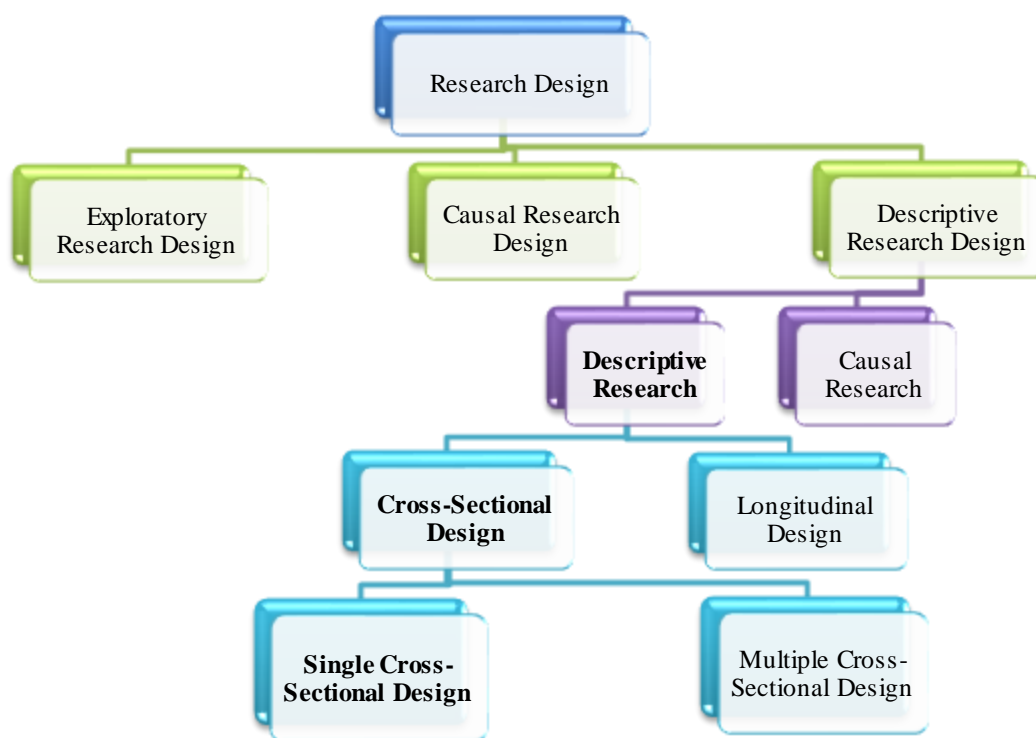


Figure 4.2 Research design process (Kotler & Armstrong, 2012:127; Malhotra, 2010:103; Silver *et al.*, 2013:54)

The three broad streams of research designs are discussed briefly in the subsequent sub-sections.

4.3.1 Exploratory research

This type of research design aims at expounding indistinct situations (Zikmund & Babin, 2013:48) and involves acquiring insights into and ideas on research problems (Bradley, 2010:38; Iacobucci & Churchill, 2010:60; Kumar, 2008:15). Moreover, this research facilitates the formulation of questions and proposed hypotheses for more defined investigation (Kotler & Armstrong, 2012:127; Struwig & Stead, 2010:7). Cant *et al.* (2008:30) add that generally, the information necessary for this type of research is characterised as loose, flexible and unstructured. Likewise, Malhotra (2010:103) states that the findings emanating from exploratory research should be considered tentative or as input to further research; hence, leading to conclusive research. Kent (2007:17) points out that exploratory research comprises qualitative research methods, including observation, pilot and expert surveys, focus group discussions, in-depth interviews and projective techniques.

4.3.2 Causal research

This type of research is a conclusive research design and also known as testing research (Kotler & Armstrong, 2012:127). The primary purpose of causal research is to evaluate whether a change in one variable has an effect on other variables, and should the effect cause change in other variables, by how much (Kolb, 2008:27; Remler & Van Ryzin, 2011:15). Malhotra (2010:113) restates this by asserting that this type of research is used to determine cause-and-effect relationships. In other words, causal research evaluates, using experiments, the extent to which one or more independent variable causes an effect on a dependent variable of an anomaly, while holding all other variables constant (Cant *et al.*, 2008:36; Kent, 2007:18) and to evaluate the relationship between the causal variables and the effect (Malhotra, 2010:113).

4.3.3 Descriptive research

A descriptive research design is another form of conclusive research (Malhotra, 2010:106), with the primary objective of describing attributes of objects, groups, people or environments (Iacobucci & Churchill, 2010:84; Kotler & Armstrong, 2012:127; Zikmund & Babin, 2013:49) with correctness and totality (Struwig & Stead, 2010:8). Both Kumar (2008:10) and Bradley (2010:510) reiterate this by stating that descriptive

research explains market situations, attitudes, perceptions, beliefs or opinions as opposed to describing the causes of such situations or opinions. Leedy and Ormrod (2010:182) add that a descriptive research design does not involve changing or modifying the situation under analysis. This research is employed to find answers to questions on who, what, when, where and how (McDaniel & Gates, 2013:43; Wilson, 2006:34; Silver *et al.*, 2013:71) and in projecting a study's outcome to a larger population sample (Burns & Bush, 2010:149).

Further classifications of descriptive research include longitudinal and cross-sectional research designs (Iacobucci & Churchill, 2010:86). Longitudinal research designs are investigations involving an identical fixed sample of participants that are measured repeatedly over a specified time (Berndt & Petzer, 2011:133). Cross-sectional research designs, however, gather information from any given sample of population elements only once (Cant *et al.*, 2008:35; Silver *et al.*, 2013:74). Cross-sectional research designs are divided into single and multiple cross-sectional designs (Malhotra, 2010:103). A single cross-sectional design involves the collection of data from a single sample of participants only once, whereas in a multiple cross-sectional design, data is collected from two or more samples of participants once (Malhotra, 2010:108).

In keeping with the primary objective formulated for this study, a descriptive research design using a single cross-sectional approach based on a six-point Likert scale was followed. This study sought to determine the antecedents of Generation Y students' attitudes towards and usage behaviour of mobile banking by obtaining information from the sample only once, and owing to the Likert scale being known for its effectiveness in measuring attitudes and perceptions in self-administered questionnaires (Iacobucci & Churchill, 2010:264).

The research approach employed in this study is discussed in the succeeding section.

4.4 RESEARCH APPROACH

Two distinct, but basic research approaches, can be used in a research study, namely quantitative and qualitative research (Kothari, 2004:5). Maree *et al.* (2011:257) explain that quantitative research uses numerical data to determine the relationships between variables. As such, the nature of quantitative studies is either descriptive or experimental (Leedy & Ormrod, 2010:182). The main purpose of quantitative research is to test

hypotheses on a large representative sample by employing formal instruments (Matthews & Ross, 2010:142; Struwig & Stead, 2010:4; Wilson, 2006:135), such as questionnaires (Kent, 2007:10).

Qualitative research, on the other hand, employs techniques that are not reliant on numerical instruments (Zikmund & Babin, 2013:97). According to Bradley (2010:513), the qualitative research approach explains the depth and breadth of an attitude, perception, belief or opinion by means of interviews, focus groups or observation. Berndt and Petzer (2011:84) concur, stating that qualitative methods attempt to explain participants' experience of a particular occurrence or incident. Furthermore, this research approach uses a smaller number of participants who are not necessarily representative of all elements in the population (Kolb, 2008:29; Wilson, 2006:135), and an unstructured, exploratory research methodology applies (Malhotra, 2010:73; Wilson, 2006:135).

For the purpose of this study, a quantitative research approach was chosen, because this research lends itself to statistical analysis of large numbers of representative cases. The succeeding section discusses the sampling strategy used in this study.

4.5 SAMPLING STRATEGY

Zikmund and Babin (2013:312) describe the sampling strategy as the process that is followed in implementing the sample design and sampling methods with the primary aim of arriving at conclusions about an entire population by taking measurements from only a percentage of all the population elements. Cant *et al.* (2008:163) describe a sample as a subgroup of the population, designated to partake in the research. Moreover, sampling allows research to be achievable in situations where taking measurements from everyone, or on everything, is unfeasible. The following sampling strategy, as illustrated in Figure 4.3, was used in this study:

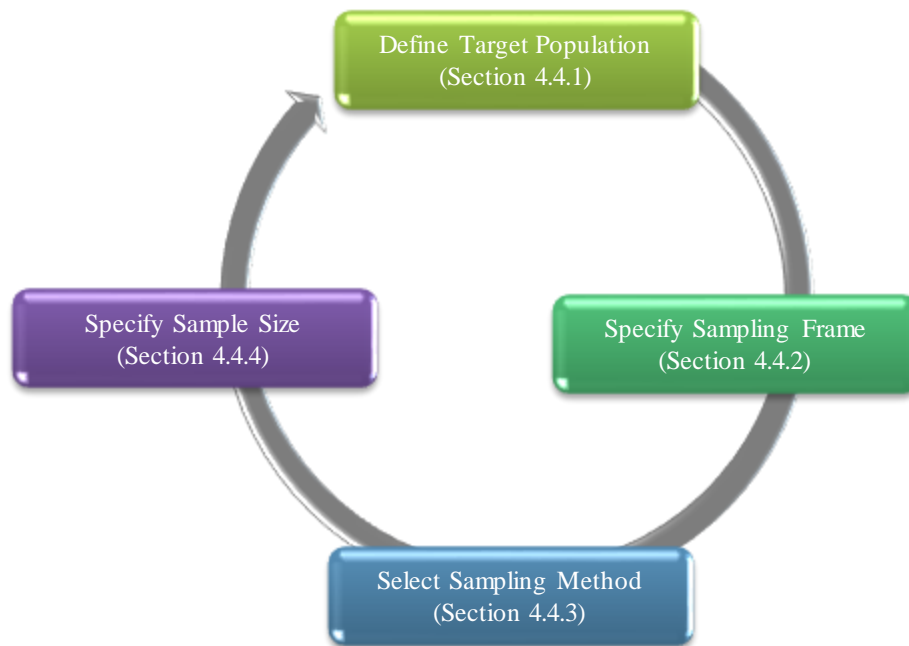


Figure 4.3 Sampling strategy (Salkind, 2012:95)

The following sub-sections explain the sampling strategy used in this study with specific reference to the description of the target population, the sampling frame, the sampling method and the sample size.

4.5.1 Target population

A population is the total number of elements or entities that share a general set of communal attributes relevant to a specific research issue (Malhotra, 2010:371). The target population is the collection of a complete unit of elements or objects that have the data and information required by the researcher to investigate the specific research issue and to arrive at the necessary conclusions (Kent, 2007:227; Zikmund & Babin, 2013:312). According to Burns and Bush (2010:364), the objectives of the study as well as the target population determine which elements should be integrated in the sample. As such, it is imperative that the target population from which the sample is drawn be defined with absolute accuracy to ensure that reliable and valid results are attained (Cant *et al.*, 2008:164; Malhotra & Birks, 2007:406). Malhotra (2010:372) advises taking the participant in survey research (element), the elements about which information is desired (sampling units), the geographical boundaries (extent) as well as the time period under consideration into account when defining the target population.

The target population relevant for this study consisted of full-time Generation Y students, aged between 18 and 24 years who were enrolled at registered public South African HEIs in Gauteng during 2015.

4.5.2 Sampling frame

The sampling frame is a concrete list (Malhotra, 2010:373), including a telephone directory or the listing of households, companies classes, registered voters and the like, from which a sample is to be drawn (Feinberg *et al.*, 2013:302; Iacobucci & Churchill, 2010:284; Scheaffer *et al.*, 2012:9; Zikmund & Babin, 2013:317). The sampling frame for this study comprised the 26 registered South African public HEIs (Universities South Africa, 2015). Of these 26 registered HEIs, there are 11 traditional universities, nine comprehensive universities and six universities of technology (Department of Higher Education and Training, 2014). Table 4.1 summarises the registered South African public HEIs and student enrolment numbers as recorded in 2012.

Table 4.1 Registered South African public HEIs and students enrolments in 2012

Institution*	Website*	Location*	Student enrolment 2012**
1. Cape Peninsula University of Technology	www.cput.ac.za	Western Cape	33 506
2. Central University of Technology	www.cut.ac.za	Free State	12 724
3. Durban University of Technology	www.dut.ac.za	KwaZulu-Natal	24 875
4. Mangosuthu University of Technology	www.mut.ac.za	KwaZulu-Natal	10 802
5. Nelson Mandela Metropolitan University	www.nmmu.ac.za	Eastern Cape and Western Cape	26 597
6. North-West University	www.nwu.ac.za	North-West and Gauteng	58 752
7. Rhodes University	www.ru.ac.za	Eastern Cape	7 395
*** 8. Sol Plaatje University	www.spu.ac.za	Northern Cape	-
*** 9. Sefako Makgatho Health Sciences University	www.smu.ac.za	Pretoria	-
10. Tshwane University of Technology	www.tut.ac.za	Gauteng, Mpumalanga, Limpopo and North-West	51 711
11. University of Cape Town	www.uct.ac.za	Western Cape	25 805

Table 4.1 Registered South African public HEIs and students enrolments in 2012 (continued...)

Institution*	Website*	Location*	Student enrolment 2012**
12. University of KwaZulu-Natal	www.ukzn.ac.za	KwaZulu-Natal	41 864
13. University of Fort Hare	www.ufh.ac.za	Eastern Cape	12 044
14. University of Free State	www.ufs.ac.za	Free State	32 375
15. University of Johannesburg	www.uj.ac.za	Gauteng	48 769
16. University of Limpopo	www.ul.ac.za	Limpopo, Gauteng	22 249
*** 17. University of Mpumalanga	www.ump.ac.za	Mpumalanga	-
18. University of Pretoria	www.up.ac.za	Gauteng	57 508
19. University of South Africa	www.unisa.ac.za	All provinces	336 286
20. University of Stellenbosch	www.sun.ac.za	Western Cape	27 510
21. University of Venda	www.univen.ac.za	Eastern Cape	10 323
22. University of the Western Cape	www.uwc.ac.za	Western cape	19 591
23. University of the Witwatersrand	www.wits.ac.za	Gauteng	30 436

Table 4.1 Registered South African public HEIs and students enrolments in 2012 (continued...)

Institution[*]	Website[*]	Location[*]	Student enrolment 2012^{**}
24. University of Zululand	www.uzulu.ac.za	KwaZulu-Natal	16 434
25. Vaal University of Technology	www.vut.ac.za	Gauteng, North-West, Mpumalanga and Northern Cape	21 201
26. Walter Sisulu University for Technology & Science	www.wsu.ac.za	Eastern Cape	24 613
Total			938 201
*** No student enrolment numbers are recorded			

Source: ^{*} Universities South Africa (2015); ^{**} CHE (2014:36-38)

Owing to time and cost constraints, it was practically impossible to gather information from all the 26 HEIs and from all the Generation Y students registered at these public HEIs. As such, HEI campuses located in the Gauteng province were selected. This decision was based on the fact that Gauteng is the most populated province in South Africa (Stats SA, 2015) and the province with the highest percentage of student enrolment in public HEIs (CHE, 2014:36-38). In Table 4.2, the mid-year population estimates by province are summarised.

Table 4.2 Mid-year population estimates by province

Province	Population estimates
Eastern Cape	6 916 200
Free State	2 817 900
Gauteng	13 200 300
KwaZulu-Natal	10 919 100
Limpopo	5 726 800
Mpumalanga	4 283 900
Northern Cape	1 185 600
North West	3 707 000
Western Cape	6 200 100
Total	54 956 900

Source: Stats SA (2015)

In addition, Gauteng is the province with the highest number of Generation Y population group (Stats SA, 2015). Table 4.3 illustrates population estimates by age.

Table 4.3 Mid-year population estimates by 10-29 year old age brackets

Province	Population estimates
Eastern Cape	2 842 646
Free State	1 091 682
Gauteng	4 419 313
KwaZulu-Natal	4 350 215
Limpopo	2 375 943
Mpumalanga	1 729 574
Northern Cape	452 043
North West	1 398 819
Western Cape	2 137 106
Total	20 797 341

Source: Stats SA (2015)

Therefore, from the initial sampling frame of 26, non-probability judgement sampling was applied to select three HEIs located in the Gauteng province for the final sampling frame, of which one of the HEIs is a traditional university, one a comprehensive university, and one a university of technology.

4.5.3 Sample method

The sample method denotes the approach employed in choosing a sample (Matthews & Ross, 2010:154) and mainly depends on the research objectives, financial and time limitations, as well as the research problem (McDaniel & Gates, 2013:282). Two types of sampling methods are eminent, namely probability and non-probability sampling (Berndt & Petzer, 2011:173; Kothari, 2004:15; Maree *et al.*, 2011:172). Probability and non-probability sampling comprise different techniques, as depicted in Figure 4.4.

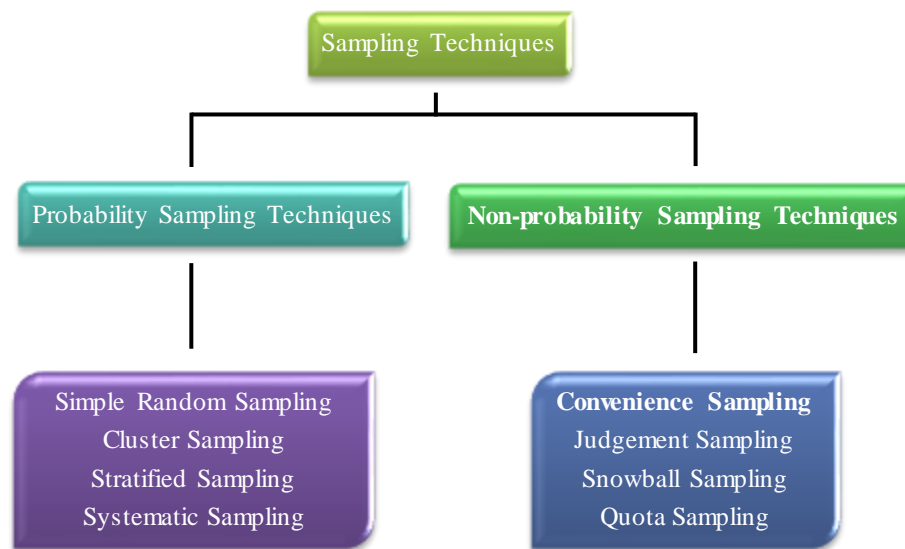


Figure 4.4 Sampling techniques (Berndt & Petzer, 2011:174)

Kent (2007:231) defines probability sampling as the non-zero chance and random selection of population elements for inclusion in the study's sample. Various authors (Berndt & Petzer, 2011:175; Iacobucci & Churchill, 2010:285; Maree *et al.*, 2011:172; Struwig & Stead, 2010:112) concur with this definition. Leedy and Ormrod (2010:205) add that a differentiating characteristic of probability sampling is that every element in the population will be signified in the sample and can be stated in advance. The selection of participants using non-probability sampling, however, depends on the personal judgement of the researcher alone and does not involve random selection techniques (Blumberg *et al.*, 2008:235; Feinberg *et al.*, 2013:304; Malhotra, 2010:376). As such, there is difficulty in establishing with certainty whether the population element included in the sample is representative of the population (Berndt & Petzer, 2011:175; Feinberg *et al.*, 2013:304; Iacobucci & Churchill, 2010:285; Leedy & Ormrod, 2010:211). Malhotra (2010:376) opines that probability sampling, in many cases, is viewed as superior to non-probability sampling owing to its accuracy and thoroughness. Despite these favourable conditions, probability sampling may be unfeasible, impractical or theoretically insensible in certain scenarios, subsequently resulting in the use of non-probability methods.

As depicted in Figure 4.4, there are four different types of probability sampling techniques, namely simple random, cluster, stratified and systematic sampling, whereas non-probability sampling techniques encompass convenience, judgement, quota and

snowball sampling. Convenience sampling refers to a technique that provides a means of selecting sample elements based on proximity and convenient accessibility (Kent, 2007:235; Salkind, 2012:103; Struwig & Stead, 2010:111). Researchers often prefer convenience sampling, as this method allows for effortless, appropriate and cost- and time-efficient selection of participants (Burns & Bush, 2010:383; Malhotra, 2010:377; Maree *et al.*, 2011:177).

For the purpose of this study, a non-probability convenience sample of full-time Generation Y students, registered at the three South African HEIs campuses, aged between 18 and 24 years between April 2015 and May 2015 was drawn from the sample frame. The study was undertaken without replacement sampling. In addition, the questionnaire included several demographic questions, including province of origin, gender, ethnic group, language and age to determine the final sample's degree of representation of the target population.

4.5.4 Sample size

A sample size is defined as the number of elements to be included in a research study's sample to draw conclusions from, using analysis (Berndt & Petzer, 2011:182; Burns & Bush, 2010:60; Malhotra, 2010:374). The size of the sample is reliant on various factors, such as the basic characteristics found within the researched population, the costs involved as well as the anticipated reliability and accuracy of the results (McDaniel & Gates, 2013:301). Several researchers (Blumberg *et al.*, 2008:273; Hair *et al.*, 2007:139; Struwig & Stead, 2010:120) advise specifying a sample size in the range of studies alike to perform comparisons with other researcher's judgements.

A sample size of 450 full-time Generation Y students was selected for this study. This sample size is in line with previous studies of this nature, such as those conducted by Akturan and Tezcan (2012) (sample size of 435), Hanafizadeh *et al.* (2014) (sample size of 403), Kesharwani and Radhakrishna (2013) (sample size of 410), and Lee (2009) (sample size of 446). Furthermore, the sample size was decided upon after careful consideration of the planned statistical analysis techniques. Structural equation models that include seven or more dimensions, such as this study, should have a sample size of between 300 and 500 (Hair *et al.*, 2010:662) and, as such, this sample size was deemed sufficiently large. The sample size of 450 full-time students was split evenly between the

three selected HEIs campuses, thereby allowing a sample size of 150 students per HEI campus.

This section has given insights into the sampling strategy utilised within this study. The data collection method used to collect the required data from this sample of 450 full-time Generation Y students is discussed in the succeeding section.

4.6 DATA COLLECTION METHOD

McDaniel and Gates (2013:281) emphasise the importance of selecting an appropriate data collection method as it is viewed as the cornerstone of all research activities within any research study and may have consequences for the sampling process. Quantitative studies make use of two typical data collection methods, namely the survey method and/or the observation method (Blumberg *et al.*, 2008:278; Malhotra, 2010:211). Whereas the observation method involves a systematic process of observing and collecting actual behavioural data patterns of individuals, objects and/or occurrences (Malhotra, 2010:230; Silver *et al.*, 2013:137; Stevens *et al.*, 2013:121), the survey method employs self-administered or fieldworker-administered questionnaires to permit a systematic and organised questioning approach to data gathering (Kent, 2007:182; McDaniel & Gates, 2013:116).

The survey method can be administered through various methods, *inter alia* personal interviews, telephone surveys, mail surveys, online interviews, self-administered questionnaires and drop-off surveys (Cant *et al.*, 2008:95; Malhotra & Birks, 2007:267). The drop-off survey method in particular, constitutes the physical drop-off of the questionnaire at the participant's location, after which time arrangements for collecting the completed questionnaires are agreed upon (Burns & Bush, 2010:288; Zikmund & Babin, 2013:176). Malhotra (2010:228) adds that drop-off surveys generate greater response rates, and are particularly valuable for local-market surveys. Berndt and Petzer (2011:48) postulate that self-administered surveys require the participant involved in the research study to complete the questionnaire without the researcher being present.

For the purpose of this study, the chosen data collection method was the survey method. The needed data were obtained through a standardised self-administered questionnaire using the drop-off survey method. The questionnaire was submitted for approval and ethics clearance to the Ethics Committee of the Faculty of Economic Sciences and

Information Technology at the North-West University (Vaal Triangle Campus). After the ethics clearance certificate was issued (Ethics Clearance Number: **ECONIT-ECON-2014-005**), lecturers at each of the three HEI campuses were contacted telephonically and asked whether they would allow the questionnaire to be distributed to their students during class time. The participating lecturers subsequently were shown the questionnaire accompanied by the ethics clearance certificate. Once permission was solicited, the questionnaires were hand-delivered to the participating academic staff members to be distributed to the students for voluntary completion. The structured questionnaire made it less complicated for the academic staff members to administer the distribution of the questionnaire. The relevant academic staff members were contacted after a two-week period, whereby arrangements were made for collecting the questionnaires. This approach was followed for all three participating HEI campuses. A discussion pertaining to the research instrument used in this study, namely the questionnaire, follows.

4.6.1 Questionnaire design

A questionnaire, otherwise known as a schedule, measuring instrument or interview form (Cant *et al.*, 2008:147), is the means by which a researcher gathers information from participants by presenting a set of specific questions with the primary purpose of achieving the study's research objectives (Babbie, 2011:255; Brace, 2008:4; Sciglimpaglia, 2010:106). Matthews and Ross (2010:206) explain that poor questionnaire design results in insufficient and/or inaccurate data collection. As such, various authors (Berndt & Petzer, 2011:186; Bryman & Bell, 2011:240; Malhotra & Birks, 2007:384; Struwig & Stead, 2010:91) accentuate the importance of explaining difficult terms within the questionnaire and presenting questions that are direct, short, easy to understand and unambiguous in a logical structured format. Iacobucci and Churchill (2010:221) add that a successful questionnaire necessitates a professional physical appearance, convenience, clear and concise instructions on how to complete the questionnaire as well as a well-written cover letter to achieve the highest possible response rate. Various authors (Bradley, 2010:189; Salkind, 2012:149; Zikmund & Babin, 2013:174) recommend accompanying a structured self-administered questionnaire with a cover letter, as it is not only the first component seen by the participant, but it contains important information, such as an introduction to the research study, relevant contact details and more importantly, it is influential in motivating participants to partake in the study.

The abovementioned recommendations guided the design of the questionnaire used for this study. Due care was taken to ensure that the language used in the questionnaire was simple and easily understandable by using words and constructing questions that were unambiguous, clear and concise. The questionnaire was accompanied by a cover letter explaining the aim of the research, providing the relevant contact details and requesting participation of the participants. The cover letter, together with the final questionnaire, is presented in Annexure A.

4.6.2 Questioning format

The questionnaire format refers to the sets of questions that are integrated and arranged into an instrument that is systematic, relevant and accurate (Czinkota & Ronkainen, 2010:258). The questionnaire employed in this study, was designed in accordance with achieving the empirical objectives of the research study as formulated in Chapter 1 (refer to Section 1.3.3). In accordance with the data required to achieve these objectives, this study adapted and used two previously validated scales, namely the Nor and Pearson (2008) Internet banking adoption scale, and the Zhou (2011) initial trust in mobile banking scale. The Nor and Pearson (2008) Internet banking adoption scale, comprises seven possible antecedents, namely attitudes towards mobile banking, ease of use, subjective norms, behavioural control, integrity, mobile banking usage behaviour and relative advantage. The seven constructs consisted of three items each. The Zhou (2011) initial trust in mobile banking scale was used to measure the system quality construct (nine items). The research instrument used in this study was adapted based on previous literature that relates to the various aspects of mobile banking, attitudes towards mobile banking and mobile banking behaviour, as reviewed in Chapters 2 and 3. Table 4.4 outlines the possible antecedents that were used to address each of the objectives formulated for this study.

Table 4.4 Antecedents used in answering the research objectives

Empirical research objective	Items
Empirically test the extent to which attitudes towards mobile banking influences Generation Y students' mobile banking usage behaviour.	C1-C3
Empirically test the extent to which perceived ease of use influences Generation Y students' attitudes towards mobile banking.	C4-C6

Table 4.4 Antecedents used in answering the research objectives (continued...)

Empirical research objective	Items
Empirically test the extent to which subjective norms influences Generation Y students' attitudes towards mobile banking.	C7-C9
Empirically test the extent to perceived behavioural control influences Generation Y students' attitudes towards mobile banking.	C10-C12
Empirically test the extent to which perceived integrity influences Generation Y students' attitudes towards mobile banking.	C13-C15
Determine Generation Y students' mobile banking usage behaviour .	C16-C18
Empirically test the extent to which perceived relative advantage influences Generation Y students' attitude towards mobile banking.	C19-C21
Empirically test the extent to which perceived system quality influences Generation Y students' attitudes towards mobile banking.	C22-C30
Empirically test the extent to which differences exist between male and female Generation Y students' attitudes towards mobile banking, perceived ease of use, subjective norms, perceived behavioural control, perceived integrity, mobile banking usage behaviour, perceived relative advantage and perceived system quality.	C1-C30
Empirically test the extent to which differences exist between different age groups of Generation Y students' attitudes towards mobile banking, perceived ease of use, subjective norms, perceived behavioural control, perceived integrity, mobile banking usage behaviour, perceived relative advantage and perceived system quality.	C1-C30

Antecedents are indicated in bold

Additionally, the questionnaire included sections designed to gather demographical data, such as province of origin, gender, ethnic group, language, and age to ensure representativeness of the sample. Background information, in view of mobile banking, was also contained in the questionnaire and included questions related to bank account ownership, mobile device ownership and mobile banking usage. Moreover, a cover letter (refer to Annexure A) was included delineating the nature and purpose of the study.

There are two types of question formats, namely unstructured (open-ended) and structured (closed-ended) (Pallant, 2010:7; Wilson & MacLean, 2011:259). With reference to open-ended questions that make up an unstructured questionnaire, the participant is provided with a space in which to respond with their own words, phrases or comments (Burns & Bush, 2010:300; Maree *et al.*, 2011:161) and are generally used in

exploratory research (Malhotra & Birks, 2007:381). Conversely, closed-ended questions that make up a structured questionnaire, stipulate the pre-determined set of responses from which the participant may choose (Cant *et al.*, 2008:151; Matthews & Ross, 2010:201) and are commonly employed for self-administered questionnaires (Bryman & Bell, 2011:232). There are three forms of structured questions, namely multiple-choice questions, dichotomous questions or scaled questions. Multiple-choice questions require the participant to choose one or more responses from a choice of answers (Malhotra, 2010:344; Zikmund & Babin, 2013:285). In contrast, dichotomous questions require the participant to choose one response from only two alternatives provided. Scaled questions require the participant to rate their degree of agreement or disagreement with a particular scale item, in order to capture the participants' attitudes and perceptions (Malhotra, 2010:344).

Additional to the questionnaire format is the decision whether to formulate disguised or undisguised questions. The aim of disguised questions is to prevent the participant from establishing an understanding of the purpose of the study, whereas undisguised questions makes the purpose of the study evident in the questions asked (Iacobucci & Churchill, 2010:604).

Once the researcher has determined the research design, procedures relating to measurement and scaling can follow (Cant *et al.*, 2008:132). Measurement involves the process of outlining the attributes of a phenomenon of interest by ascribing numerical values by following a reliable and valid approach (Kent, 2007:132; Zikmund & Babin, 2013:264). Scaling is deliberated as an addition to measurement (Kothari, 2004:76) and involves the development of a range upon which measured variables are ranked (Malhotra, 2010:282). Malhotra (2010:282) furthermore states that scales generally are used in survey research to measure the participants' attitudes, perceptions and/or feelings.

Various scaling techniques can be employed (refer to Figure 4.5). However, for the purpose of this study, the focus will be directed at the Likert scale as part of non-comparative itemised rating scales.

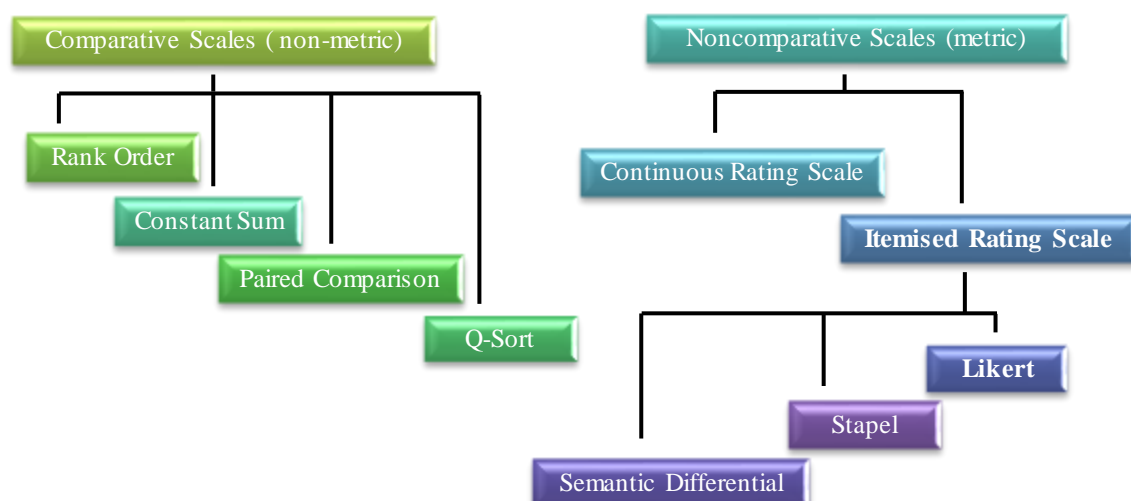


Figure 4.5 Scaling techniques (Malhotra, 2010:289)

The development and administration of itemised rating scales are relatively easy and typically require the participant to choose a category or rating that best describes their attitude or perception (Malhotra & Birks, 2007:348; McDaniel & Gates, 2013:223). The Likert scale, named after its developer, Rensis Likert, is a commonly used itemised rating scale and is popular for measuring a participant's attitude or perception (Maree *et al.*, 2011:167; Schiffman *et al.*, 2010:61). With this scale, participants indicate their degree of agreement or disagreement to a series of scale items (Bradley, 2010:511; Wilson & MacLean, 2011:262). Moreover, the Likert scale is highly reliable, allows for effective data collection (Malhotra, 2010:309), is simple to prepare and interpret and participants find it easy to use and complete, all of which increases the value of its use, especially for many quantitative studies (Schiffman *et al.*, 2010:61).

By taking into account the abovementioned techniques and effects, this study formulated structured-undisguised questions throughout the self-administered questionnaire. The questions that were used in obtaining demographical information (Section A of the questionnaire) from the participants comprised six multiple-choice questions where the participants had to indicate their university, province of origin (includes an open-ended question), year of study, ethnic group (includes an open-ended question), mother tongue language (includes an open-ended question) and age. In addition, there were three dichotomous questions where the participants had to indicate their country of origin (includes an open-ended question), registered full-time or part-time and gender. The

questions that were used in obtaining the participants mobile banking background information (Section B of the questionnaire) consist of one dichotomous question where the participant had to indicate whether they own a bank account. Furthermore, there were five multiple-choice questions pertaining to the participants' banking institution (includes an open-ended question), whether they own a mobile device, whether their mobile device can launch an Internet browser, whether they use mobile banking and for what banking activities they have used mobile banking (includes an open-ended question). The questions that relate directly to the topic of this study were organised in the form of a multi-item scale in Section C of the questionnaire of this study. A six-point Likert scale, ranging from strongly disagree (1) to strongly agree (6) was used to measure the participants' extent of agreement or disagreement with each specific item, which is in keeping with a similar study measuring the antecedents of attitudes towards and usage behaviour of mobile banking (Püschel *et al.*, 2010).

4.6.3 Questionnaire layout

Questionnaires should not be developed haphazardly; as such, McDaniel and Gates (2013:258) advise the logical positioning of each section of the questionnaire. Berndt and Petzer (2011:196) add that a questionnaire that is well organised and professionally arranged will result in a higher response rate as it eliminates confusion among the participants. Furthermore, Malhotra (2010:351) advises that questions pertaining to a specific topic should be asked before the commencement of a new topic. In addition, Maree *et al.* (2011:159) suggest including simple, clear and epigrammatic transitional phrases for every section in the questionnaire, assisting the participants to switch their train of thoughts when switching from section to section.

For the purpose of this study, the questionnaire (refer to Annexure A) included a cover letter explaining the aim of the research study, as well as assuring confidentiality. The questionnaire used in this study comprised three sections. Section A (A1-A9) was designated to gather the demographical data of the participants. In order to ascertain that the participants meet the necessary age requirement of the sample, one filter question was included in Section A. This requirement included the participants' age to ensure that the participants are part of the defined target population, namely 18 to 24 years of age. Section B (B1-B4) of the measuring instrument was employed to gather the participants' mobile banking background information in order to determine whether they meet the

mobile banking enabling conditions and to establish their banking activities. The third part of the questionnaire was designated to gather information that relates to the topic and objectives of the research. Therefore, Section C (C1-C30) of the measuring instrument measured the extent to which Generation Y students' perceived utility and trust in mobile banking influences their attitudes towards and usage behaviour of mobile banking, and comprised eight antecedents measuring attitudes towards mobile banking, perceived ease of use, subjective norms, perceived behavioural control, perceived integrity, mobile banking usage behaviour, perceived relative advantage and perceived system quality respectively. The antecedents of attitudes towards and usage behaviour of mobile banking scale employed in this study was adapted from the measuring instruments of Nor and Pearson (2008) and Zhou (2011).

The different items in the eight antecedents of attitudes towards and usage behaviour of mobile banking address the different research objectives, as formulated in the beginning of the study and set out in Section 1.3.3. Although these possible antecedents of attitudes towards and usage behaviour of mobile banking, as discussed in Chapter 3, were specifically adapted from Nor and Pearson (2008) and Zhou (2011), several other authors have also researched these antecedents. Table 4.5 outlines the eight possible antecedents of attitudes towards and usage behaviour of mobile banking.

Table 4.5 Antecedents of attitudes towards and usage behaviour of mobile banking

Antecedent	Author/s
Attitudes	Akturan and Tezcan (2012); Garg <i>et al.</i> (2014); Lin (2011); Maduku and Mpinganjira (2012); Nel <i>et al.</i> (2012); Nor and Pearson (2008)
Ease of use	Akturan and Tezcan (2012); Hanafizadeh <i>et al.</i> (2014); Ismail and Masinge (2012); Lin (2011); Maduku and Mpinganjira (2012); Njenga and Ndlovu (2013); Singh <i>et al.</i> (2010)
Subjective norms	Bhatti (2007); Brown <i>et al.</i> (2003); Gu <i>et al.</i> (2009); Maduku and Mpinganjira (2012); Martins <i>et al.</i> (2014); Nor and Pearson (2008); Singh <i>et al.</i> (2010)
Behavioural control	Bhatti (2007); Crabbe <i>et al.</i> (2009); Nor and Pearson (2008); Saibaba and Murthy (2013)

Table 4.5 Antecedents of attitudes towards and usage behaviour of mobile banking (continued...)

Antecedent	Author/s
Integrity	Delafrooz <i>et al.</i> (2013); Galadima <i>et al.</i> (2014); Lin (2011); Nor and Pearson (2008)
Usage behaviour	Akturan and Tezcan (2012); Dzugbenuku (2013); Garg <i>et al.</i> (2014); Ismail and Masinge (2012); Lin (2011); Martins <i>et al.</i> (2014); Talukder <i>et al.</i> (2014)
Relative advantage	Brown <i>et al.</i> (2003); Dzugbenuku (2013); Kim <i>et al.</i> (2009); Lin (2011); Nor and Pearson (2008); Wu and Wang (2005)
System quality	DeLone and McLean (2003); Gu <i>et al.</i> (2009); Kleijnen <i>et al.</i> (2004); Talukder <i>et al.</i> (2014); Yang <i>et al.</i> (2005); Zhou (2011)

A discussion relating to the methods used in the pre-testing of the questionnaire follows.

4.6.4 Pre-testing of the questionnaire

Before the questionnaire undergoes pilot testing, it is advised that a pre-test is undertaken (McDaniel & Gates, 2013:263; Silver *et al.*, 2013:149). Pre-testing involves trial runs of the research instrument with pertinent field researchers or actual participants to ensure that the instructions, questions and/or design of the questionnaire are understood in the manner that was intended (Zikmund & Babin, 2013:183). As such, researchers employ various methods of pretesting, such as debriefing pre-test and pilot testing, which provide support in identifying and eliminating potential problems (Cant *et al.*, 2008:157; Hair *et al.*, 2008:180). Debriefing, as part of the pre-test, involves asking the researchers or participants for feedback regarding their interpretation of each question, difficulties experienced and any other unclear pointers and concerns within the questionnaire (Berndt & Petzer, 2011:147; Malhotra, 2010:354). Following the completion of the debriefing pre-test, the questionnaire may be subject to pilot testing. Pilot testing involves a process whereby the research instrument is tested with an actual group of participants, which does not form part of the main study. This is an important method to identify possible questionnaire errors and to ensure that the survey instrument is reliable, before it is administered to the main sample (Bradley, 2010:211; Iacobucci & Churchill, 2010:223).

In this study, following questionnaire design, the questionnaire was subject to pre-testing using the debriefing and pilot testing approaches. The first phase involved the scrutinising of the questionnaire by two experienced researchers, in the relevant field, to identify any obvious mistakes and potential problems. The second phase employed the debriefing approach to permit the understanding of the questionnaire and to ensure that each questionnaire item was decoded in the intended manner. One experienced academic staff member and three students, who were representative of the target population, were chosen to participate in the debriefing pre-test. Owing to the multilingual context of the South African market, it is essential that first-language English speakers and second-language English speakers, understand the questionnaire. As such, two first-language English speaker participants and two second-language English speaker participants were selected to participate in the debriefing pre-test. These participants were excluded from the pilot and the main sample. The questionnaire took 10 minutes to complete, which is acceptable according to McDaniel and Gates (2013:262). The feedback received from the pre-testing was used to refine the items in the questionnaire.

After the adjustments and refinements, as suggested by the feedback received from the pre-test, the questionnaire was subject to pilot testing. For this study, the questionnaire was piloted on a convenience sample of 60 Generation Y students on a South African HEI campus that did not form part of the sampling frame, in order to ascertain its reliability and validity. The results of the pilot study are analysed and reported on in Chapter 5. The shortcomings identified after the pilot test were corrected before administering the questionnaire for the main survey.

This section has given insights to the pre-testing of the questionnaire. The next section describes how the questionnaire of the study was administered.

4.7 ADMINISTRATION OF THE QUESTIONNAIRE

The main survey was conducted between April 2015 and May 2015 using a self-administered questionnaire. Lecturers at each of the three HEI campuses were contacted telephonically and asked whether they would allow the questionnaire to be distributed to their students during class time. Prior to questionnaire distribution, the participating lecturers were shown the questionnaire accompanied by the ethics clearance certificate. After permission was solicited, the non-probability convenience sample of 450 full-time

Generation Y students was applied. The questionnaires were hand-delivered to the participating academic staff members to be distributed to the students for voluntary completion. The structured questionnaire made it less complicated for the academic staff members to administer the distribution of the questionnaire. The completion of the questionnaire, under the supervision of the relevant academic staff member, took 10 minutes, and as such one class period was sufficient. After two weeks, the completed questionnaires were collected from the relevant academic staff members. The preliminary data analysis conducted is explained in the section to follow.

4.8 PRELIMINARY DATA ANALYSIS

Once the necessary fieldwork has been completed, the raw data have to be processed and converted for interpretation and analysis (Malhotra, 2010:453; McDaniel & Gates, 2013:326; Zikmund & Babin, 2013:64). In data preparation, three steps are typically followed, namely data editing, coding and tabulation (Iacobucci & Churchill, 2010:350).

4.8.1 Step 1: Editing

Editing, the first step in data preparation, encompasses a process of determining whether the questionnaire is free of ambiguities, inconsistencies, omissions and response errors (Zikmund & Babin, 2013:64). Editing, therefore, will ensure that the collected data is accurate, precise and complete (Malhotra, 2010:453) and that it follows the research objectives, is uniformly entered, and organised in such a manner that it simplifies coding and tabulation (Shukla, 2008:95). To this end, McDaniel and Gates (2010:384) suggest performing the editing process on the questionnaire twice before data capturing.

The questionnaire in this study was subject to the editing process twice. Questionnaires completed by participants from other countries of origin than South Africa and those falling outside the specified age bracket (18-24 years of age), as well as part-time students, were discarded. Additionally, any questionnaire with completion of less than 90 percent was discarded.

4.8.2 Step 2: Coding

After questionnaire editing, the data may be subject to coding, which is the second step in data preparation. Coding is the process of assigning numerical codes to each individual

response for each specific question asked in the questionnaire (Iacobucci & Churchill, 2010:351; Shukla, 2008:96). Coding provides for the transformation of raw data into numeric symbols in order to position the responses of the participants into different categories or groupings (Iacobucci & Churchill, 2010:351; Remler & Van Ryzin, 2011:76; Shukla, 2008:96). This subsequently allows data to become more useful (Zikmund & Babin, 2013:64).

The questionnaire applicable to this study comprised three sections. Section A was designed to collect demographical data. Section B was allocated to collect mobile banking background information. Section C measured eight dimensions pertaining to the antecedents of attitudes towards and usage behaviour of mobile banking, namely attitudes towards mobile banking, perceived ease of use, subjective norms, perceived behavioural control, perceived integrity, mobile banking usage behaviour, perceived relative advantage and perceived system quality.

The data pertinent to this study was coded accordingly per construct as outlined in Table 4.6.

Table 4.6 Coding information

Data type	Code	Question number
Demographical data	A1-A9	Section A: Questions A1-A9
Mobile banking background information	B1-B4	Section B: Questions B1-B4
Antecedents of attitudes towards and usage behaviour of mobile banking	C1-C30	Section C: C1-C30
Attitudes towards mobile banking	C1-C3	Section C: Items C1-C3
Perceived ease of use	C4-C6	Section C: Items C4-C6
Subjective norms	C7-C9	Section C: Items C7-C9
Perceived behavioural control	C10-C12	Section C: Items C10-C12
Perceived integrity	C13-C15	Section C: Items C13-C15

Table 4.6 Coding information (continued...)

Data type	Code	Question number
Mobile banking usage behaviour	C16-C18	Section C: Items C16-C18
Perceived relative advantage	C19-C21	Section C: Items C19-C21
Perceived systemquality	C22-C30	Section C: Items C22-C30

The third and final step in data preparation, namely tabulation, is discussed in the subsequent section.

4.8.3 Step 3: Tabulation

Leedy and Ormrod (2010:145) argue that tabulating the number of responses of each characteristic found in the studied material is an important step for content analysis. Iacobucci and Churchill (2010:32) describe tabulation as the process of orderly presenting or arranging collected data in a systematic manner in one or more classification systems by counting the number of responses allocated for each of the questions. Tables can take on various forms, including univariate, bivariate and multivariate tabulation (Malhotra, 2010:467; Struwig & Stead, 2010:152). Univariate tabulation encompasses tabulating responses to one question at a time, whereas bivariate tabulation tabulates responses to two questions at the same time and multivariate tabulation tabulates responses to more than two questions simultaneously (Struwig & Stead, 2010:152). This study employed univariate tabulation, as data were calculated and tabulated individually.

Subsequent to the completion of the tabulation step, statistical analysis of the data set was conducted. The statistical methods applied on the empirical data set are discussed in the following section.

4.9 STATISTICAL ANALYSIS

The IBM SPSS Statistics (SPSS) and the Analysis of Moment Structures (AMOS) package, Version 22 were used to analyse the captured data. The statistical methods used on the empirical data sets include frequency analysis, factor analysis, reliability and validity analysis, descriptive statistical analysis, correlation analysis, multicollinearity analysis, structural equation modelling, two independent-samples t-test and analysis of

variance (ANOVA). The sections to follow describe these statistical methods applied on the empirical data sets.

4.9.1 Frequency analysis

Generally, the frequency distributions of the variables in the data set are assessed first in data analysis (Malhotra, 2010:484). According to Pallant (2010:55), only frequencies should be employed in the case of categorical variables, such as describing the demographics of a sample. Malhotra (2010:484) explains that frequency analysis involves counting the number of responses for every value of a variable. In addition, to provide more clarity to a research study report, statistical tables, graphs, pictures and the like can be employed. In this study, statistical tables, pie-, and bar charts are used to report on the frequency distribution.

4.9.2 Factor analysis

Factor analysis is described as a statistical method that reduces data that may aid an exploratory or confirmatory purpose (Pallant, 2010:81). Hair *et al.* (1995:368) explain that factor analysis allows for an examination of which variables are related and which variables are not. Moreover, factor analysis uncovers which variables relate to which factor. As such, factor analysis is valuable for evaluating correlations between variables. Therefore, as noted by Malhotra (2010:635), factor analysis scrutinises the entire set of interdependent relationships amongst variables.

Exploratory factor analysis (EFA) is defined as the method of recognising the underlying constructs or factors that explicate the associations between a set of variables (Malhotra, 2010:739). Prior to the undertaking of EFA, Pallant (2010:182-183) advises a suitable sample size; that is, the larger the sample size, the better. Hair *et al.* (2010:102) argue that as a rule of thumb, a five to one ratio is suggested, which involves five observations for every item to be factor analysed. Pallant (2010:183) points out that Bartlett's test of sphericity and the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy may be employed to evaluate the factorability of the data. Pallant (2010:183) asserts that when the KMO calculates a value greater than 0.6 and the Bartlett's test of sphericity is significant, then it typically indicates sample adequacy.

There are two general methods in factor analysis, namely common factor analysis and principle components factor analysis. In common factor analysis, the factors are estimated based only on the common variance. As such, the most popular factor analysis method is principle components analysis. In principal components analysis, the number of variables is reduced in order to determine the minimum number of factors that will account for maximum variance in the data. Hence, principal components analysis considers the total variance in the data (Malhotra, 2010:643). Pallant (2007:181) indicates that when principal components analysis is employed, all communalities are initially assumed to be 1.0. Therefore, the total variance of the variables may be considered by the factors or components, which denotes a no error variance. Consequently, it is important that researchers decide on the optimal number of factors that may be extracted to illustrate effectively the interrelations between the variable sets.

Malhotra (2010:643) suggests three methods that may be used to determine the optimal factor solution. These comprise determining the number of factors consistent with former knowledge of the anticipated number of variables, retaining all components with an eigenvalue greater than 1.0 or determining the number of factors to retain using the scree plot method. This method entails plotting the number of dimensions on the x-axis and the corresponding eigenvalues on the y-axis.

Following factor extraction, difficulty in interpreting and naming the factors grounded on their factor loadings may be experienced (Pallant, 2010:185). Pallant (2010:185), therefore, advises factor rotation to eliminate this obstacle. Pallant (2010:185) identifies two key categories of rotation, namely orthogonal rotation, which comprise Varimax, Quartimax and Equamax rotation methods, and oblique rotation, which comprise Direct Oblimin and Promax rotation methods. Malhotra (2010:645) argues that the Varimax rotation, as part of orthogonal rotation methods, is a general approach used for factor rotation.

This study made use of exploratory principle components analysis to determine the underlying factors of the measurement scale. A discussion pertaining to reliability analysis follows.

4.9.3 Reliability analysis

In research, a measuring instrument is deemed reliable when consistent, if not identical, results are produced in repeated measurements (Burns & Bush, 2010:319; Malhotra, 2010:318; Schiffman *et al.*, 2010:58). Therefore, reliability relates to the consistency of a measure (Remler & Van Ryzin, 2011:118; Shukla, 2008:83). Various techniques can be used to assess reliability, namely test-retest, alternative forms and internal-consistency (Malhotra, 2010:318; Maree *et al.*, 2011:215; Remler & Van Ryzin, 2011:121).

However, in the case of multi-item summated rating scales, as those used in this study, internal-consistency reliability is undertaken to determine the reliability of a scale (Malhotra, 2010:319). There are two measurements of internal-consistency reliability, namely split-half reliability and the Cronbach alpha coefficient.

The split-half reliability measure divides the multi-item scale measurement into two equal groups randomly, or by means of even or odd numbered items, and subsequently compares the resulting half scores by way of a correlation coefficient (Malhotra, 2010:319; Remler & Van Ryzin, 2011:122). The Cronbach alpha, however, is recognised as the most popular technique of assessing internal reliability (Pallant, 2010:6; Shukla, 2008:84). The Cronbach alpha coefficient is the average or mean of all possible split-half coefficients, resulting from the different ways of splitting the scale items (Malhotra, 2010:319; Zikmund & Babin, 2013:257). The value of the Cronbach alpha ranges from zero, indicating no correlation between the scale items, to one, indicating perfect correlation of the scale items (Malhotra, 2010:319). A Cronbach alpha value of 0.60 or above is recommended (Malhotra, 2010:319), whereas a value of 0.5 denotes acceptable reliability and a value less than 0.5 generally points towards inadequate internal-consistency reliability (Nunally, 1978:245; Peterson, 1994:382).

The scales employed in this study, as mentioned earlier in this chapter, were adapted from previously published research, and each computed a Cronbach alpha above the recommended value of 0.60, signifying that these scales are reliable and appropriate for this study (Nor & Pearson, 2008; Zhou, 2011). Pallant (2007:6) admonishes that the Cronbach alpha tends to decrease with a decrease in the number of scale items of a particular construct and vice versa. Pallant (2010:97) concurs and adds that constructs with fewer than 10 items may produce low Cronbach alpha values. As an alternative

indication of reliability, Spiliotopoulou (2009:12) proposes reporting on the average inter-item correlation value, which should range between 0.15 and 0.50.

Struwig and Stead (2010:130) stress that the validity of the scales is dependent on the scale's reliability, in view of the fact that if the reliability value is poor, a poor validity value will also be yielded. Therefore, as explained by Leedy and Ormrod (2010:29), reliability is an essential, nonetheless an insufficient condition for validity.

4.9.4 Validity analysis

The validity of a scale refers to the degree to which it actually measures what it is intended to measure (Pallant, 2010:7; Schiffman *et al.*, 2010:58; Wilson & MacLean, 2011:73). Malhotra (2010:320) adds that validity indicates the extent to which variations in observed scale scores reflect actual variations between objects on the characteristics being investigated and measured. Moreover, a scale that contains no measurement error signifies perfect validity. Validity takes on various forms, including content validity, criterion validity and construct validity (Blumberg *et al.*, 2008:449; Salkind, 2012:124; Zikmund & Babin, 2013:258).

Content validity is a subjective measure that indicates the degree to which the content of the scale represents the theoretical construct that is set out to be measured (Blumberg *et al.*, 2008:449; Maree *et al.*, 2011:217; Pallant, 2010:7; Shukla, 2008:82). This is done primarily according to the researcher's discretion (Pallant, 2010:7; Shukla, 2008:82). In this study, two experienced academics in the particular field evaluated the content validity of the instrument. Criterion validity, contrariwise, evaluates whether the computed scale scores relate to a specified and meaningful measurable criterion (Malhotra, 2010:320; Salkind, 2012:125; Shukla, 2008:82). Construct validity then assesses the construct or characteristic the measuring instrument is actually measuring within a theoretical context (Cant *et al.*, 2008:236; Malhotra, 2010:320). In addition, Zikmund and Babin (2013:259) indicate that construct validity comprises convergent, discriminant and nomological validity.

Malhotra (2010:321) as well as Bryman and Bell (2011:160) assert that convergent validity is the extent to which two or more tests correlate with other measures of an identical construct. Discriminant validity, conversely, as explained by Salkind (2012:127), refers to the degree to which constructs measuring dissimilar theoretical

dimensions in a measuring instrument disassociate with each other. Clark and Watson (1995:316) accentuate that an average inter-item correlation value of between 0.15 and 0.50 is necessary for convergent and discriminant validity and as such, was applicable in this study to assess construct validity (refer to Section 4.9.8 for a more detailed discussion). Remler and Van Ryzin (2011:113) postulate that nomological validity measures the level of association between measures of dissimilar but interrelated constructs, in a theoretically predicted manner. Following the measurement of the scales' reliability and validity, descriptive analysis was employed to recapitulate the captured data.

4.9.5 Descriptive statistical analysis

Descriptive analysis is related to frequency analysis and is typically conducted to summarise and determine patterns in the collected data (Kolb, 2008:251; Malhotra, 2010:486). Descriptive statistical methods are employed to convert large amounts of data into rudimentary characteristics for easier elucidation (Zikmund & Babin, 2013:364). Furthermore, descriptive statistics make a valuable contribution to answering and achieving certain research objectives and questions (Shukla, 2008:99). The three most common descriptive statistics, as part of descriptive analysis, were used in this study, including measures of location (means), measures of variability (standard deviations), and measures of shape (skewness and kurtosis).

4.9.5.1 Measures of location

Measures of location, often denoted as measures of central tendency, is the term used to determine the central point of a distribution (Leedy & Ormrod, 2010:265). Measures of location encompass three statistical measures, including the arithmetic mean, median and mode (Kent, 2007:310; Malhotra, 2010:486), of which the arithmetic mean, the measure of location chosen for this study, is the most common and widely applied measure of location (Malhotra, 2010:486; Maree *et al.*, 2011:187). The arithmetic mean is computed by summing all variables in a data series and subsequently dividing the resultant sum by the number of variables (McDaniel & Gates, 2013:343; Wilson & MacLean, 2011:286).

4.9.5.2 Measures of variability

Measures of variability, often signified as measures of dispersion, are statistical ratios, which assess the level of divergence of the observations from the mean in a data set (Salkind, 2012:166; Zikmund & Babin, 2013:340). Four variability measures, including the range, interquartile range, the variance and the standard deviation (Leedy & Ormrod, 2010:271), are regularly employed. For the purpose of this study, the standard deviation, which is defined as the square root of the variance of a distribution (Malhotra, 2010:487; Zikmund & Babin, 2013:343), was used to measure variability.

4.9.5.3 Measures of shape

Measures of shape involve measures of skewness and kurtosis, which aids in comprehending and establishing the nature and normality of a distribution (Malhotra, 2010:488). Skewness indicates the degree of deviation from the mean or asymmetry (Shukla, 2008:101; Struwig & Stead, 2010:159). With a zero skewness score, the data are normally distributed, whereas a skewness score other than zero denotes data that are skewed either to the left (positive distribution) or to the right (negative distribution) (Pallant, 2010:57). Figure 4.6 depicts the various distributions.

1 - Symmetrical distribution

2 - Positive skewness

3 - Negative skewness

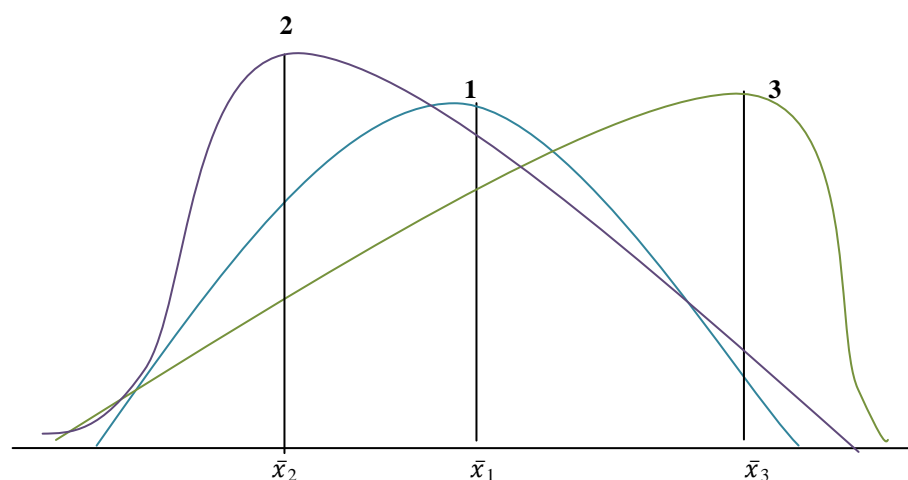


Figure 4.6 Skewness (Maree *et al.*, 2011:190)

Kurtosis measures the degree to which a distribution is peaked or flat (Malhotra, 2010:488; Pallant, 2010:57). Three kurtosis classifications, including mesokurtic (normal distribution), leptokurtic (more peaked distribution than that of a normal distribution) and platykurtic (unusually flat distribution) (Shukla, 2008:101; Struwig & Stead, 2010:159) can be identified. Figure 4.7 illustrates these three classifications.

- 1 - Mesokurtic
- 2 - Leptokurtic
- 3 - Platykurtic

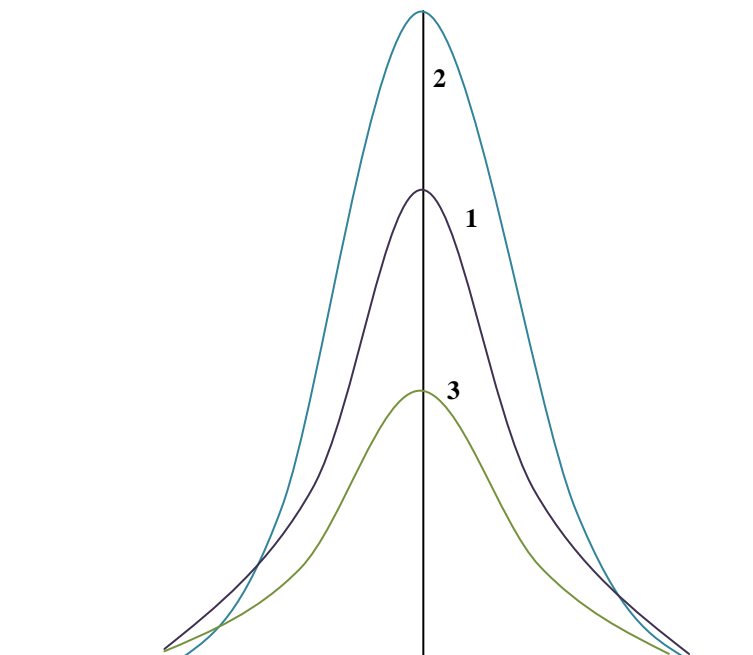


Figure 4.7 Kurtosis (Maree *et al.*, 2011:190)

A discussion pertaining to correlation analysis follows this section.

4.9.6 Correlation analysis

Correlation analysis first attempts to determine whether associations exist between two variables (Leedy & Ormrod, 2010:273; Malhotra, 2010:562) and then measures the strength and direction of the relationship (Remler & Van Ryzin, 2011:261). Correlation can be measured by employing various measures, including Spearman's rho, Point-biserial correlation coefficient or the Phi coefficient (Salkind, 2012:204; Struwig and Stead, 2010:140). However, Pearson's product-moment correlation coefficient, symbolised r , is commonly used for determining the strength of the relationship between two metric variables and ranges from -1 (perfect negative correlation) to +1 (perfect positive correlation) (Pallant, 2010:128). No relationship between two variables exists

when r equals zero (Berndt & Petzer, 2011:239; McDaniel & Gates, 2013:367; Pallant, 2010:134).

According to Pallant (2010:134), the strength of the relationship between variables is determined by the value of the correlation coefficient, whether positive or negative. A small relationship between the variables is represented by a value between 0.10 and 0.29, a medium relationship by a value between 0.30 and 0.49 and a strong relationship is represented by a value between 0.5 and 1.0.

This study constructed a matrix of construct correlations by employing Pearson's correlation coefficients in order to assess the nomological validity of the proposed measurement model in structural equation modelling (Hair *et al.*, 2010:710). In addition, these correlation coefficients were calculated to determine possible multicollinearity among the independent variables, namely perceived ease of use, subjective norms, perceived behavioural control, perceived integrity, perceived relative advantage and perceived system quality, which could jeopardise the interpretation of these variables' influence on the dependent variables, namely attitudes towards mobile banking and mobile banking usage behaviour. Multicollinearity is explained in the next section.

4.9.7 Multicollinearity

Multicollinearity is of particular importance when multivariate statistical analysis is applied to a data set (Hair *et al.*, 2010:201). Malhotra (2010:586) explains multicollinearity as the state where the inter-item correlation between the independent variables is exceptionally high, consequently making it challenging to evaluate the relative strength of a predictor variable in clarifying the variation in a dependent variable (Malhotra, 2010:586).

A common measure of multicollinearity includes the tolerance test, which involves a regression analysis to provide each independent variable a chance to act as the dependent variable with respect to the other predictor variables. The calculated coefficients of determination (R^2) are subtracted subsequently from one to arrive at the tolerance values. A smaller degree of multicollinearity is represented by high tolerance values (Hair *et al.*, 2010:201). Tabachnick and Fidell (2014:138) add that a data set is free from multicollinearity when the condition index values are smaller than 30. Moreover, the variance proportions for every factor may mostly only have one value greater than 0.5.

Owing to this study including a multivariate method in the data analysis, a tolerance test was performed for the purpose of checking for multicollinearity. Structural equation modelling is discussed in the succeeding section.

4.9.8 Structural equation modelling

Structural equation modelling (SEM) is described as a multivariate data analysis method (Hair *et al.*, 2010:19) used to determine complex relationships between observed (measured) and unobserved (latent) variables as well as relationships between two or more latent variables (Anglim, 2007:1). According to Bowen and Guo (2011:7), the purpose of SEM is to validate research hypotheses in terms of the observed means, variances and covariance of the set of variables. Ullman (2006:35) explains that SEM estimates and investigates the relationships between one or more independent variables and one or more dependent variables. As such, Hair *et al.* (2010:629) highlight that SEM is a statistical method serving as an extension to other multivariate methods such as factor analysis and multiple regressions.

The size of the sample makes for important consideration in any multivariate statistical technique, including SEM (Hair *et al.*, 1998:604). Because SEM is considered as a large sample technique, a larger sample size is necessary to undertake the data analysis (Babin & Svensson, 2012:329; Kline, 2011:11). For each parameter to be estimated, Reisinger and Mavondo (2007:52) suggest at least five participants, Kline (2011:12) propose ten participants and Hair *et al.* (2010:661) recommend that 15 participants should be observed. A sample size of 200 and more is considered adequate for providing sufficient power for data analysis (Barrett, 2007:820; Kline, 2011:12; Reisinger & Mavondo, 2007:52).

According to Byrne (2010:3), with SEM, the causal processes under examination are signified by a series of regression equations, pictorially modelling the structural relationships, allowing for the provision of a clear visual conceptualisation of a particular theory. Iacobucci and Churchill (2010:538) opine that the main advantage of employing SEM is that the factors of the model are fit simultaneously and all the interrelationships, whether it is direct or indirect paths, are tested at once. This is referred to as path analysis.

A SEM model can only be estimated when all the relationships have been specified, and as such, any SEM model should be grounded on an underlying theory (Bowen & Guo, 2011:7; Malhotra, 2010:726). Therefore, SEM encompasses specifying the measurement model to undertake confirmatory factor analysis and subsequently subjecting the structural model to path analysis (Zappa, 2012). The measurement model depicts how the observed or measured variables denote constructs, whereas the structural model signifies how the constructs are related to each other, generally with multiple dependence relationships (Malhotra, 2010:726).

According to Malhotra (2010:731), goodness-of-fit is utilised to explain how well the specified model reproduces the covariance matrix among the indicator items. In other words, how similar is the estimated covariance of the indicator variables to the observed covariance in the sample data. Furthermore, the closer the values of the two matrices are to each other, the better the model is said to fit. Several fit indices can be assessed. Reisinger and Mavondo (2007:57) note that typically, the chi-square is a null hypothesis significance test carried out to determine whether the model under consideration fits the data. The model is accepted when the chi-square value is low and non-significant. However, Hair *et al.* (2008:666-667) argue that the chi-square is notoriously sensitive and unreliable to the effects of larger sample sizes. In an attempt to overcome the limitations associated with the chi-square statistic, various alternative goodness-of-fit indices have been developed to provide a more pragmatic approach to determining model fit. Malhotra (2010:731) indicates that these model fit indices differ in terms of whether they are testing absolute fit, incremental fit, or parsimonious fit.

Absolute fit indices explain how well a hypothesised model correspond with the empirical data of the study and include goodness-of-fit measures, such as the goodness-of-fit index (GFI), the adjusted goodness-of-fit index (AGFI), and badness-of-fit measures, which comprise the chi-square test, the standardised root mean residuals (SRMR) and the root mean square error of approximation (RMSEA). Hair *et al.* (2010:667) further state that a GFI and AGFI value larger than 0.90 signifies good model fit, while greater than 0.95 is suggested. For the SRMR and the RMSEA, Byrne (2010:77) suggests a value of 0.05 or less and a value of 0.08 or lower respectively.

The incremental fit measures respond to how well the specified model is performing when compared to the null model in which the variables are assumed to be uncorrelated

(Miles & Shevlin, 2007:870). Incremental fit indices include the incremental fit index (IFI), the comparative fit index (CFI), the normed fit index (NFI) and the Tucker-Lewis index (TLI) (Malhotra, 2010:733). For these indices, values of 0.90 and higher denote an acceptable model fit (Byrne, 2010:80). Parsimonious fit measures evaluates whether a model fit has been achieved. The Akaike information criterion (AIC) and Bozdogan's consistent version of the AIC (CAIC) is a form of model fit measure that compares two or more models (Byrne, 2010:82) These measures, however, are not measures of significance and are primarily used to choose between models (Hair *et al.*, 1995:620).

In SEM, it is of great significance to determine the reliability and validity of a measurement model. Reliability is tested by examining composite reliability (CR), which is defined by Malhotra (2010:733) as the total number of actual score variance with respect to the total score variance and is calculated as follows:

$$[(F_{I1}+F_{I2}+F_{I3}+...) ^2 / (F_{I1}+F_{I2}+F_{I3}+...) ^2 + (err_1+err_2+err_3+...)]$$

Lee *et al.* (2005:1100) and Malhotra (2010:734) posit that the measurement model is indicative of reliability when all the constructs produce a critical level value of 0.70 and above.

In SEM, the validity of the measurement model is derived by computing the average variance extracted (AVE) using the following formula:

$$[(F_{I1}^2+F_{I2}^2+F_{I3}^2+...) / (F_{I1}^2+F_{I2}^2+F_{I3}^2+...) + (err_1+err_2+err_3+...)]$$

The AVE tests the overall variance in the indicators, accounted for by the latent construct. Convergent validity arguably is achieved when all the constructs produce a critical level value of 0.50 or higher for the AVE (Hair *et al.*, 2010:688, 709). Moreover, discriminant validity is believed to be achieved when the square root of the AVE is greater than the correlation coefficients (Malhotra, 2010:741).

For the purpose of this study, the chi-square, SRMR, RMSEA, IFI, CFI, and the TLI indices were used to measure the model fit.

4.9.9 Two independent-samples t-test

A t-test is a statistical analysis technique used for testing differences between means of the population under study (Malhotra, 2010:504; Pallant, 2010:105; Silver *et al.*,

2013:211). Three main types of t-tests are known, namely the one sample t-test, the two independent-samples t-test and the paired samples t-test (Field, 2011:256; Zikmund & Babin, 2013:390-394). The two independent-samples t-test attempts to uncover possible variations between mean scores that have been sampled from two independent groups or population samples (Pallant, 2010:239; Zikmund & Babin, 2013:390). This study employed the two independent-samples t-test to determine whether there were any statistically significant differences between the antecedents of male and female Generation Y students' attitudes towards and usage behaviour of mobile banking.

4.9.10 Cohen's D-statistic

Whereas a t-test is utilised to assess whether there is a statistically significant difference between means, the Cohen's D-statistic is employed to evaluate whether that difference is of practical significance (Silver *et al.*, 2013:211). The Cohen D-statistic estimates the strength of different effect sizes to determine practical significance (Pallant, 2010:280). Pallant (2010:210) suggests the following guidelines for interpreting the size of the effect:

- $0.20 \leq d < 0.50$: signifies a small, practically non-significant effect;
- $0.50 \leq d < 0.80$: signifies a medium-sized effect moving towards practical significance; and
- $0.80 \leq d$: signifies is a large effect that has reached practical significance.

4.9.11 One-way analysis of variance (ANOVA)

Analysis of variance, commonly known as ANOVA, is a statistical analysis technique used for testing differences between mean scores for more than two independent samples (Malhotra, 2010:531). ANOVA typically uses two important values, namely the F-value, which is the test statistics, and the p-value to identify whether significant differences exist (Remler & Van Ryzin, 2011:307). There are two main types of ANOVA, namely one-way ANOVA, where only one factor is involved, and two-way ANOVA, where two or more factors are involved (Malhotra, 2010:531). This study made use of one-way ANOVA in order to assess whether there were any statistically significant age differences in terms of Generation Y students' perceived utility and trust in mobile banking.

4.10 CONCLUSION

Chapter 4 explained the research methodology followed in conducting the empirical portion of the study. Given the nature of this study, a descriptive research design, utilising a single cross-sectional sample, was followed. The sampling frame of the study comprised the 26 public registered HEIs in South Africa. This sampling frame was narrowed down by means of judgement sampling to include one traditional university campus, one comprehensive university campus and one university of technology campus, located in the Gauteng province. Thereafter, a non-probability convenience sample of 450 full-time students (150 students per campus) was taken.

The required data were collected by employing a self-administered questionnaire that comprised validated scales from previously published research, and the participants' responses were measured on a six-point Likert scale. In addition, the questionnaire included sections designated to collect demographical data, as well as background information, in view of mobile banking.

The captured data was analysed using IBM SPSS and AMOS, Version 22. The statistical methods applied on the empirical data sets included frequencies, factor analysis, reliability and validity analysis, descriptive statistics, correlation analysis, multicollinearity analysis and structural equation modelling, as well as one two independent-samples t-test and one-way ANOVA.

In Chapter 5, the research findings emanating from the statistical analysis of the captured data of both the pilot study and the main study are presented and discussed. The hypothesised relationships within the proposed model of factors that influence Generation Y students' attitudes towards and usage behaviour of mobile banking are tested in Chapter 5.

CHAPTER 5

ANALYSIS AND INTERPRETATION OF EMPIRICAL FINDINGS

“You can only predict things after they’ve happened.”

— Eugene Ionesco

5.1 INTRODUCTION

In Chapter 4, the research methodology applied to conduct this study was described. Against the background of Chapter 4, this chapter reports on the empirical findings of the study. The primary purpose of this chapter is to address the nine empirical objectives set out in Chapter 1 under Section 1.3.3.

In this chapter, the results emanating from the pilot test are reported on in Section 5.2 and an explanation of the data collection process in Section 5.3. Section 5.4 provides a discussion of the preliminary data analysis that entailed the coding and the tabulation of the data. Section 5.5 presents a description of the sample and a summary of their mobile banking background information. Subsequently, in Section 5.6, the study explains the exploratory principal components analysis conducted together with the internal-consistency reliability of the factors extracted, followed by Section 5.7, which outlines the descriptive statistics. Section 5.8 and Section 5.9 delineate the correlation analysis conducted and multicollinearity analysis undertaken respectively. Section 5.10 comprises the formulation and testing of the study’s hypotheses.

In Section 5.11, the focus is on structural equation modelling. In this section, the results of the empirical testing of the extent to which perceived utility (as measured by relative advantage and ease of use), trust (as measured by integrity and system quality), perceived behavioural control and subjective norms influence South African Generation Y students’ attitudes towards and usage behaviour of mobile banking; that is, the antecedents of South African Generation Y students’ attitudes towards and usage behaviour of mobile banking as proposed in Chapter 3 (refer to Section 3.5). The results of the two independent-samples t-test and one-way analysis of variance (ANOVA) are discussed in Section 5.12 and Section 5.13 respectively.

The data analysis was undertaken using IBM SPSS Statistics and AMOS, Version 22, and was conducted in two stages. The first stage comprised analysing the results of the pilot testing of the questionnaire, and the second stage involved a data analysis of the main survey's findings. The section to follow outlines the data analysis procedures involved in the pilot testing stage.

5.2 PILOT TEST RESULTS

Subsequent to an initial pre-testing of the questionnaire, undertaken to determine the questionnaire's face- and content validity, the questionnaire was subject to pilot testing on a convenience sample of 60 Generation Y students enrolled at a South African HEI campus that did not form part of the main study's sampling frame. This pilot test was carried out in order to ascertain the internal-consistency reliability of the scale within the questionnaire before carrying out the main survey. After data cleaning, however, the pilot test delivered 58 viable questionnaires.

For the purpose of this study, both the Cronbach alpha coefficient and the average inter-item correlation coefficient were used, as suggested by Spiliotopoulou (2009:12), to assess internal-consistency reliability and convergent and discriminant validity of the antecedents of attitudes towards and usage behaviour of mobile banking scale. The six-point Likert scale returned a Cronbach alpha value of 0.903 for the entire scale, which is above the recommended level of 0.6 (Malhotra, 2010:319). This is indicative of internal consistency reliability (Spiliotopoulou, 2009:12). An average inter-item correlation value of 0.254 was recorded for the overall scale, which is within the recommended range of 0.15 and 0.50 (Clark & Watson, 1995:316; Spiliotopoulou, 2009:12), thereby indicating both convergent and discriminant validity.

Given these statistics and due to the scale being adapted from previous scales, which have previously proven to be reliable and robust measuring instruments in the studies of Nor and Pearson (2008) and Zhou (2011), none of the items included in the scale were removed. Following the pre-testing and pilot testing, the 30-scaled items were used to prepare the main survey questionnaire (refer to Annexure A), which was administered to a larger sample size.

5.3 DATA GATHERING PROCESS

In keeping with the sampling plan set out in Chapter 4, the data required for this study were collected from 450 full-time South African Generation Y students enrolled at the three South African HEI campuses. A self-administered questionnaire was utilised to collect the required data.

As stated in Section 4.6, permission was solicited from the lecturers at each of the three campuses to allow for the distribution of the questionnaire to their students during lectures. Prior to questionnaire distribution, the participating lecturers were shown the questionnaire accompanied by the ethics clearance certificate. Following the drop-off survey approach, the self-administered questionnaires were then hand-delivered to those lecturers from whom permission was obtained, and subsequently distributed to students for completion during class time. In accordance with the specified sample size, 450 questionnaires were distributed – 150 per campus. The completed questionnaires were collected after two weeks from the participating lecturers at the agreed upon time. Students were informed that the questionnaire is to be completed on a voluntary basis and that all information provided, including the name of their HEI where they were registered, would remain confidential.

5.4 PRELIMINARY DATA ANALYSIS

Before analysing the data, Kolb (2008:199) recommends that a preliminary data analysis be undertaken on a data set. According to Iacobucci and Churchill (2010:350), preliminary data analysis involves data cleaning, coding and tabulation. An overview of the coding, data cleaning and the tabulation employed on the collected data set of this study follows.

5.4.1 Coding

The questionnaire used in this study contained three sections, namely Section A, which requested demographical data from the participants, Section B, which requested mobile banking background information and Section C, which measured the participants' attitudes towards and usage behaviour of mobile banking, together with the antecedents thereof. Table 5.1 delineates the item codes and assigned values.

Table 5.1 Coding information

Section A: Demographical data			
Question	Code	Variable	Value assigned to responses
Question 1	A1	Name of institution	Traditional university (1); Comprehensive university (2); University of technology (3)
Question 2	A2	Country of origin	South Africa (1); Other (2)
Question 3	A3	Province of origin	Eastern Cape (1); Free state (2); Gauteng (3); KwaZulu-Natal (4); Limpopo (5); Mpumalanga (6); Northern Cape (7); North West (8); Western Cape (9); Other (10)
Question 4	A4	Registered	Full-time (1); Part-time (2)
Question 5	A5	Current year of study	1 st (1); 2 nd (2); 3 rd (3); 4 th (4) Post graduate (5)
Question 6	A6	Gender	Male (1); Female (2)
Question 7	A7	Ethnic group	Black/African (1); Coloured (2); Indian/Asian (3); White (4); Other (5)
Question 8	A8	Mother tongue language	Afrikaans (1); English (2); IsiNdebele (3); IsiXhosa (4); IsiZulu (5); Sepedi (6); Sesotho (7); Setswana (8); SiSwati (9); Tshivenda (10); Xitsonga (11); Other (12)
Question 9	A9	Age at last birthday	<18 (1); 18 (2); 19 (3); 20 (4); 21 (5); 22 (6); 23 (7); 24 (8); 25 (9); >25 (10)
Section B: Mobile banking background information			
Question	Code	Variable	Value assigned to responses
Question 1	B1	Have a bank account	Yes (1); No (2)
	B1A	Name of banking institution	ABSA (1); African Bank (2); Capitec (3); FNB (4); Nedbank (5); Standard Bank (6); Other (7)
Question 2	B2	Type of mobile device	iPad/Tablet (1); Smartphone (2); Feature phone/Normal mobile phone (3); Personal digital assistant (PDA)/Handheld PC (4); None (5)

Table 5.1 Coding information (continued...)

Section B: Mobile banking background information			
Question	Code	Variable	Value assigned to responses
Question 3	B3	Mobile phone has an Internet browser	Yes (1); No (2); Not sure (3)
Question 4	B4	Use mobile banking	Yes (1); No, but interested (2); No, not interested (3)
	B4A	Have used mobile banking for the following activities	Buy airtime (1); Buy electricity (2); Buy data bundles (3); Check account balances (4); Receive statements (5); Pay accounts (6); Withdraw cash (7); Transfer funds to relatives/friends (8); Save money (9); Manage accounts (10); Purchase groceries at a supermarket (11); Other (12)
Section C: Antecedents of attitudes towards and usage behaviour of mobile banking			
Item	Code	Construct measured	Value assigned to responses
Item 1 - 3	C1 - C3	Attitudes towards mobile banking	Strongly disagree (1); Disagree (2); Slightly disagree (3); Slightly agree (4); Agree (5) Strongly agree (6)
Item 4 - 6	C4 - C6	Perceived ease of use	
Item 7 - 9	C7 - C9	Subjective norms	
Item 10 - 12	C10 - C12	Perceived behavioural control	
Item 13 - 15	C13 - C15	Perceived integrity	
Item 16 - 18	C16 - C18	Mobile banking usage behaviour	
Item 19 - 21	C19 - C21	Perceived relative advantage	
Item 22 - 30	C22 - C30	Perceived systemquality	

The following section describes the data cleaning that was conducted on the data set.

5.4.2 Data cleaning

In this study, data cleaning was conducted with the primary purpose of discarding questionnaires completed by participants falling outside of the defined target population, as well as questionnaires that had missing values greater than 10 percent. Of the 450 questionnaires administered, 393 completed questionnaires were returned, resulting in a response rate of 87 percent. The data cleaning resulted in 334 complete and usable questionnaires, resulting in an actual response rate of 74 percent. In the case of questionnaires with missing values of less than 10 percent, the mode value was used to substitute the missing values for the scaled-response items.

The following section discusses the tabulation conducted.

5.4.3 Tabulation of variables

Concerning the tabulation of the data, Table 5.2 reports on frequencies of the scaled responses in the measuring instrument.

Table 5.2 Frequency table of responses

Code	Scale item	Strongly disagree	Disagree	Slightly disagree	Slightly agree	Agree	Strongly agree
		1	2	3	4	5	6
Antecedent 1: Attitudes towards mobile banking							
C1	Using mobile banking is a good idea.	9	4	13	52	127	129
C2	Using mobile banking is an appealing idea.	5	5	10	64	149	101
C3	My attitude towards mobile banking is favourable.	2	14	14	71	143	90
Antecedent 2: Perceived ease of use							
C4	It is easy to learn how to use mobile banking.	8	6	28	70	110	112
C5	Becoming skilful at using mobile banking is easy.	15	16	24	91	112	76

Table 5.2 Frequency table of responses (continued...)

Code	Scale item	Strongly disagree	Disagree	Slightly disagree	Slightly agree	Agree	Strongly agree
		1	2	3	4	5	6
Antecedent 2: Perceived ease of use							
C6	It is easy to remember how to use mobile banking.	7	12	15	73	121	106
Antecedent 3: Subjective norms							
C7	People who are important to me think I should use mobile banking.	30	28	41	73	96	66
C8	People whose opinions I value think I should use mobile banking.	20	30	34	102	89	59
C9	People who influence my decisions think that I should use mobile banking.	25	38	40	84	96	51
Antecedent 4: Perceived behavioural control							
C10	I believe I could easily use mobile banking to conduct my banking activities.	12	11	16	57	123	115
C11	I believe using mobile banking is entirely within my control.	13	13	30	59	118	101
C12	I believe I have everything I need to use mobile banking.	18	15	26	64	101	110
Antecedent 5: Perceived integrity							
C13	Banks that provide mobile banking services are honest with their customers.	20	20	61	128	74	31
C14	Banks that provide mobile banking services keep promises they make.	20	28	60	129	68	29
C15	Banks that provide mobile banking services act ethically in dealing with customers.	13	21	50	129	87	34

Table 5.2 Frequency table of responses (continued...)

Code	Scale item	Strongly disagree	Disagree	Slightly disagree	Slightly agree	Agree	Strongly agree
		1	2	3	4	5	6
Antecedent 6: Mobile banking usage behaviour							
C16	I have used mobile banking in the past.	71	47	18	42	71	85
C17	I have recommended using mobile banking to my friends/family/peers.	55	50	32	44	75	78
C18	I do not intend ever switching from mobile banking to traditional banking.	35	28	45	73	74	79
Antecedent 7: Perceived relative advantage							
C19	I think that mobile banking enables me to complete my banking activities quickly.	3	7	12	56	133	123
C20	I think that mobile banking is useful in conducting my banking activities.	4	6	11	65	136	112
C21	I think that mobile banking enables me to complete my banking activities more conveniently.	1	9	15	60	140	109
Antecedent 8: Perceived system quality							
C22	I think that mobile banking has enough safeguards to make me feel comfortable using it.	15	16	41	105	88	69
C23	I think that mobile banking has enough legal structures to adequately protect me when using it.	13	23	43	111	92	52
C24	I think that mobile banking has enough technological advances to adequately protect me when using it.	15	18	39	102	108	52

Table 5.2 Frequency table of responses (continued...)

Code	Scale item	Strongly disagree	Disagree	Slightly disagree	Slightly agree	Agree	Strongly agree
		1	2	3	4	5	6
Antecedent 8: Perceived system quality							
C25	I think that mobile banking can provide me with information relevant to my needs.	6	9	28	87	134	70
C26	I think that mobile banking can provide me with sufficient information.	8	4	26	86	146	64
C27	I think that mobile banking can provide me with accurate information.	6	9	32	86	133	69
C28	I think that mobile banking quickly loads all text and graphics.	7	12	34	104	112	65
C29	I think that mobile banking is easy to navigate.	6	7	21	85	131	84
C30	I think that mobile banking is visually attractive.	8	14	21	94	124	73

The following section, Section 5.5, reports on the demographical attributes and the mobile banking background information of the sample of participants that took part in this study.

5.5 DEMOGRAPHIC AND MOBILE BANKING BACKGROUND INFORMATION ANALYSIS

This section first provides a description of the sample in terms of their demographics, as well as a description of the samples' reported mobile banking background information. The demographical information is illustrated by means of pie charts and bar graphs.

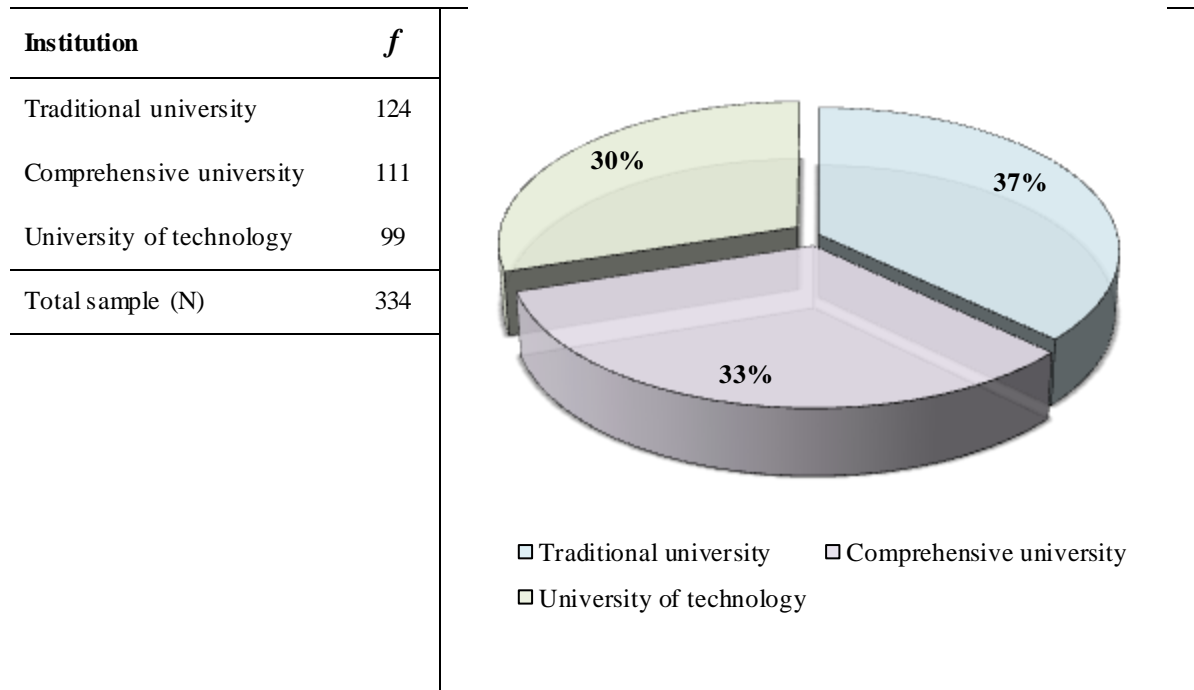
5.5.1 Sample description

As indicated in Section 5.4.2, of the 450 questionnaires distributed, 334 complete and usable ones were returned, resulting in a response rate of 74 percent. Given that the final

sample only includes participants that fell in the defined target population, no graphs are provided for country of origin or for full- or part-time registration status.

A description of the samples' demographic characteristics pertaining to their higher education institution, province of origin, current year of study, gender, ethnicity, mother tongue language and age follows.

Table 5.3 Higher education institution



As shown in Table 5.3, 37.1 percent of the participants were from a traditional university, 33.2 percent were from a comprehensive university, and 29.6 percent were from a university of technology. Note that the percentages in the tables have been rounded off.

Table 5.4 **Participants' province of origin**

Province	<i>f</i>	
Eastern Cape	7	Eastern Cape 2%
Free State	36	Free State 11%
Gauteng	191	Gauteng 57%
KwaZulu-Natal	9	KwaZulu-Natal 3%
Limpopo	38	Limpopo 11%
Mpumalanga	21	Mpumalanga 6%
Northern Cape	2	Northern Cape 1%
North-West	24	North-West 7%
Western Cape	6	Western Cape 2%
Total sample (N)	334	

Table 5.4 indicates that 2.1 percent of the participants originate from the Eastern Cape, 10.8 percent from the Free State, 57.2 percent from Gauteng, 2.7 percent from KwaZulu Natal, 11.4 percent from Limpopo, 6.3 percent from Mpumalanga, 0.6 percent from the Northern Cape, 7.2 percent from the North-West, and 1.8 percent from the Western Cape. As such, the sample was representative of all nine South African provinces, with the majority of the participants being from the Gauteng province.

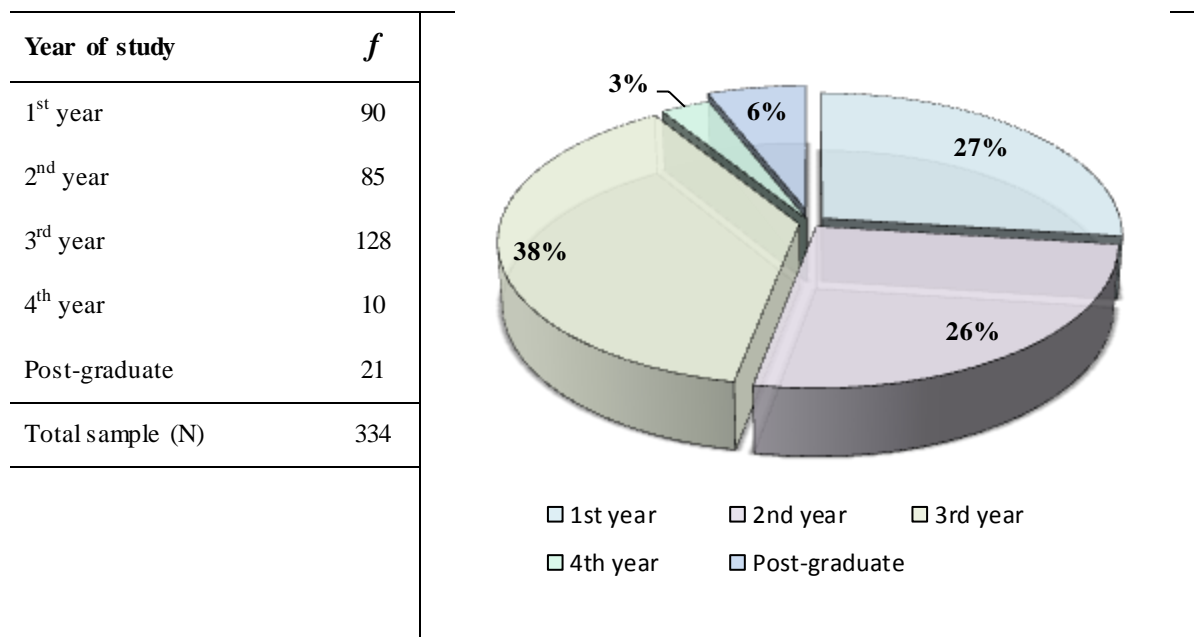
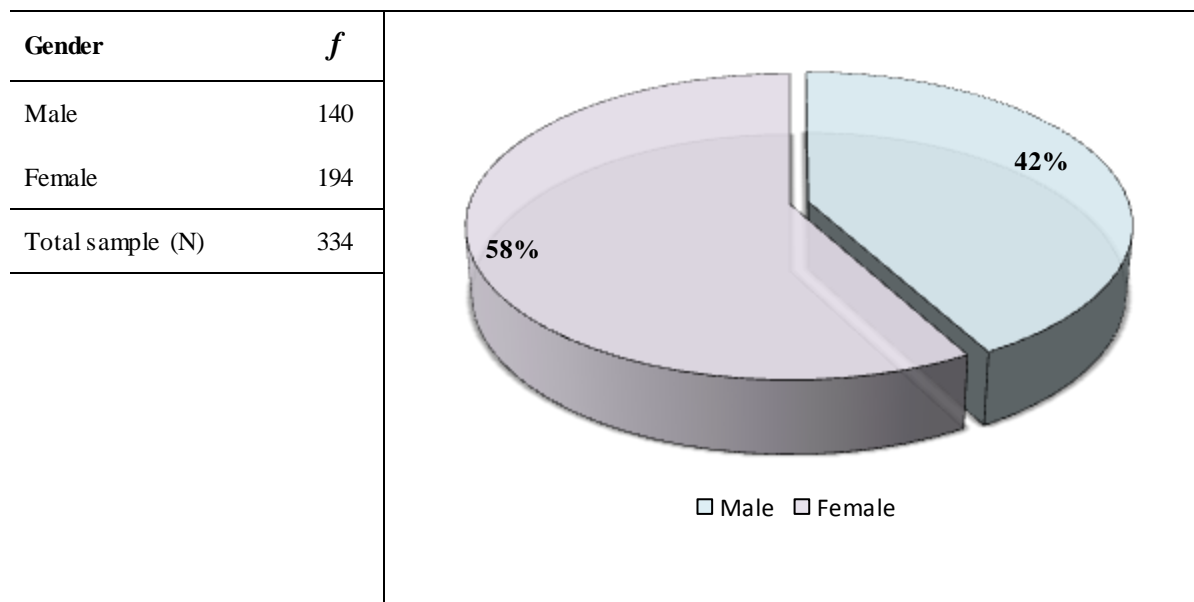
Table 5.5 **Current year of study**

Table 5.5 presents the participants' current year of study and shows that 26.9 percent of the participants were first year students, 25.5 percent second year students, 38.3 percent third year students, 3.0 percent fourth year students and 6.3 percent were post-graduate students.

Table 5.6 **Gender profile**

As depicted in Table 5.6, there were less male participants (41.9%) than female participants (58.1%) in the sample.

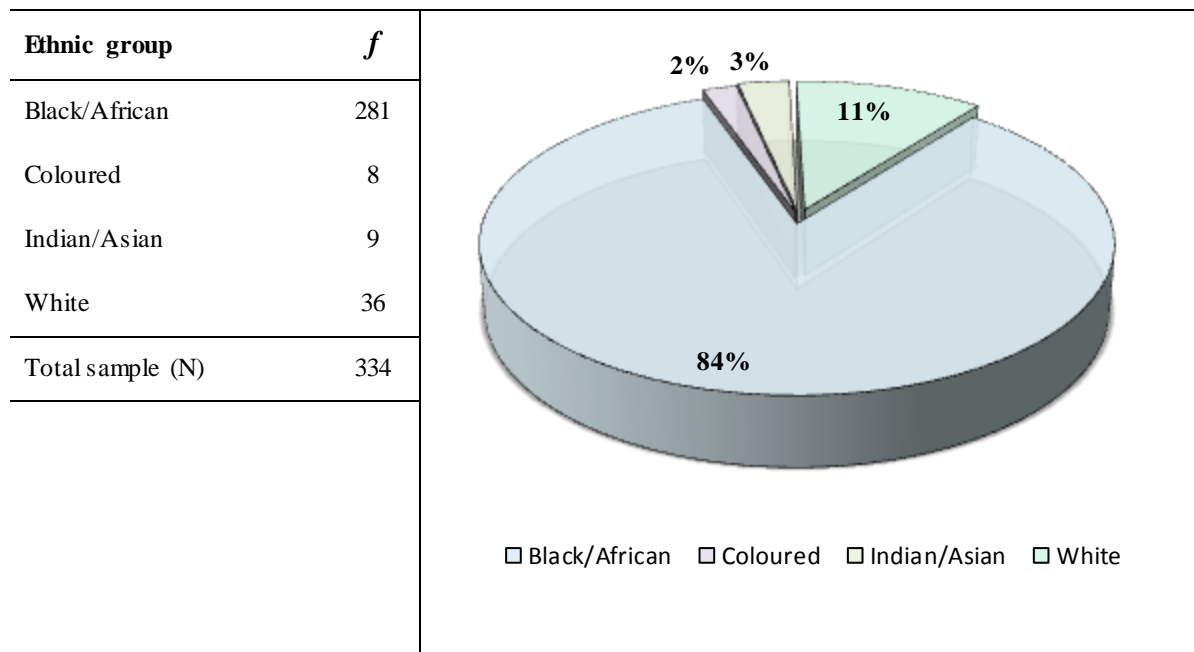
Table 5.7 Ethnicity profile

Table 5.7 shows that the race groups are represented in the sample. The majority identified themselves as black Africans (84.1%), followed by those who identified themselves as White (10.8%), Indian/Asian (2.7%) and Coloured (2.4%). As previously stated, the South African population totalled around 54 956 900 in 2015, of which an approximated 38 percent formed part of the Generation Y cohort. In terms of race, the African portion of this Generation Y cohort account for roughly 84 percent of the South African Generation Y cohort, compared to the Coloured portion accounting for approximately 8 percent, the Indian/Asian portion roughly 2 percent and the White portion roughly 6 percent. In addition, the African portion of the Generation Y cohort account for nearly 32 percent of the total South African population (Stats SA, 2015). These statistics justify the high percentage of African participants compared to the other ethnic groups.

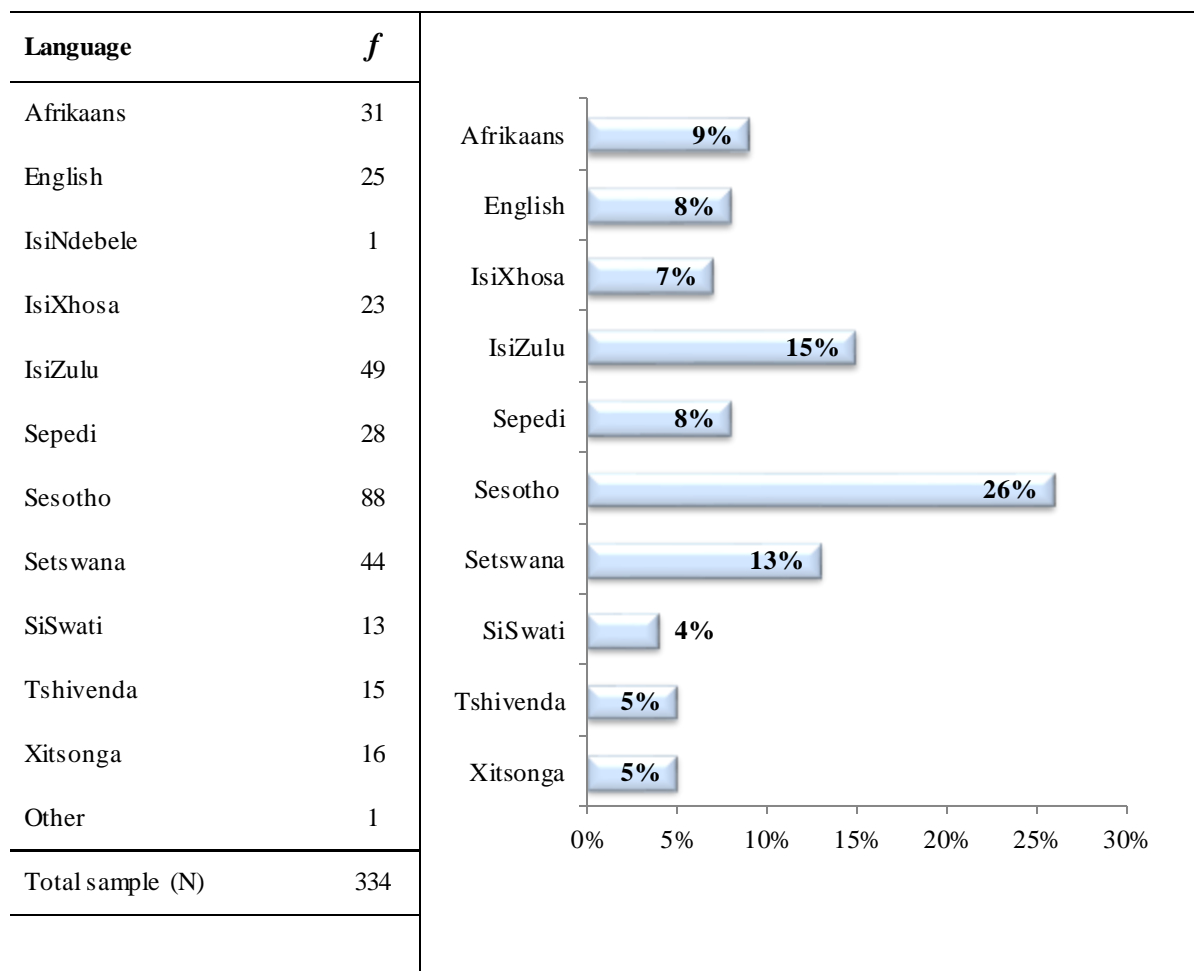
Table 5.8 Mother tongue language

Table 5.8 points out that 9.3 percent of the participants indicated Afrikaans as their mother tongue language, 7.5 percent English, 0.3 percent IsiNdebele, 6.9 percent IsiXhosa, 14.7 percent IsiZulu, 8.4 percent Sepedi, 26.3 percent Sesotho, 13.2 percent Setswana, 3.9 percent SiSwati, 4.5 percent Tshivenda, and 4.8 percent of the participants indicated Xitsonga as their mother tongue language. One participant (0.3%) indicated speaking another mother tongue language and specified this language as Portuguese. As such, Table 5.8 shows that each of South Africa's 11 official languages was represented in the sample.

Table 5.9 **Participants' age distribution**

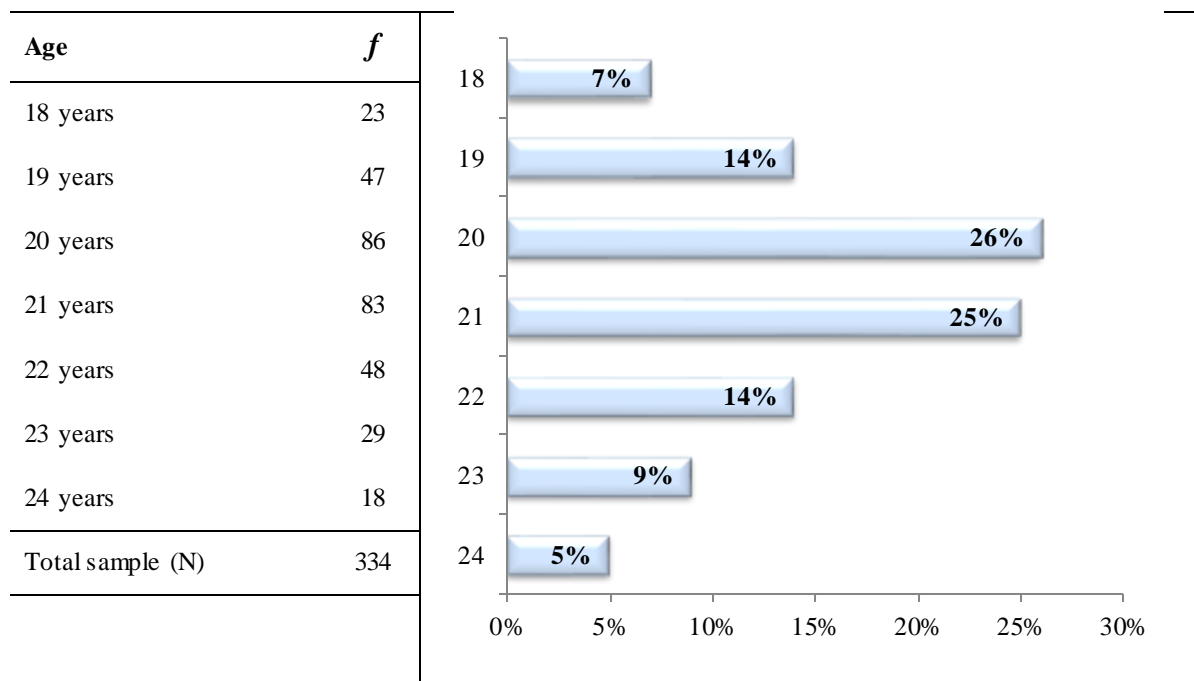
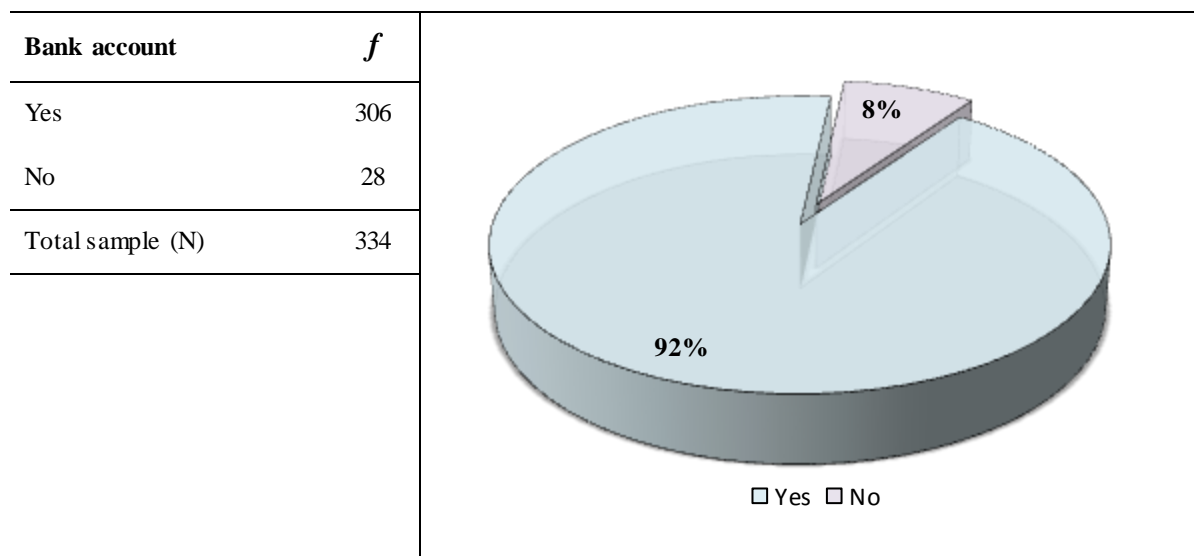


Table 5.9 presents the age spread of the participants and indicates that 6.9 percent were 18 years old, 14.1 percent 19 years old, 25.7 percent 20 years old, 24.9 percent 21 years old, 14.4 percent 22 years old, 8.7 percent 23 years old and 5.4 percent 24 years old. Therefore, all age groups specified in the target population were represented in the sample.

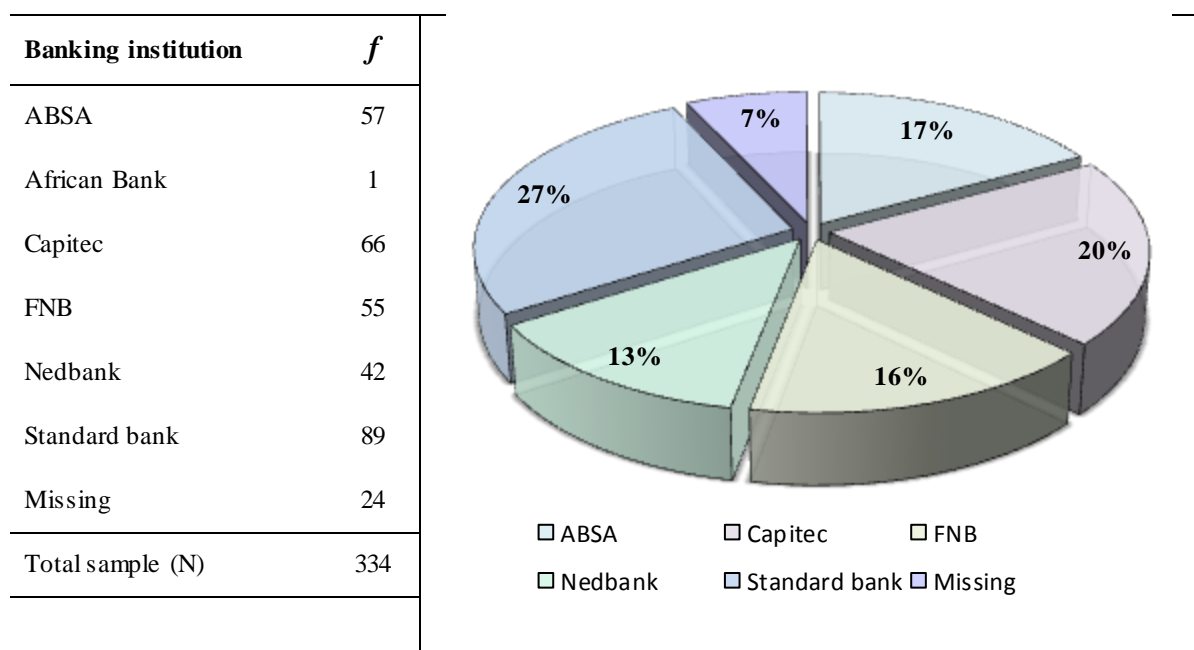
The section to follow reports on the mobile banking background information provided by the participants.

5.5.2 Mobile banking background information

In addition to demographic questions, Section B of the questionnaire included four questions requesting mobile banking background information from the participants, pertaining to possession of a bank account, banking institution, possession of a mobile device, mobile device's ability to launch an Internet browser, mobile banking usage and mobile banking activities.

Table 5.10 Possession of a bank account

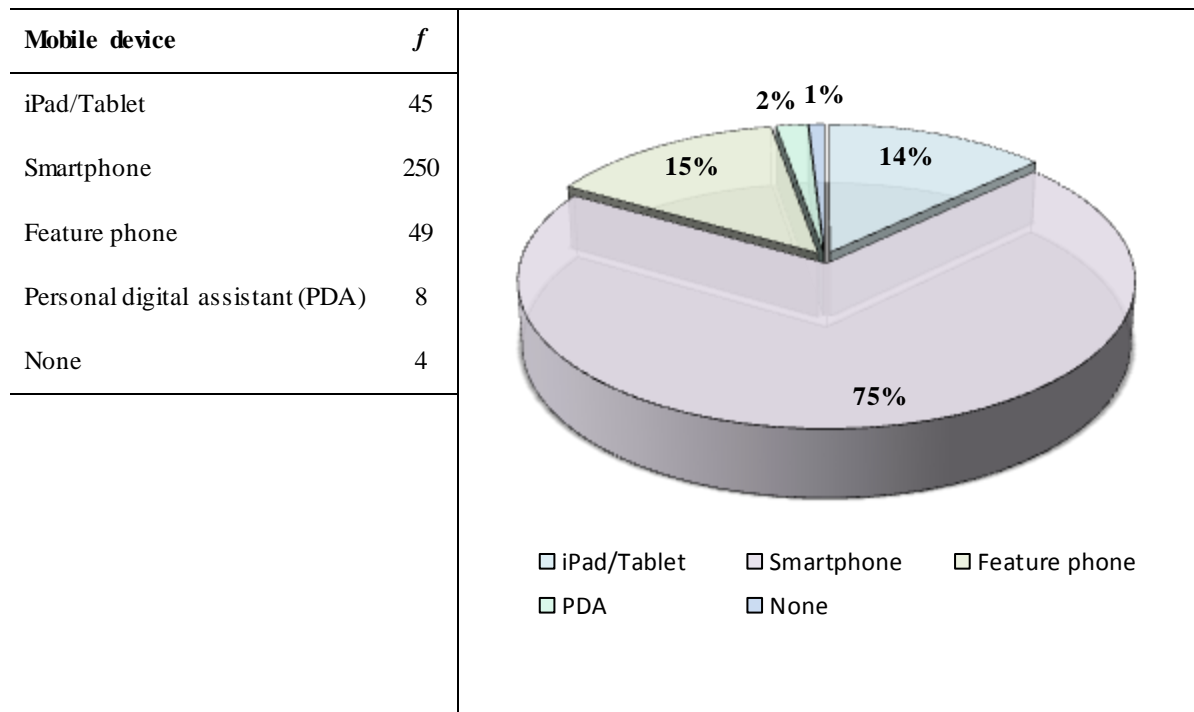
As indicated in Table 5.10, 91.6 percent of the participants indicated having a bank account, while 8.4 percent indicated that they do not have a bank account. Note that the percentages in this section's tables are also rounded off.

Table 5.11 Banking institution

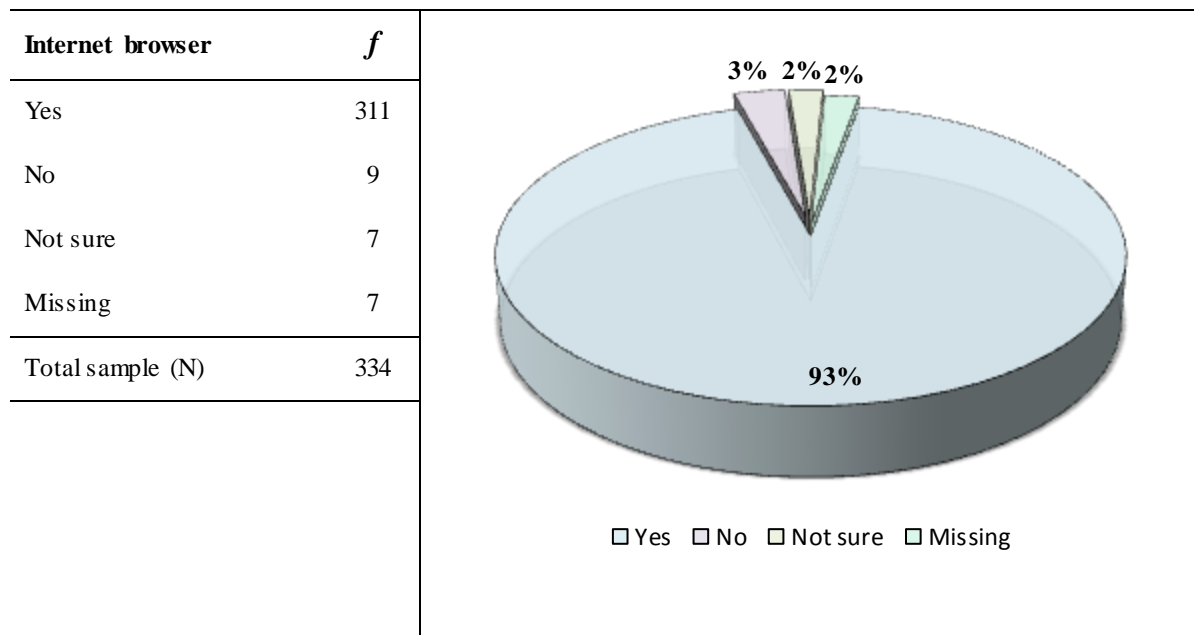
The participants who indicated having a bank account were requested to specify at which banking institution the bank account is held. Table 5.11 shows that, while 17.1 percent of the participants bank with ABSA, 0.3 percent with African Bank, 19.8 percent with Capitec, 16.4 percent with FNB, 12.6 percent with Nedbank, the majority of the participants indicated banking with Standard bank (26.6%). Of the participants, 24

participants (7.2%) did not specify their banking institution, and as such, were categorised as missing.

Table 5.12 Possession of a mobile device



With regard to the participants reporting to owning a mobile device, the results show that the majority of the participants in this study do have a mobile device. Even though some of the participants indicated that they do not have any mobile device (1.2%), 13.5 percent of the participants are in possession of an iPad/tablet, 14.7 percent in possession of a feature phone, 2.4 percent in possession of a personal digital assistant and an overwhelming 74.9 percent stated that they have a smartphone. This is indicated in Table 5.12. For this question, it should be noted that participants had multiple response options.

Table 5.13 Mobile device ability to launch an Internet browser

The participants who indicated having a mobile device were requested to specify whether their mobile devices could launch an Internet browser. Table 5.13 delineates that while 2.1 percent of the participants who indicated having a mobile device were not sure whether their mobile device could launch an Internet browser, 93.1 percent of the participants indicated that it could. Only 2.7 percent of the participants indicated that their mobile device could not launch an Internet browser. Of the participants, seven (2.1%) did not complete this question and, therefore, were categorised as missing.

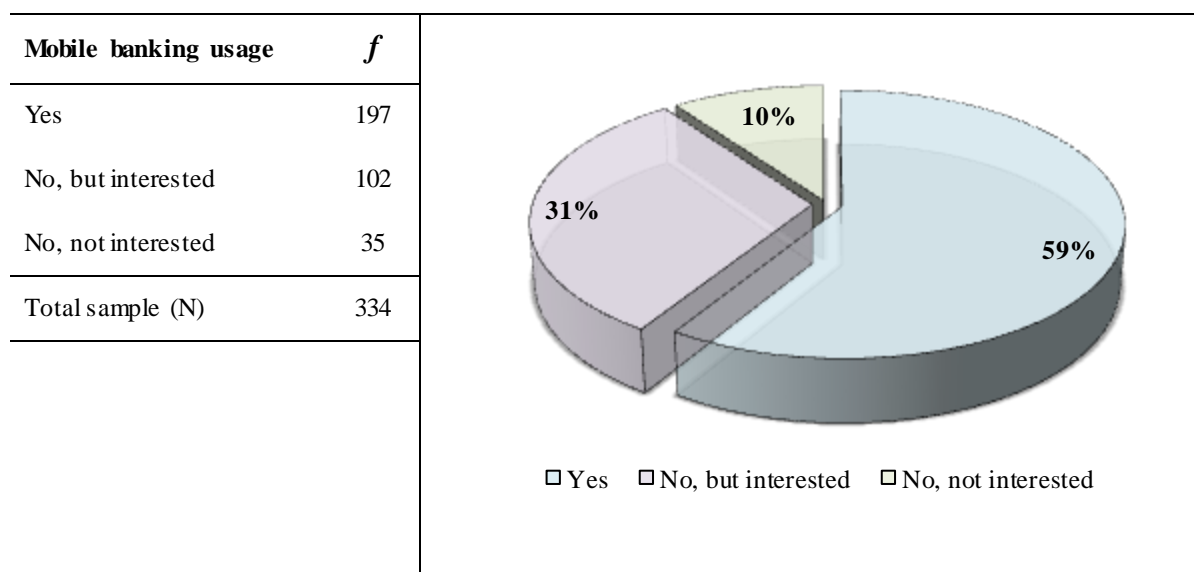
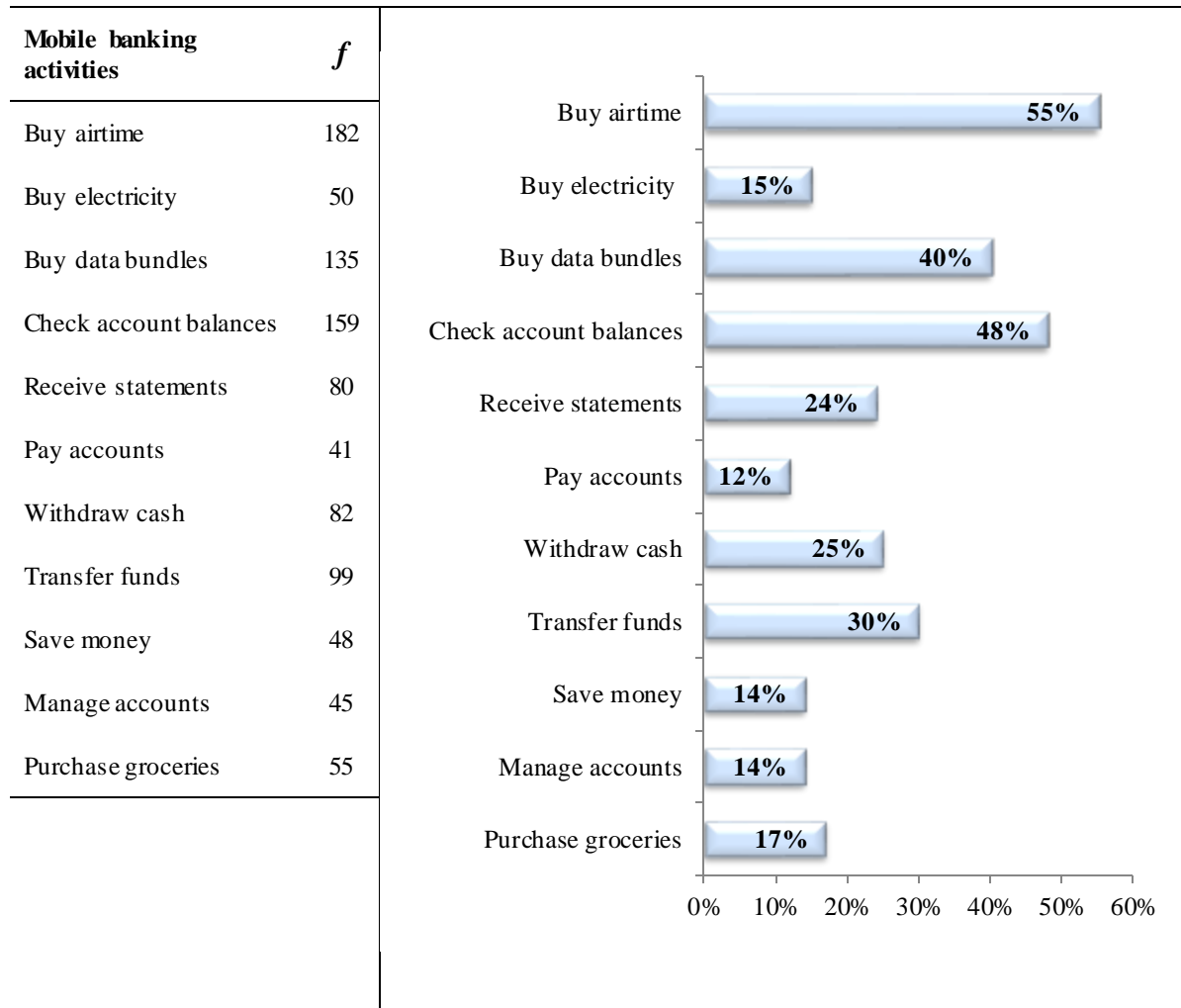
Table 5.14 Mobile banking usage

Table 5.14 reveals that the majority of the participants indicated that they use mobile banking (59.0%), followed by those who indicated that while they are not using mobile banking are interested in using the self-service technology (30.5%), and those who do not use mobile banking and are not interested in using it (10.5%).

Table 5.15 Mobile banking activities



The participants who indicated using mobile banking were requested to specify for which banking activities they have used mobile banking. For this question, it should again be noted that participants had multiple response options. Table 5.15 reveals that the participants in this study do use mobile banking for various banking activities. Of the participants who indicated using mobile banking, the majority indicated having used mobile banking to purchase airtime (54.5%), followed by those who indicated using mobile banking to check account balances (47.6%), buy data bundles (40.4%), transfer funds to a relative or friend (39.6%) and withdraw cash (24.6%). Furthermore, 24 percent indicated having used mobile banking to receive statements, 16.5 percent to buy groceries

at a supermarket, 15 percent to buy electricity, 14.4 percent to save money, 13.5 percent to manage accounts and 12.3 percent to pay accounts.

The above section has provided information on the demographics regarding the sample used in this study. The following section discusses the exploratory principal components analysis conducted on the scaled responses in the questionnaire used for the main survey in this study.

5.6 EXPLORATORY PRINCIPAL COMPONENTS ANALYSIS

Exploratory principal components analysis was carried out on the data set to determine whether the 30 scale-related items used within Section C of the questionnaire produced the proposed constructs, and to identify whether the variables loaded on the intended constructs. Before undertaking this analysis, the factorability of the data was assessed by performing the Kaiser-Meyer-Olkin (KMO) test, together with Barlett's test of sphericity. Pallant (2010:183) suggests that a KMO value of 0.6 and above, and a significant Barlett's test of sphericity value is indicative of sampling adequacy; that is, the data is appropriate for factor analysis. Both of these tests returned satisfactory values [KMO=0.914, chi-square Barlett test=6423.018 (df=435), $p=0.000<0.05$], consequently confirming the data's appropriateness for principal components analysis.

Once the factorability of the data was established, principle components analysis, using varimax rotation was performed on the scaled items. The extraction method extracted eight factors from the scale with eigenvalues greater than 1.0, and these eight factors explained 74.03 percent of the total variance. However, although all eight factors aligned well with the specified scale, one item (C30) pertaining to perceived system quality (Factor 8) loaded on the incorrect factor (Factor 4 – subjective norms – C7-C9). This item was deleted once it had been examined in order to ascertain that its elimination would not affect the original conceptualisation of the factor. The deletion of this item increased the total variance explained to 75.43 percent.

The eight factors extracted, together with the eigenvalues, percentage variance explained by each factor and the Cronbach alpha values of each factor are presented in Table 5.16.

Table 5.16 Exploratory principal components analysis results

Item	Factors								Communalities
	1	2	3	4	5	6	7	8	
C1							0.804		0.779
C2							0.767		0.746
C3							0.617		0.660
C4					0.857				0.806
C5					0.830				0.791
C6					0.780				0.760
C7				0.859					0.807
C8				0.874					0.858
C9				0.823					0.782
C10						0.744			0.746
C11						0.778			0.744
C12						0.758			0.746
C13			0.852						0.803
C14			0.857						0.823
C15			0.826						0.779
C16								0.830	0.853
C17								0.778	0.863
C18								0.498	0.841
C19		0.830							0.703
C20		0.801							0.787
C21		0.825							0.692

Table 5.16 Exploratory principal components analysis results (continued...)

Item	Factors								Communalities
	1	2	3	4	5	6	7	8	
C22	0.626								0.758
C23	0.742								0.762
C24	0.693								0.706
C25	0.777								0.641
C26	0.762								0.520
C27	0.719								0.774
C28	0.714								0.798
C29	0.562								0.546
Eigenvalues	10.907	2.197	1.887	1.758	1.525	1.391	1.184	1.023	
% Variance	16.689	9.223	8.857	8.817	8.498	8.361	8.162	6.823	
Cronbach alpha	0.826	0.856	0.880	0.834	0.877	0.748	0.926	0.915	

As reflected in Table 5.16, all of the communalities were above 0.50, thereby suggesting that a large amount of the variance in an item has been extracted by the factor solution (Hair *et al.*, 2010: 119). Furthermore, the three items pertaining to favourable attitudes towards using mobile banking loaded on Factor 1 and, therefore, was named attitudes towards mobile banking. The three items related to the perceived ease of conducting mobile banking loaded on Factor 2 and, therefore, was named perceived ease of use. The three items concerned with the opinions of significant other regarding mobile banking usage loaded in Factor 3 and, therefore, was named subjective norms. The three items associated with the perceived innate capability and resources required to use mobile banking loaded on Factor 4 and, therefore, was named perceived behavioural control. The three items pertaining to the perceived truthfulness of banks in providing mobile banking loaded in Factor 5 and, therefore, was named perceived integrity. The three items related to behaving actively in terms of using and recommending mobile banking to friends,

family or peers loaded on Factor 6 and, therefore, was named mobile banking usage behaviour. The three items associated with the perceived benefits derived from using mobile banking loaded on Factor 7 and, therefore, was named perceived system quality. The nine items concerned with the perceived structural assurances, information quality and user-friendliness of the mobile banking system loaded on Factor 8 and, therefore, was named perceived system quality.

In order to determine the internal-consistency reliability of each factor, the Cronbach alpha was calculated. The Cronbach alpha ranges from zero to one (Malhotra, 2010:319), where a value of 0.50 (Peterson, 1994:382) or 0.60 and above commonly points towards acceptable internal-consistency reliability (Malhotra, 2010:319). Table 5.16 shows that the Cronbach alphas of the factors ranged from 0.748 to 0.926, exceeding the recommended level of 0.60, thereby indicating satisfactory internal-consistency reliability.

The descriptive statistics calculated in this study are delineated in the section to follow.

5.7 DESCRIPTIVE STATISTICS

Descriptive statistics allow researchers to present an overall, coherent, and basic representation of large data sets by summarising the data sets (Hair *et al.*, 2008:235; Struwig & Stead, 2010:158). As mentioned in Chapter 4, descriptive statistics generally comprise measures of central tendency, dispersion and measures of shape (Maree *et al.*, 2011:19; Pallant, 2010:53), and as such, were computed for all scaled items to address the first six empirical objectives. A six-point Likert scale was employed in this study to measure the scaled responses, which ranged from strongly disagree (1) to strongly agree (6). Therefore, higher mean values denote greater agreement amongst the sampled Generation Y students. Table 5.17 provides a summary of the descriptive statistics pertaining to the antecedents of Generation Y students' attitudes towards and usage behaviour of mobile banking.

Table 5.17 Descriptive statistics per factor

Factors	Valid N	Mean	Standard deviation	Skewness	Kurtosis
Overall scale	334	4.396	0.750	-0.542	0.536
Attitudes towards mobile banking	334	4.926	0.907	-1.418	3.082
Perceived ease of use	334	4.705	1.069	-1.064	1.194
Subjective norms	334	4.101	1.317	-0.581	-0.377
Perceived behavioural control	334	4.714	1.144	-1.205	1.555
Perceived integrity	334	3.949	1.104	-0.487	0.317
Mobile banking usage behaviour	334	3.876	1.459	-0.340	-0.985
Perceived relative advantage	334	4.989	0.934	-1.133	1.537
Perceived systemquality	334	4.490	0.927	-0.772	0.830

As reflected in Table 5.17, the highest mean was recorded on perceived relative advantage (mean=4.989), followed by attitudes towards mobile banking (mean=4.926) and perceived system quality (mean=4.490). The lowest means were recorded for mobile banking usage behaviour (mean=3.876), perceived integrity (mean=3.949) and subjective norms (mean=4.101).

This infers that Generation Y students have a positive attitude towards mobile banking, perceive mobile banking as easy to use and take into consideration the opinions of their significant others regarding mobile banking usage. Furthermore, Generation Y students believe that they are in control of mobile banking in terms of their capability and resources needed to use mobile banking, and trust that their retail banks are likely to be honest, keep promises, and act ethically in providing mobile banking services. Moreover, these students report behaving actively in terms of their mobile banking usage and recognise the perceived utility in mobile banking concerning convenience and timesaving advantages. Furthermore, this proposes that Generation Y students trust that the mobile banking system likely has adequate structural assurances, can provide quality and relevant information and that the system is likely to be user-friendly in terms of navigation and loading of texts and graphics.

Whilst the highest means were computed on the perceived utility related factor of perceived relative advantage, attitudes towards mobile banking and the trust-related factor of perceived system quality, it is important to note that all means computed were significantly high. This accentuates the importance of utility and trust in mobile banking and their likely positive influence on attitudes towards and usage behaviour of mobile banking.

Table 5.17 also shows that the highest standard deviation occurred on mobile banking usage behaviour (Std. Dev. =1.459), suggesting a greater dispersion in responses to the items in this factor. Attitudes towards mobile banking recorded the lowest standard deviation (Std. Dev. =0.907), indicating less dispersion in responses to the items in this factor.

In addition, the data set may be classified as distributed normally, since Table 5.17 indicates that none of the skewness values fall outside the -2 to +2 range. In addition, the kurtosis values suggest that the data set is relatively more peaked than normal, as the majority of the variables differed from zero.

Before the structural equation modelling was undertaken, correlation analysis was performed to establish whether the relationships between the hypothesised antecedents of attitudes towards and usage behaviour of mobile banking were significant. This is outlined in the following section.

5.8 CORRELATION ANALYSIS

The construction of a matrix of the correlations coefficients between the factors extracted in the exploratory principle components analysis is valuable in evaluating the nomological validity of a proposed measurement model (Hair *et al.*, 2010:710). In this study, the Pearson product-moment correlation coefficients (r) between each pair of factors were examined. Pallant (2007:132) explains that the strength of the relationship is given by the Pearson r , whereby values ranging from 0.10 to 0.29 indicate a small relationship, values ranging from 0.30 to 0.49 indicate a medium relationship, and values ranging from 0.50 to 1.0 indicate a strong relationship.

Table 5.18 reports on the correlation matrix.

Table 5.18 Correlation matrix

Factors	1	2	3	4	5	6	7	8
Attitudes towards mobile banking	1							
Perceived ease of use	0.328**	1						
Subjective norms	0.352**	0.375**	1					
Perceived behavioural control	0.527**	0.369**	0.329**	1				
Perceived integrity	0.258**	0.244**	0.195**	0.359**	1			
Mobile banking usage behaviour	0.473**	0.377**	0.356**	0.431**	0.405**	1		
Perceived relative advantage	0.486**	0.332**	0.245**	0.400**	0.324**	0.434**	1	
Perceived systemquality	0.527**	0.463**	0.410**	0.508**	0.456**	0.499**	0.592**	1
** Correlation is significant at the 0.01 level (2-tailed)								

As indicated in Table 5.18, there was significant positive correlation at a significance level of $\alpha=0.01$ between each of the pairs of factors, which implies nomological validity. Moreover, the majority of the Pearson correlation coefficients (r) ranged between 0.30 and 0.50, inferring a medium to strong relationship between the factors.

Since this study included a multivariate method in the data analysis, a tolerance test was undertaken for the purpose of checking for multicollinearity (Hair *et al.*, 2010:161, 201, 339). The succeeding section reports on the multicollinearity results of the data set.

5.9 MULTICOLLINEARITY

Testing the multicollinearity of a data set is particularly important when multivariate statistical analysis is used (Hair *et al.*, 2010:201). According to Tabachnick and Fidell (2014:138), to determine whether a data set is free from multicollinearity, the condition index values must be smaller than 30. Moreover, the variance proportions for every factor may only have one value greater than 0.5. In addition, high tolerance values represent a smaller degree of multicollinearity. Table 5.19 outlines the collinearity diagnostics of the factors.

Table 5.19 Collinearity diagnostics

Factors	Condition index	Tolerance
Attitudes towards mobile banking	10.510	0.568
Perceived ease of use	11.110	0.716
Subjective norms	13.562	0.751
Perceived behavioural control	16.095	0.609
Perceived integrity	17.163	0.732
Mobile banking usage behaviour	21.074	0.612
Perceived relative advantage	24.445	0.591
Perceived systemquality	26.729	0.443

Table 5.19 Collinearity diagnostics (continued...)

Factors	Variance proportions							
	1	2	3	4	5	6	7	8
Attitudes towards mobile banking	0.00	0.01	0.02	0.00	0.01	0.79	0.00	0.00
Perceived ease of use	0.00	0.00	0.71	0.00	0.15	0.01	0.01	0.00
Subjective norms	0.03	0.03	0.19	0.02	0.72	0.04	0.02	0.00
Perceived behavioural control	0.03	0.50	0.02	0.44	0.00	0.01	0.00	0.00
Perceived integrity	0.03	0.36	0.02	0.40	0.01	0.01	0.13	0.01
Mobile banking usage behaviour	0.09	0.00	0.00	0.00	0.02	0.05	0.13	0.41
Perceived relative advantage	0.56	0.00	0.03	0.12	0.00	0.02	0.39	0.02
Perceived systemquality	0.26	0.09	0.01	0.01	0.09	0.06	0.32	0.39

As showed in Table 5.19, the condition index values are smaller than 30 and high tolerance values, ranging from 0.44 to 0.75, were recorded. In addition, the variance proportions were all lower than 0.5 with some factors returning only one value greater than 0.5. This suggests that the data set exhibits only a small and, therefore, negligible degree of multicollinearity.

The hypotheses to be tested utilising structural equation modelling, a two independent samples t-test, and one-way analysis of variance (ANOVA) are formulated in the subsequent section.

5.10 HYPOTHESES TESTING

The significance level for the hypotheses testing undertaken was set at the conventional 5 percent level; that is, $\alpha = 0.05$ (Kolb, 2008:259; Pallant, 2010:242). In keeping with the literature reviewed in Chapters 2 and 3 and the observed significant relationships examined in the correlation analysis (refer to Table 5.18), the following hypotheses were formulated:

H₀₁: Antecedents of mobile banking usage behaviour is not an eight-factor structure comprising attitudes towards mobile banking, perceived ease of use, subjective

norms, perceived behavioural control, perceived integrity, mobile banking usage behaviour, perceived relative advantage and perceived system quality.

- H_a1: Antecedents of mobile banking usage behaviour is an eight-factor structure comprising attitudes towards mobile banking, perceived ease of use, subjective norms, perceived behavioural control, perceived integrity, mobile banking usage behaviour, perceived relative advantage and perceived system quality.
- H_o2: Perceived ease of use (+) does not have a significant direct influence on Generation Y students' attitudes towards mobile banking.
- H_a2: Perceived ease of use (+) does have a significant direct influence on Generation Y students' attitudes towards mobile banking.
- H_o3: Subjective norms (+) do not have a significant direct influence on Generation Y students' attitudes towards mobile banking.
- H_a3: Subjective norms (+) do have a significant direct influence on Generation Y students' attitudes towards mobile banking.
- H_o4: Perceived behavioural control (+) does not have a significant direct influence on Generation Y students' attitudes towards mobile banking.
- H_a4: Perceived behavioural control (+) does have a significant direct influence on Generation Y students' attitudes towards mobile banking.
- H_o5: Perceived integrity (+) does not have a significant direct influence on Generation Y students' attitudes towards mobile banking.
- H_a5: Perceived integrity (+) does have a significant direct influence on Generation Y students' attitudes towards mobile banking.
- H_o6: Perceived relative advantage (+) does not have a significant direct influence on Generation Y students' attitudes towards mobile banking.
- H_a6: Perceived relative advantage (+) does have a significant direct influence on Generation Y students' attitudes towards mobile banking.

- H₀7: Perceived system quality (+) does not have a significant direct influence on Generation Y students' attitudes towards mobile banking.
- H_a7: Perceived system quality (+) does have a significant direct influence on Generation Y students' attitudes towards mobile banking.
- H₀8: Attitudes towards mobile banking (+) does not have a significant direct influence on Generation Y students' mobile banking usage behaviour.
- H_a8: Attitudes towards mobile banking (+) does have a significant direct influence on Generation Y students' mobile banking usage behaviour.
- H₀9: There is no difference between male and female Generation Y students' attitudes towards mobile banking, perceived ease of use, subjective norms, perceived behavioural control, perceived integrity, mobile banking usage behaviour, perceived relative advantage and perceived system quality.
- H_a9: There is a difference between male and female Generation Y students' attitudes towards mobile banking, perceived ease of use, subjective norms, perceived behavioural control, perceived integrity, mobile banking usage behaviour, perceived relative advantage and perceived system quality.
- H₀10: There is no difference between different age groups of Generation Y students' attitudes towards mobile banking, perceived ease of use, subjective norms, perceived behavioural control, perceived integrity, mobile banking usage behaviour, perceived relative advantage and perceived system quality.
- H_a10: There is a difference between different age groups of Generation Y students' attitudes towards mobile banking, perceived ease of use, subjective norms, perceived behavioural control, perceived integrity, mobile banking usage behaviour, perceived relative advantage and perceived system quality.

The succeeding section discusses structural equation modelling and path analysis employed to test the proposed model of the antecedents influencing Generation Y students' attitudes towards and usage behaviour of mobile banking; that is, H₀1 to H₀8.

5.11 STRUCTURAL EQUATION MODELLING

This section encompasses the process used to perform structural equation modelling to address the seventh empirical objective.

5.11.1 Measurement model specification

Specifying the measurement model and conducting confirmatory factor analysis (CFA) is the first step in structural equation modelling. In accordance with the model proposed in Chapter 3, the measurement model to be tested for the first hypothesis, is an eight-factor structure that includes eight latent or unobserved factors, namely attitudes towards mobile banking (F1) (three indicators), perceived ease of use (F2) (three indicators), subjective norms (F3) (three indicators), perceived behavioural control (F4) (three indicators), perceived integrity (F5) (three indicators), mobile banking usage behaviour (F6) (three indicators), perceived relative advantage (F7) (three indicators) and perceived system quality (F8) (eight indicators).

This hypothesised measurement model is specified in Figure 5.1.

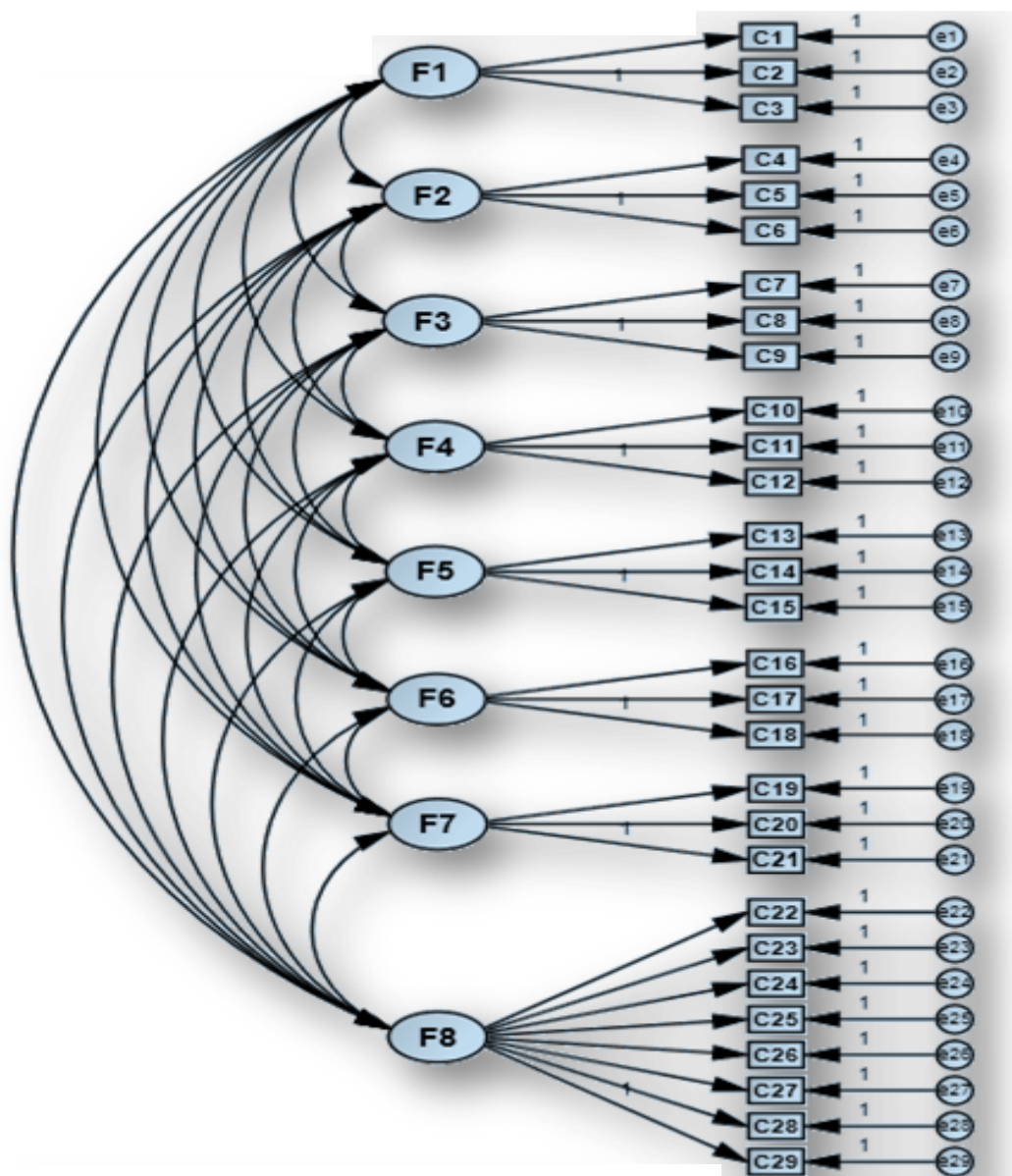


Figure 5.1 Specified measurement model

Note, for measurement model: *F1* = Attitudes towards mobile banking; *F2* = Perceived ease of use; *F3* = Subjective norms; *F4* = Perceived behavioural control; *F5* = Perceived integrity; *F6* = Mobile banking usage behaviour; *F7* = Perceived relative advantage; *F8* = Perceived system quality.

For model identification purposes, the first loading of each of the eight factors was fixed at 1.0. Consequently, there are 435 distinct sample moments, and 86 parameters to be estimated, leaving 349 degrees of freedom (df) based on the over-identified model, and a chi-square value of 797.638 with a probability level equal to $p=0.000$.

Table 5.20 Standardised coefficients of the measurement model

Latent factors	Factors	Indicators	Factor loadings		Error variance
F1	Attitudes towards mobile banking	C1	0.80	+	0.64
		C2	0.80	+	0.64
		C3	0.76	+	0.58
F2	Perceived ease of use	C4	0.81	+	0.66
		C5	0.81	+	0.66
		C6	0.83	+	0.68
F3	Subjective norms	C7	0.82	+	0.67
		C8	0.92	+	0.84
		C9	0.81	+	0.65
F4	Perceived behavioural control	C10	0.79	+	0.62
		C11	0.81	+	0.66
		C12	0.79	+	0.62
F5	Perceived integrity	C13	0.83	+	0.69
		C14	0.88	+	0.77
		C15	0.81	+	0.66
F6	Mobile banking usage behaviour	C16	0.67	+	0.45
		C17	0.85	+	0.72
		C18	0.64	+	0.41
F7	Perceived relative advantage	C19	0.90	+	0.81
		C20	0.92	+	0.85
		C21	0.87	+	0.76

Table 5.20 Standardised coefficients of the measurement model (continued...)

F8	Perceived systemquality	C22	0.72	+	0.52
		C23	0.80	+	0.64
		C24	0.73	+	0.54
		C25	0.83	+	0.68
		C26	0.80	+	0.65
		C27	0.80	+	0.64
		C28	0.75	+	0.56
		C29	0.65	+	0.43

The model was scrutinised for any problematic estimates, such as negative error variances, also recognised as Heywood cases, and standardised factor loadings above 1.0 or below -1.0 (Hair *et al.*, 2010:706). Table 5.20 shows that there were no problematic estimates in the model as all item loadings on the eight factors returned values above the 0.5 level. Therefore, no factor loadings above 1.0 or below -1.0 and no negative error variances were observed.

To measure the fit of the model, the following indices produced by AMOS, namely the absolute fit indices of the chi-square, the standardised root mean residual (SRMR), the root mean square of approximation (RMSEA), the incremental fit index (IFI), the comparative fit index (CFI), and the Tucker-Lewis index (TLI) were used. A significant chi-square value of 797.638 was calculated with 349 degrees of freedom. While this suggests poor fit, both Byrne (2010:76) and Malhotra (2010:732) argue that the chi-square statistic is notoriously sensitised to sample size. The remaining fit indices showed an acceptable degree of fit between the measurement model and the data, with SRMR=0.0511, RMSEA=0.062, IFI=0.93, CFI=0.93, and TLI=0.91.

Following these results, the reliability, and validity of the measurement model was calculated and subsequently assessed.

5.11.2 Reliability and validity of the measurement model

A significant component of this study was to measure the extent to which perceived utility and trust in mobile banking influences attitudes towards and usage behaviour of mobile banking; that is, to validate the antecedents of the attitudes towards and usage behaviour of mobile banking scale in the South African context. Therefore, the composite reliability (CR), average variance extracted (AVE) and the correlation coefficients were calculated to evaluate the reliability and construct validity of the scale. Table 5.21 presents the CR, AVE and the correlation coefficients.

Table 5.21 Measurement model: construct reliability, average variance extracted and correlation matrix

	CR	AVE	$\sqrt{\text{AVE}}$	1	2	3	4	5	6	7	8
Attitudes towards mobile banking	0.83	0.62	0.79	1							
Perceived ease of use	0.86	0.67	0.82	0.65	1						
Subjective norms	0.88	0.72	0.85	0.50	0.36	1					
Perceived behavioural control	0.84	0.63	0.79	0.45	0.28	0.21	1				
Perceived integrity	0.88	0.71	0.84	0.51	0.38	0.28	0.43	1			
Mobile banking usage behaviour	0.77	0.53	0.73	0.57	0.46	0.42	0.37	0.43	1		
Perceived relative advantage	0.93	0.81	0.90	0.58	0.55	0.31	0.41	0.39	0.63	1	
Perceived systemquality	0.92	0.58	0.76	0.57	0.49	0.47	0.44	0.46	0.50	0.56	1

Table 5.21 shows that all the CR values exceeded the recommended level of 0.70, thus suggesting the reliability of the factors. Additionally, all factor loadings exceeded the 0.50 level (refer to Table 5.20) and AVE values were computed exceeding the recommended 0.50 and above level, thereby denoting convergent validity (Hair *et al.*, 2010:709). In terms of discriminant validity, all the correlation coefficients were smaller than the square root of the AVE, thereby providing evidence of discriminant validity.

Therefore, the specified measurement model demonstrates acceptable reliability, convergent validity and discriminant validity. As such, it may be concluded that overall, the measurement is not only valid and reliable, but also exhibits acceptable fit to the model, thereby making it an appropriate structural model for testing.

In conclusion, there is sufficient evidence in the sample to suggest that the null hypothesis, H_0 be rejected and the alternative hypothesis, H_a concluded. This infers that the antecedent of attitudes towards and usage behaviour of mobile banking is an eight-factor structure.

The following section presents the hypothesised structural model.

5.11.3 Structural model

In structural equation modelling, path coefficients, illustrated by single headed arrows, indicate relationships between variables. In the initial hypothesised structural model, Structural Model A, it was postulated that perceived ease of use (F2), subjective norms (F3), perceived behavioural control (F4), perceived integrity (F5), perceived relative advantage (F7) and perceived system quality (F8) have a direct positive influence on attitudes towards mobile banking (F1). Furthermore, it was hypothesised that attitudes towards mobile banking (F1) has a direct positive influence on mobile banking usage behaviour (F6). As such, Structural Model A is based on an extended technology acceptance model (TAM) as all the factors are believed to have a direct influence on attitudes towards mobile banking, which, in turn, has a direct influence on mobile banking usage behaviour. This postulation is in line with other studies of a similar nature (Galadima *et al.*, 2014; Maduku, 2013; Maduku & Mpinganjira, 2012; Mazhar *et al.*, 2014; Sayid *et al.*, 2012; Shanmugam *et al.*, 2014).

Figure 5.2 illustrates the regression path estimates of Structural Model A. In an attempt to improve visual comprehension, the covariance lines between the independent variables, the residuals of the dependent variables and the indicator variables of the latent variables have been removed from all structural model figures. Detailed figures of the models may be found in Annexure B.

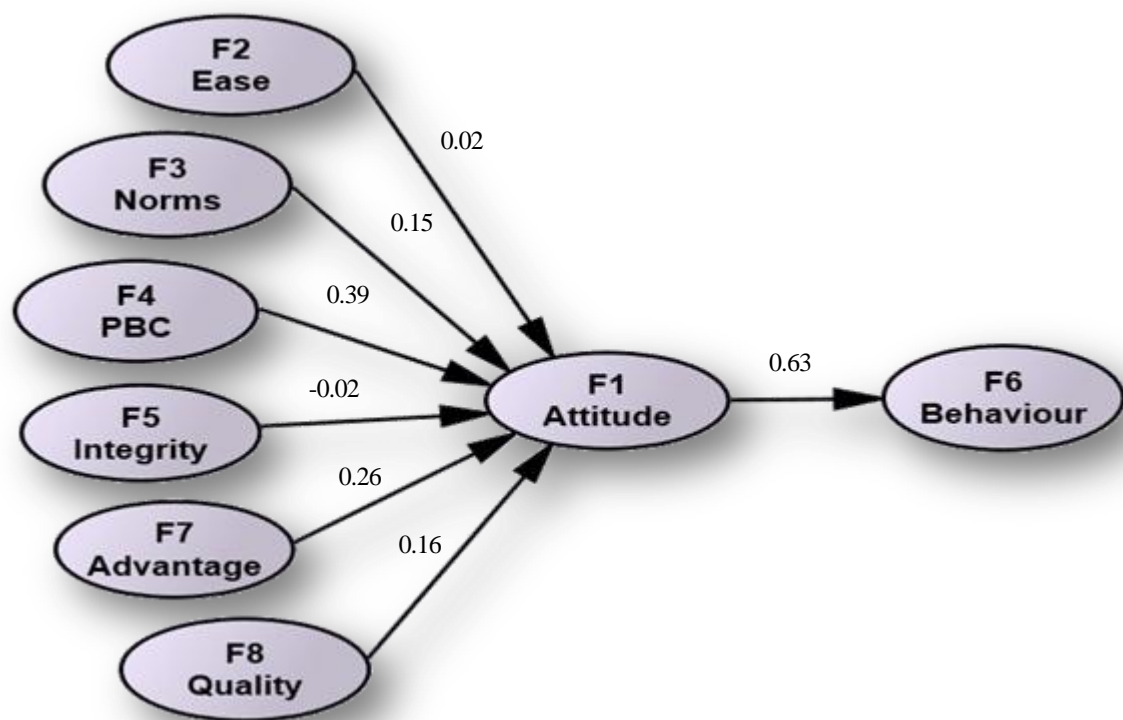


Figure 5.2 Structural Model A

Note, for Structural Model A: *Attitude* = Attitudes towards mobile banking; *Ease* = Perceived ease of use; *Norms* = Subjective norms; *PBC* = Perceived behavioural control; *Integrity* = Perceived integrity; *Behaviour* = Mobile banking usage behaviour; *Advantage* = Perceived relative advantage; *Quality* = Perceived system quality.

While Structural Model A returned a problematic chi-square [(851.990 (df=355, $p < 0.05$))] value, the model produced other acceptable model fit indices of SRMR=0.0669, RMSEA=0.065, IFI=0.92, TLI=0.91, CFI=0.92.

Despite the fit indices denoting that the overall fit of the hypothesised model is acceptable, the path between perceived ease of use (F2) ($p = 0.749 > 0.05$) and Generation Y students' attitudes towards mobile banking (F1) was not significant. This suggests that there is insufficient evidence to reject the null hypothesis H_{02} . This conclusion is contrary

to what the TAM hypothesises (Davis, 1989; Davis *et al.*, 1989), but not without grounds, as studies by Aboelmaged and Gebba (2013), Akturan and Tezcan (2012), Hu *et al.* (1999) and Kleijnen *et al.* (2004) also found perceived ease of use to have no significant influence on attitude. In addition, Legris *et al.* (2003:196) performed a comprehensive review of the literature and identified three more studies indicating a non-significant relation between perceived ease of use and attitude. Subjective norms (F3) ($p=0.01<0.05$) and perceived behavioural control (F4) ($p=0.000<0.05$) have a significant positive influence on Generation Y students' attitudes towards mobile banking (F1), inferring that the null hypotheses H_{03} and H_{04} be rejected and the alternatives H_{a3} and H_{a4} concluded.

Similar to perceived ease of use, the path between perceived integrity (F5) ($p=0.737>0.05$) and attitudes towards mobile banking (F1) was not significant, suggesting that there is insufficient evidence to reject the null hypothesis H_{05} . This finding is not surprising as the literature dictates that perceived integrity is a trust related factor. As such, perceived integrity is expected to predict trust in a technology rather than attitudes towards the technology (Nor & Pearson, 2008; Ya'gobi & Rad, 2015; Yousafzai *et al.*, 2003). Perceived relative advantage (F7) ($p=0.000<0.05$) has a significant positive influence on Generation Y students' attitudes towards mobile banking (F1). This infers that the null hypothesis H_{06} be rejected and the alternative H_{a6} concluded. Likewise, the path between perceived system quality (F8) ($p=0.046<0.05$) and Generation Y students' attitudes towards mobile banking (F1) as well as the path between attitudes towards mobile banking (F1) ($p=0.000<0.05$) and Generation Y students' mobile banking usage behaviour (F6) were significant. This infers that the null hypotheses H_{07} and H_{08} be rejected and the alternatives H_{a7} and H_{a8} concluded.

Given the insufficient evidence to reject the null hypotheses H_{02} and H_{05} , it was decided to test a revised model based on the original measurement model. Hair *et al.* (2010:647) support this decision, as these researchers advise the introduction of a competing model to ascertain that the hypothesised Structural Model A represents the best possible model fit. Structural Model B was introduced as a competing model. Byrne (2010:82) opines that when two or more models are compared, it is wise to consider Akaike's information criterion (AIC) and Bozdogan's consistent version of the AIC (CAIC), where smaller values are preferred as it indicates a better fitting model. The AIC and the CAIC indices for Structural Model A were 1011.99 and 1396.88 respectively.

Structural Model B (refer to Figure 5.3) tests whether perceived ease of use (F2) and perceived integrity (F5) have a direct positive influence on mobile banking usage behaviour (F6), rather than an indirect influence via their influence on attitudes towards mobile banking (F1). The findings from the Daneshgadeh and Yildirim (2014) study indicate that perceived ease of use have a significant direct influence on usage. Moreover, because perceived integrity is a trust-related factor and owing to the influence of this factor on trust (Nor & Pearson, 2008; Ya'gobi & Rad, 2015; Yousafzai *et al.*, 2003), which in turn influences usage intention or behaviour (Hanafizadeh *et al.*, 2014; Koch *et al.*, 2011; Nor & Pearson, 2008), it is reasonable to assert that perceived integrity may have a direct positive influence on usage behaviour.

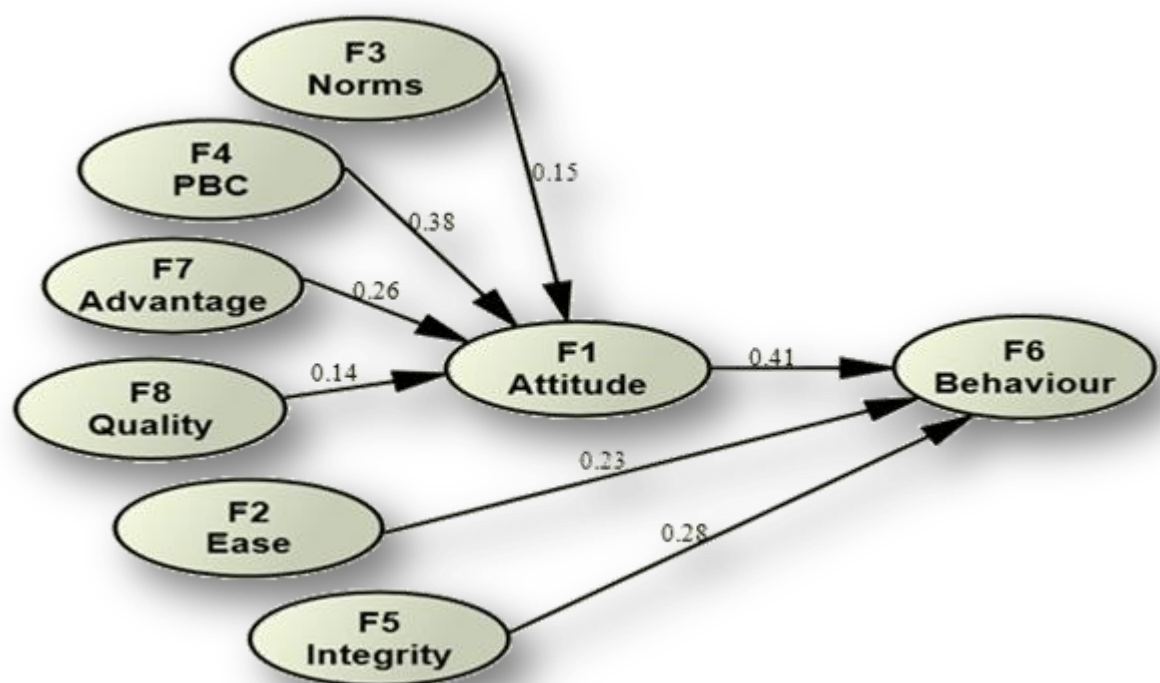


Figure 5.3 Structural Model B

Note, for Structural Model B: *Attitude* = Attitudes towards mobile banking; *Ease* = Perceived ease of use; *Norms* = Subjective norms; *PBC* = Perceived behavioural control; *Integrity* = Perceived integrity; *Behaviour* = Mobile banking usage behaviour; *Advantage* = Perceived relative advantage; *Quality* = Perceived system quality.

In terms of model fit, Structural Model B delivered fit indices of chi square=810.95 (df=355), SRMR=0.0534, RMSEA=0.062, IFI=0.93, TLI=0.91, CFI=0.93, AIC=970.95 and CAIC=1355.84.

When compared to Structural Model A's AIC value of 1011.99 and CAIC value of 1396.88, Structural Model B has both a lower AIC value of 970.95 and a lower CAIC value of 857.50, inferring that Structural Model B has a better model fit. However, the path between perceived system quality (F8) ($p=0.087>0.05$) and Generation Y students' attitudes towards mobile banking (F1) was not significant. This conclusion is not without grounds, as the path, although significant, between perceived system quality (F8) and attitudes towards mobile banking (F1) in Structural Model A were weak. This can be attributed to the fact that perceived system quality is a trust related factor. Therefore, perceived system quality is expected to predict trust in a technology rather than attitudes towards the technology.

As such, the third revised model, Structural Model C, was tested to determine whether perceived system quality (F8) has a direct positive influence on mobile banking usage behaviour (F6). The DeLone and McLean (1992; 2003) studies found that system quality predicts intention or use of a technology. Structural Model C is depicted in Figure 5.4.

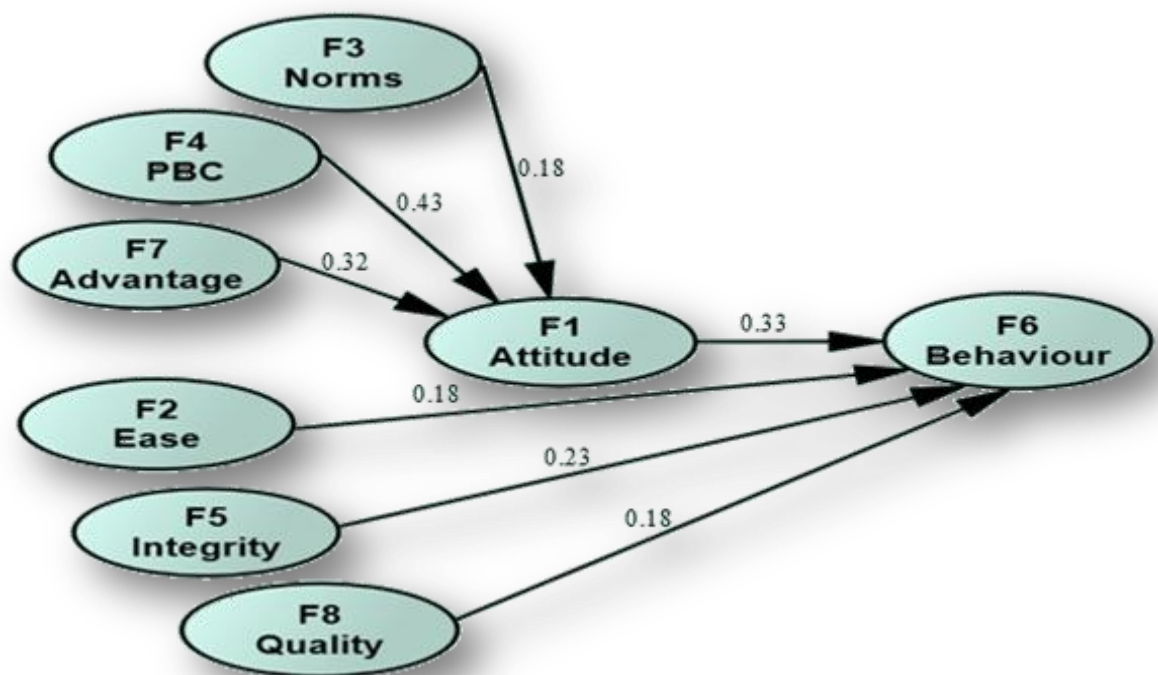


Figure 5.4 Structural Model C

Note, for Structural Model C: *Attitude* = Attitudes towards mobile banking; *Ease* = Perceived ease of use; *Norms* = Subjective norms; *PBC* = Perceived behavioural control; *Integrity* = Perceived integrity; *Behaviour* = Mobile banking usage behaviour; *Advantage* = Perceived relative advantage; *Quality* = Perceived system quality.

Structural Model C produced improved fit indices of chi-square=808.765 (df=355), SRMR=0.0526, RMSEA=0.062, IFI=0.93, TLI=0.92, CFI=0.93, AIC=968.77 and CAIC=1353.66.

Structural Model C produced acceptable model fit indices. More significantly, Structural Model C reports an even lower AIC value of 968.77 and CAIC value of 1353.66 than both Structural Models A and B, thereby indicating an improvement in model fit.

In Structural Model C, subjective norms (F3) (path estimate=0.18, $p<0.05$), perceived behavioural control (F4) (path estimate=0.43, $p<0.05$) and perceived relative advantage (F7) (path estimate=0.32, $p<0.05$) continue to have a significant positive influence on Generation Y students' attitudes towards mobile banking (F1). The squared multiple correlation (SMC) coefficient for attitudes towards mobile banking is 0.53, which indicate that these three predictors, namely subjective norms, perceived behavioural control and perceived relative advantage, together explained 53 percent of the variance in Generation Y students' attitudes towards mobile banking.

Perceived ease of use (F2) (path estimate=0.18, $p<0.05$), perceived integrity (F5) (path estimate=0.23, $p<0.05$) and perceived system quality (F8) (path estimate=0.18, $p<0.005$) have a significant positive influence on Generation Y students' mobile banking usage behaviour (F6). Moreover, attitudes towards mobile banking (F1) (path estimate=0.33, $p<0.05$) has a significant positive influence on mobile banking usage behaviour (F6). The SMC coefficient for mobile banking usage behaviour is 0.49, indicating that attitudes towards mobile banking explain 49 percent of the variance in Generation Y students' mobile banking usage behaviour.

Table 5.22 presents a comparison of Structural Models A, B and C for easy interpretation of the fit indices.

Table 5.22 Structural model comparison

Measures	Recommended value	Model A	Model B	Model C
χ^2	Low χ^2 value	851.99	810.95	808.77
IFI	≥ 0.90	0.92	0.93	0.93
TLI	≥ 0.90	0.91	0.91	0.92
CFI	≥ 0.90	0.92	0.93	0.93
SRMR	≤ 0.50	0.067	0.053	0.053
RMSEA	≤ 0.80	0.065	0.062	0.062
AIC	Small positive values	1011.99	970.95	968.77
CAIC	Small positive values	1396.88	1355.84	1353.66

As outlined in Table 5.22, all the fit indices for Structural Model C indicate an improved fit when compared to Structural Model A, whereas only the value of the TLI improved compared to Structural Model B. Additionally, there was an observed improvement in model fit in the final Structural Model C in terms of the χ^2 , SRMR, RMSEA, AIC and the CAIC values when compared to Structural Model A. Most importantly, the AIC and CAIC indices for Structural Model C are noticeably lower than Structural Model A, indicating that the revised or competing model, Structural Model C, fits the data better than the initial hypothesised Structural Model A.

The next section reports on the results of the two independent-samples t-test.

5.12 TWO INDEPENDENT-SAMPLES T-TEST

Research findings from previous studies (Crabbe *et al.*, 2009; Martins *et al.*, 2014; Nel & Raleting, 2012; Ya'gobi & Rad, 2015) suggest possible gender differences pertaining to technology acceptance issues. As such, for addressing the eight empirical objective of this study, formulated in Chapter 1 (refer to Section 1.3.3.), a two independent-samples t-test were utilised to determine whether there is a significant divergence between male and female Generation Y students regarding the eight factors pertaining to the antecedents of the students' attitudes towards and usage behaviour of mobile banking.

The significance level was set at the conventional 5 percent level; that is, $\alpha=0.05$ (Kolb, 2008:259). Table 5.23 outlines the statistical and practical significance of male and female Generation Y students, in terms of the eight factors, tested for the survey.

Table 5.23 Gender differences

	Male Mean N=140	Male Std. Dev.	Female Mean N=194	Female Std. Dev.	t-value	p-value	Cohen's D
Attitudes towards mobile banking	4.829	1.027	4.997	0.804	-1.675	0.051	*****
Perceived ease of use	4.602	1.146	4.778	1.006	-1.487	0.109	*****
Subjective norms	3.881	1.307	4.259	1.304	-2.615	0.832	*****
Perceived behavioural control	4.631	1.135	4.773	1.150	-1.122	0.731	*****
Perceived integrity	3.855	1.140	4.017	1.075	-1.328	0.201	*****
Mobile banking usage behaviour	3.874	1.460	3.878	1.461	-0.026	0.967	*****
Perceived relative advantage	4.898	1.009	5.055	0.873	-1.522	0.322	*****
Perceived system quality	4.379	1.026	4.570	0.842	-1.866	0.017*	0.18**
* Statistically significant at $p<0.05$							
** Small effect, practically non-significant							
*** Medium effect and moving toward practical significance							
**** Large effect, practically significant							
***** Cohen's D-statistic not calculated as the variable was not statistically significant							

As shown in Table 5.23, there was no statistical significant difference between male and female Generation Y students' attitudes towards mobile banking, perceived ease of use, subjective norms, perceived behavioural control, perceived integrity, mobile banking usage behaviour, and perceived relative advantage. As such, for these seven aspects, the null hypothesis, H_0 , cannot be rejected at the 5 percent significance level. This infers that male and female Generation Y students did not differ much in their perceptions towards these seven antecedents of attitudes towards and usage behaviour of mobile banking. However, a statistically significant difference was found between male and female Generation Y students' perceptions towards system quality. Therefore, for

perceived system quality, the null hypothesis, H_0 , is rejected and the alternative, H_a , concluded. This suggests that female Generation Y students display a greater degree of agreement with the trust related items in perceived system quality than male students do; that is, female students trust mobile banking more in terms of perceived system quality than their male counterparts do.

To test whether the difference in perceived system quality between male and female Generation Y students is of any practical significance, the Cohen's D-statistic was calculated. Perceived system quality returned a Cohen's D value of 0.18, suggesting a small practical effect that is virtually non-significant.

The succeeding section reports on the one-way analysis of variance (ANOVA)

5.13 ONE-WAY ANOVA

The results from previous studies (Crabbe *et al.*, 2009; Maduku, 2013; Maduku & Mpinganjira, 2012; Martins *et al.*, 2014; Ya'gobi & Rad, 2015) propose possible age differences concerning technology acceptance issues. Therefore, for the purpose of addressing the ninth and final empirical objective set out in Chapter 1 (refer to section 1.3.3), one-way ANOVA, set at a confidence level of 95 percent, was undertaken. This was done to determine whether there is a significant difference between the different age groups of Generation Y students' attitudes towards mobile banking, perceived ease of use, subjective norms, perceived behavioural control, perceived integrity, mobile banking usage behaviour, perceived relative advantage and perceived system quality.

Table 5.24 reports on the mean, standard deviation, sum of squares, degrees of freedom (df), mean square, F-ratio and p-values for different age groups in terms of the eight factors, tested for the survey.

Table 5.24 Age differences

	Age													
	18 Mean N=23	18 Std. Dev.	19 Mean N=47	19 Std. Dev.	20 Mean N=86	20 Std. Dev.	21 Mean N=83	21 Std. Dev.	22 Mean N=48	22 Std. Dev.	23 Mean N=29	23 Std. Dev.	24 Mean N=18	24 Std. Dev.
Attitudes towards mobile banking	4.348	1.372	4.801	0.760	4.977	0.916	4.956	0.872	5.160	0.775	4.839	0.907	5.130	0.706
Perceived ease of use	4.116	1.153	4.504	1.173	4.884	0.907	4.876	1.028	4.521	1.056	4.690	1.312	4.852	0.902
Subjective norms	3.464	1.711	3.759	1.369	4.085	1.286	4.112	1.214	4.500	1.098	4.126	1.476	4.722	1.031
Perceived behavioural control	3.957	1.609	4.553	1.230	4.806	1.088	4.699	1.018	4.903	1.056	4.966	0.965	4.815	1.248
Perceived integrity	3.870	0.994	3.887	1.164	4.074	1.021	4.040	0.988	3.611	1.329	4.092	1.087	3.870	1.299
Mobile banking usage behaviour	3.304	1.470	3.496	1.459	3.911	1.376	3.960	1.467	4.056	1.482	4.115	1.412	4.185	1.654
Perceived relative advantage	4.754	1.194	4.879	0.760	4.969	0.992	5.012	0.966	5.313	0.617	4.874	1.017	4.889	1.035
Perceived systemquality	4.130	1.132	4.431	0.938	4.631	0.902	4.527	0.822	4.432	0.923	4.310	1.068	4.694	0.908

Table 5.24 Age differences (continued...)

		Sum of squares	df	Mean square	F-ratio	p-value
Attitudes towards mobile banking	Between groups	12.301	6	2.050	2.564	0.02*
	Within groups	261.433	327	0.799		
	Total	273.734	333			
Perceived ease of use	Between groups	17.071	6	2.845	2.559	0.02*
	Within groups	363.560	327	1.112		
	Total	380.631	333			
Subjective norms	Between groups	29.480	6	4.913	2.934	0.01*
	Within groups	547.682	327	1.675		
	Total	577.162	333			
Perceived behavioural control	Between groups	18.889	6	3.148	2.468	0.02*
	Within groups	417.159	327	1.276		
	Total	436.049	333			
Perceived integrity	Between groups	8.538	6	1.423	1.171	0.32
	Within groups	397.374	327	1.215		
	Total	405.913	333			
Mobile banking usage behaviour	Between groups	19.898	6	3.316	1.575	0.15
	Within groups	688.542	327	2.106		
	Total	708.440	333			
Perceived relative advantage	Between groups	7.507	6	1.251	1.445	0.20
	Within groups	283.230	327	0.866		
	Total	290.738	333			
Perceived systemquality	Between groups	6.806	6	1.134	1.329	0.24
	Within groups	279.126	327	0.854		
	Total	285.932	333			

* Significant at $p < 0.05$ level

As indicated in Table 5.24, a statistically significant difference was found between different age groups of Generation Y students and attitudes towards mobile banking, perceived ease of use, subjective norms, and perceived behavioural control. Therefore, for these four factors, the null hypothesis, H_{010} , is rejected and the alternative, H_{a10} , concluded. It may then be suggested that older age groups (20 years and older), hold a more positive attitude towards mobile banking, perceive mobile banking as more easy to use, view the opinions of significant others as more important and believe that using mobile banking is more within their control than younger students. The Tukey HSD test, indicating where the specific variances lay, can be found in Annexure C.

There was no statistically significant difference between different age groups of Generation Y students and perceived integrity, mobile banking usage behaviour, perceived relative advantage and perceive system quality. As such, for these four factors, the null hypothesis, H_{010} , cannot be rejected at the 5 percent significance level.

5.14 CONCLUSION

Within this chapter, the empirical findings of the study were reported on and a discussion pertaining to the results of the pilot study was provided, which indicated that the scale used was both reliable and valid. Subsequently, the preliminary data analysis, including data cleaning, coding and tabulation, was discussed. The demographic and mobile banking background information analysis was then undertaken. To evaluate the factorability of the data, exploratory principal components analysis was employed. The internal-consistency reliability for each of the factors was calculated. Descriptive statistics, comprising the mean, standard deviation, and frequency distributions were computed to summarise the data relating to the antecedents of Generation Y students' attitudes towards and usage behaviour of mobile banking. Correlation analysis was undertaken to establish whether relationships between the hypothesised antecedents of attitudes towards and usage behaviour of mobile banking were significant and to establish the nomological validity of the proposed model. This was followed by testing the data set for multicollinearity. In accordance with the relationships examined in the correlation analysis, hypotheses were formulated, which were subsequently tested using structural equation modelling and path analysis. A two independent-samples t-test and one-way ANOVA were used in order to determine whether there was a significant divergence between male and female Generation Y students and whether there was a significant

difference between the different age groups of Generation Y students regarding the eight factors pertaining to the antecedents of the students' attitudes towards and usage behaviour of mobile banking respectively.

In the concluding chapter, Chapter 6, the empirical findings are interpreted further and the research questions and objectives are re-visited to evaluate whether they have been answered. Moreover, based on the reported findings in this chapter as well as against the background of the literature reviewed in Chapter 2 and Chapter 3, recommendations and conclusions inferred from this study are provided.

CHAPTER 6

RECOMMENDATIONS AND CONCLUSION

“Information can tell us everything. It has all the answers. But they are answers to questions we have not asked, and which doubtless don’t even arise.”

— Jean Baudrillard

6.1 INTRODUCTION

The influence and affect that technology has on the retail-banking sector worldwide should not be underestimated. The introduction, development and implementation of new innovative technologies such as mobile banking, have changed the manner in which financial products and services are delivered to consumers. However, these technological developments have not re-engineered the fundamental structures and foundations of retail banking. Although some researchers have asserted that the brick-and-mortar bank branch will eventually become obsolete or dwindle in numbers due to technological advancements and growth, it is yet to be seen. A key issue about the actual purpose of technology within the retail banking industry today, in relation to traditional banking channels such as bank branch networks, provides food for thought. Nevertheless, the fact remains that technological advances and growth will not cease, and retail banks will continuously take advantage of these to offer even more improved and more customised financial products and services to their consumers in ways that are more convenient.

As mentioned in the preceding chapters, rapid advances in the areas of telecommunications and information communication technology in the South African banking industry makes electronic banking services, including mobile banking, an important channel for delivering banking services. The strategic management thereof represents a pertinent avenue in the search for a competitive advantage and securing healthy returns on the investments made into mobile banking information technologies in order to justify operational expenditure and to stimulate demand for these services. Moreover, mobile banking creates an opportunity to exploit possible new income-generating market segments of the South African financial landscape that have not yet

been fully exploited. These new market segments include the consumers of the Generation Y cohort.

Despite the utility of mobile banking for both the retail bank and consumer, it remains cybernetic and, as such, it is important to foster trust in this technology. This is likely to aid with successfully targeting the Generation Y cohort. The sheer size of the South African Generation Y cohort, the high future earning potential and influential role associated with the student portion of this cohort, as well as the fact that they are leading the way towards technology adoption, make Generation Y students a lucrative market segment for retail banks and their future existence.

Understanding the antecedents of Generation Y students' attitudes towards and usage behaviour of mobile banking is likely to make a valuable contribution in developing and adapting marketing and strategic plans, business models, processes, awareness programmes and pilot projects aimed at positively influencing this cohorts' attitudes towards mobile banking and mobile banking behaviour. Grounded in this assumption, the primary objective of this study was to propose and empirically test an extended technology acceptance model (TAM) that measures the extent to which perceived utility and trust influences attitudes towards and usage behaviour of mobile banking amongst Generation Y students in South Africa.

In the previous chapter, the factors were tested by comparing alternative models and presenting the results of the study. This chapter serves as the culmination of the study and begins with an overview of this study, followed by an examination of whether the study's objectives were achieved. Thereafter, the proposed model of the antecedents that influence or determine Generation Y students' attitudes towards and usage behaviour of mobile banking is discussed. The chapter ends with the limitations of the study, together with recommendations for further research as well as the concluding remarks of the study.

6.2 OVERVIEW OF THE STUDY

The primary objective of this study was to determine the likely influence of perceived utility, trust, perceived behavioural control and subjective norms on Generation Y students' attitudes towards and usage behaviour of mobile banking. In order to achieve this objective, a literature review relating to the mobile-banking platform, including the utility and trust in mobile banking and the factors that influence attitudes towards and

usage behaviour of mobile banking was performed. To provide support in understanding the main findings (Section 6.3) and resulting recommendations (Section 6.5) of this study, it is important to incorporate the insights gained over the previous five chapters, as outlined in this section.

Chapter 1 introduced the study by providing a background to the research and by identifying the research problem. This chapter accentuated the importance of the mobile banking innovation for distributing services in the retail-banking industry. In addition, this chapter highlighted the significance of utility and trust in mobile banking in determining attitudes towards and usage behaviour of mobile banking. Moreover, this chapter explained the reasons for specifically using Generation Y students to conduct this study. Based on the problem identified, one primary objective, nine theoretical objectives and nine empirical objectives were formulated in Section 1.3. The hypotheses, as formulated in Chapter 5, are also presented in Chapter 1 (Section 1.5). The remainder of the chapter comprised a summary of the proposed research design and methodology (Section 1.6), followed by the empirical portion of the study, as well as the ethical considerations (Section 1.7) of the study.

The aim of Chapter 2 was to address the first six theoretical objectives of the study in the form of a literature review. The different mobile devices that can be used to undertake mobile banking, as well as the adoption and growth of mobile phones are discussed in Section 2.2. Section 2.3 explained how and why mobile devices are used by businesses, including retail banks, as a marketing and business tool. In Section 2.4, the changes emanating from advances in mobile communication are discussed, followed by an explanation of mobile commerce in Section 2.5. Then, a review of the literature on the South African retail-banking sector is presented in Section 2.6, which includes a discussion pertaining to the future of South African retail banking and the importance of strategic management and strategy within a retail-banking context. In Section 2.7, mobile banking, the core of this chapter, is discussed, with specific emphasis on the different mobile banking methods, South African mobile banking solutions, mobile banking solutions offered by key South African retail banks, the utility and trust in mobile banking, and the growth and adoption of mobile banking internationally and in South Africa.

Mobile banking denotes using a mobile device, such as a tablet/iPad, personal digital assistant (PDA) and/or mobile phone to perform banking activities. Compared to other mobile devices, the mobile phone in particular is witnessing steady growth and adoption, suggesting that mobile phones will likely emerge as the preferred mobile technology for using mobile services (Section 2.2). Given the continuous development and increased popularity of mobile devices, more businesses around the globe are starting to recognise the importance of these devices for maximising every marketing and business opportunity presented (Section 2.3). As such, it is essential that businesses stay informed about developments in mobile communication to ensure future success (Section 2.4). Clearly, many businesses, including retail banks, are gradually progressing to selling their products and services, such as mobile banking via the mobile Internet (Section 2.5).

The South African banking system is well developed and established. In addition, the South African banking industry has emerged into a mature sector due to moderate private sector indebtedness and a first-class framework in terms of regulations and legislations offering many domestic and foreign institutions and individuals with a full spectrum of services, such as mobile banking. In order to uphold and increase market share, it is important that retail banks continuously address and invest in consumer education relating to new financial products and services (Section 2.6). The education of consumers and the reputation of retail banks are likely to play a key role in the future of retail banks, given the influence these factors may have on the future adoption of mobile banking and other innovations in South Africa. Through strategic management and the formulation of strategies, retail banks will be in a better position to improve their self-service technologies continuously, in order to satisfy the ever-changing demands, behaviours and needs of consumers, thereby ensuring future success (Sections 2.6.1 & 2.6.2).

Previously, retail banks depended on their branch network to achieve and maintain a competitive advantage, secure market share and increase profits. However, due to rapid developments in technology and changes in terms of retail banking distribution channels, deregulation, growing information and communication technology, the traditional brick-and-mortar branch model has transformed into a click-and-mortar business model, which comprise cheaper digital channels, such as mobile banking (Section 2.7). Mobile banking offers several utility advantages for retail banks, such as cost efficiency, connecting with previously unbanked consumers and an enhanced distribution network. The same holds

true for retail banking consumers, with advantages including convenience and efficiency, which, ultimately, save consumers time and money (Section 2.7.4). Although the utility in mobile banking is evident, the importance of fostering trust in this digital channel cannot be underestimated. This is largely because of the cybernetic nature of mobile banking, its lack of control and the greater uncertainty and risk associated with this type of transacting (Section 2.7.5). The mobile banking market is recognised as one of the fastest growing markets worldwide and it continues to grow at a rapid pace. However, the South African mobile banking penetration rate reached 57 percent in 2015 and, as such, South African retail banks and financial service providers alike have an interest in seeing sustained growth in mobile banking adoption (Section 2.7.6).

The purpose of Chapter 3 was to address the three remaining theoretical objectives of the study. Owing to the target population specified in this study, this chapter starts with a discussion on the Generation Y cohort, the characteristics of its members and the impact technology has had on this generation, including a discussion on the South African Generation Y cohort in Section 3.2. In Section 3.3, the different technology-adoption theories and models are explained, including the TAM as used in this study, together with a sample of information technology studies that have applied the different theories and models. In Section 3.4, the literature on the different antecedents thought to influence attitudes towards and usage behaviour of mobile banking identified in previous published research is reviewed. The chapter concludes with a proposed model of the antecedents of Generation Y students' attitudes towards and usage behaviour of mobile banking (Figure 3.8).

The youth of today, labelled the Generation Y cohort, comprises first-time bankers, highly technologically astute individuals, who demand the latest technological-delivery channels. These individuals grew up in a media-saturated environment and are able to stay well informed and up to date with the fast pace of technological and social change. This motivates marketers in various industries, including the retail-banking industry, to contemplate a more innovative approach to relate to, communicate and connect with, and deliver banking services to these consumers. In addition, it is important that key role players within retail banks, including strategists, marketers, policy makers and business- and financial-analysts, develop, rethink, and adapt mobile banking marketing and strategic plans, business models, processes, awareness programmes and pilot projects

geared towards these individuals, as well as positively influence their attitudes towards mobile banking and mobile banking behaviour (Section 3.2). In South Africa, the Generation Y cohort account for a significant percentage of the total South African population, meaning that they will drive the future success of the country's digital finance service sector (Section 3.2.1).

The adoption of information technology may be predicted by using different theories and models. These include the theory of reasoned action (Section 3.3.1), the innovation diffusion theory (Section 3.3.2), the technology acceptance model (Section 3.3.3), the theory of planned behaviour (Section 3.3.4), the decomposed theory of planned behaviour (Section 3.3.5), the extended technology acceptance model (Section 3.3.6), and the unified theory of acceptance and use of technology (Section 3.3.7).

Several researchers have been enticed to explore the factors that predict attitudes towards and behaviour of mobile banking. Understanding the determinants of attitudes towards and usage behaviour of mobile banking will not only assist in differentiating mobile banking users from non-users but also inform the design of marketing and strategic plans, business models, processes, awareness programmes and pilot projects to persuade the non-user consumer segment to adopt usage behaviour. Several studies have proposed and tested a wide array of factors thought to influence consumers' attitudes towards and usage behaviour of mobile banking, including ease of use, relative advantage, subjective norms, behavioural control, integrity and system quality (Sections 3.4 & 3.5).

In Chapter 4, the research methodology followed in the empirical portion of the study is described. The study was guided by a descriptive research design (Section 4.3) and a quantitative research approach was followed (Section 4.4). The target population relevant for this study was defined as full-time Generation Y students aged between 18 and 24 years, enrolled at South African registered public HEIs in 2015 (Section 4.5.1). The sampling frame for this study comprised the 26 South African registered public HEIs, which, by means of judgement sampling were limited to three HEIs, of which one was a traditional university, one a comprehensive university and one a university of technology, located in the Gauteng province (Section 4.5.2). Subsequently, a non-probability, convenience sample of 450 Generation Y students (150 per HEI campus), as defined by the target population, was taken (Sections 4.5.3 & 4.5.4). Following the survey approach, a standardised self-administered questionnaire that included existing validated scales was

used to collect the necessary data (Section 4.6). The various statistical techniques employed in this study are outlined in Section 4.9. These include frequency analysis (Section 4.9.1), exploratory principle components analysis (Section 4.9.2), reliability analysis (Section 4.9.3), validity analysis (Section 4.9.4), descriptive analysis (Section 4.9.5), correlation analysis (Section 4.9.6), a collinearity diagnostics (Section 4.9.7), structural equation modelling (Section 4.9.8), two independent-samples t-test (Section 4.9.9) and one-way analysis of variance (ANOVA) (Section 4.9.11).

Against the background of Chapter 4, Chapter 5 reports on the statistical analysis and interpretation of the empirical portion of the study. These results are in accordance with the empirical objectives formulated in Chapter 1, Section 1.3.3.

6.3 MAIN FINDINGS OF THE STUDY

As indicated in Chapter 1, the empirical objectives addressed in this study were as follows:

- Determine Generation Y students' attitudes towards mobile banking.
- Determine Generation Y students' perceived utility in mobile banking in terms of perceived ease of use and perceived relative advantage.
- Determine Generation Y students' subjective norms concerning mobile banking.
- Determine Generation Y students' perceived behavioural control concerning mobile banking.
- Determine Generation Y students' trust in mobile banking in terms of perceived integrity and perceived system quality.
- Determine Generation Y students' mobile banking usage behaviour.
- Empirically test a proposed model of the extent to which perceived utility, trust, perceived behavioural control and subjective norms influence Generation Y students' attitudes towards and usage behaviour of mobile banking.
- Determine whether male and female Generation Y students differ in their attitudes towards mobile banking, perceived utility in mobile banking, subjective norms,

perceived behavioural control, trust in mobile banking, and mobile banking usage behaviour.

- Determine whether different age groups of Generation Y students differ in their attitudes towards mobile banking, perceived utility in mobile banking, subjective norms, perceived behavioural control, trust in mobile banking, and mobile banking usage behaviour.

In accordance with the literature, an exploratory principle components analysis (Section 5.6) on the C-scale resulted in the extraction of eight factors identified as having a potential influence on South African Generation Y students' attitudes towards and usage behaviour of mobile banking. These factors primarily are related to utility, including ease of use and relative advantage and trust, including integrity and system quality, in mobile banking, together with subjective norms and perceived behavioural control. These eight factors explained 75.43 percent of the total variance in Generation Y students' attitudes towards and usage behaviour of mobile banking.

Descriptive statistics (Section 5.7) were calculated to address the first six empirical objectives set out in Chapter 1. Means in the agreement range of the six-point Likert scale were recorded on all construct-related items. This infers that in South Africa, Generation Y students have a positive attitude towards mobile banking, perceive mobile banking as easy to use, take into account the opinions of their significant others regarding mobile banking usage and believe that they are in control of mobile banking in terms of the capabilities and resources needed to use mobile banking. Furthermore, they trust that their retail banks have the necessary integrity in providing mobile banking services and report being active in terms of their mobile banking usage. Moreover, they perceive mobile banking as providing several utility advantages and trust that the mobile banking system has enough structural assurances, can provide quality and relevant information and that the system is user friendly in terms of navigation and loading of texts and graphics.

Correlation analysis (Section 5.8) was undertaken to provide guidance on the structural equation modelling analysis, where both a measurement model and structural models were developed with the primary purpose of establishing the causal relationships amongst the eight constructs. The results from the correlation analysis showed that there was significant positive correlation between each of the pairs of constructs, thereby implying

nomological validity. In addition, a test for multicollinearity (Section 5.9) indicated that the data set exhibited only a small and, therefore, negligible degree of multicollinearity. Therefore, structural equation modelling was considered appropriate.

Structural equation modelling was performed to address the seventh empirical objective of testing a proposed model of the Generation Y students' antecedents of attitudes towards and usage behaviour of mobile banking. The measurement model comprised eight latent factors, namely attitudes towards mobile banking, perceived ease of use, subjective norms, perceived behavioural control, perceived integrity, mobile banking usage behaviour, perceived relative advantage and perceived system quality. Once the fit indices were calculated, it was established that the measurement model showed acceptable levels of model fit, as outlined in Section 5.11.1. Furthermore, there was evidence of composite reliability and construct validity (Section 5.11.2). Thereafter, a structural model (Structural Model A) was tested based on the measurement model. As indicated in Section 5.12.3, subjective norms (F3), perceived behavioural control (F4), perceived relative advantage (F7) and perceived system quality (F8) have a significant positive influence on attitudes towards mobile banking (F1). Moreover, Structural Model A uncovered that attitudes towards mobile banking (F1) has a significant positive influence on mobile banking usage behaviour (F6).

However, the path between perceived ease of use (F2) and attitudes towards mobile banking (F1) was not significant. These results are in keeping with previous studies (Aboelmaged & Gebba, 2013; Akturan & Tezcan, 2012; Hu *et al.*, 1999; Kleijnen *et al.*, 2004). Moreover, the path between perceived integrity (F5) and attitudes towards mobile banking (F1) was not significant, as indicated in Section 5.12.3. This finding is not without grounds as the literature dictates that perceived integrity is a trust-related factor. As such, perceived integrity is expected to predict trust in a technology rather than attitudes towards the technology (Nor & Pearson, 2008; Ya'gobi & Rad, 2015; Yousafzai *et al.*, 2003).

In line with the findings of previous studies, a revised model (Structural Model B) based on the original measurement model was tested to determine whether perceived ease of use (F2) and perceived integrity (F5) have a direct positive influence on mobile banking usage behaviour (F6), rather than an indirect influence via their influence on attitudes towards mobile banking (F1). While the fit indices of Structural Model B suggest

improved model fit compared to Structural Model A, and although the results indicated that subjective norms (F3), perceived behavioural control (F4), perceived relative advantage (F7) and perceived system quality (F8) continue to have a significant positive influence on attitudes towards mobile banking (F1), the path between perceived system quality (F8) and attitudes towards mobile banking (F1) was not significant. As such, a third revised model (Structural Model C) was tested to determine whether perceived system quality (F8) has a direct positive influence on mobile banking usage behaviour (F6), which is in accordance with the DeLone and McLean (1992; 2003) studies. Structural Model C yielded improved model fit indices compared to both Structural Models A and B. In Structural Model C, subjective norms (F3), perceived behavioural control (F4) and perceived relative advantage (F7) have a direct positive influence on attitudes towards mobile banking (F1). Furthermore, perceived ease of use (F2), perceived integrity (F5) and perceived system quality (F8) have a direct positive influence on mobile banking usage behaviour (F6). Attitudes towards mobile banking (F1), in turn, have a direct positive influence on mobile banking usage behaviour (F6).

Therefore, the findings of this study infer that the model presented in Figure 6.1 may explain the antecedents of Generation Y students' attitudes towards and usage behaviour of mobile banking.

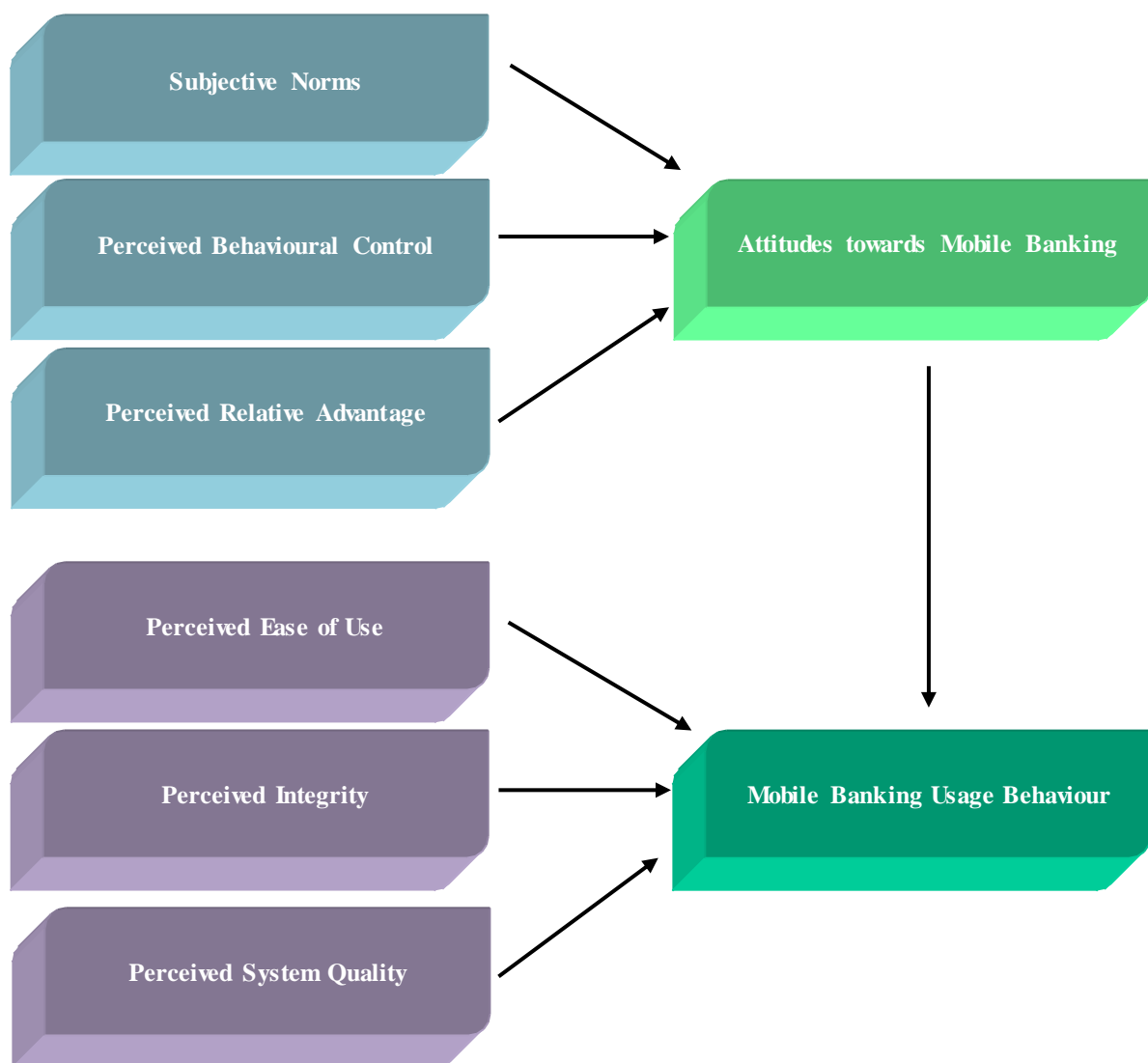


Figure 6.1 Antecedents of Generation Y students' attitudes towards and usage behaviour of mobile banking

In order to address the last two empirical objectives pertaining to gender and age differences, a two independent-samples t-test and one-way analysis of variance (ANOVA) were undertaken respectively.

There was no statistically significant difference between male and female Generation Y students' attitudes towards mobile banking, perceived ease of use, subjective norms, perceived behavioural control, perceived integrity, mobile banking usage behaviour, and perceived relative advantage. This finding is consistent with the research findings of Govender and Sihlali (2014). A possible explanation could be that male and female

students show a similar interest in mobile banking in terms of these factors. However, a small statistically significant difference was found between male and female Generation Y students' perceived system quality (Section 5.12). This finding suggests that female students trust mobile banking more in terms of perceived system quality than their male counterparts do. This may be because male students demonstrate greater fear of and less trust in mobile banking in terms of system quality. This finding is in contrast with the postulation of Lichtenstein and Williamson (2006:60), as these authors highlight that females in general have a greater fear of new technologies than their male counterparts do.

Regarding age differences (Section 5.13), a statistically significant difference was found between different age groups of Generation Y students and attitudes towards mobile banking, perceived ease of use, subjective norms, and perceived behavioural control. This is inconsistent with the findings of Maduku (2013), and Maduku and Mpinganjira (2012), as they found that age is a poor predictor of attitudes towards Internet banking and mobile banking respectively. However, there was no statistically significant difference between different age groups of Generation Y students and perceived integrity, mobile banking usage behaviour, perceived relative advantage and perceived system quality. Conversely, the Kleijnen *et al.* (2004) study suggest significant differences in the effects that perceived system quality have on attitude between younger and older consumers.

The succeeding section explains the contribution made by this study.

6.4 CONTRIBUTION OF THE STUDY

Retail banks today deploy significant resources in the development of electronic banking services, including mobile banking. As such, key role players within retail banks, including marketers, policy makers, strategists and financial and business analysts, need to understand how consumers in general, and Generation Y in particular, perceive and evaluate mobile banking as a source of self-service banking technologies, in order to recoup returns on investments and positively influence banking behaviour, attitudes towards mobile banking and mobile banking behaviour.

The findings of this study contribute towards the body of knowledge in the area of attitudes towards and usage behaviour of mobile banking by empirically testing a model of factors, primarily utility and trust factors, influencing Generation Y students' attitudes

towards and usage behaviour of mobile banking and establishing which factors act as predictors to successful mobile banking adoption. It is suggested that the hypothesised model is an eight-factor structure composed of attitudes towards mobile banking, perceived ease of use, subjective norms, perceived behavioural control, perceived integrity, mobile banking usage behaviour, perceived relative advantage and perceived system quality. Role players within retail banks, including marketers, policy makers, and strategists, can apply this model to determine and better comprehend Generation Y students' attitudes and behaviour across a wide array of technological products and services in the South African retail-banking domain. This study also offers guidance for role players in developing and adapting marketing and strategic plans, business models, processes, awareness programmes and pilot projects to increase mobile banking uptake, satisfy the banking needs of the intended target markets as well as influence banking behaviour, thereby ensuring future success. Moreover, there is a dearth of published research and a definite lack of empirical research on this type of study, which focuses specifically on the South African Generation Y cohort. Additionally, the recommendations discussed in the section to follow will enable the aforementioned role players targeting the Generation Y cohort with innovative retail banking products and services to tailor, *inter alia* their marketing efforts accordingly.

6.5 RECOMMENDATIONS

The insights gained from the preceding chapters highlight that changing consumer needs and behaviour, innovative financial products and services, modifications in the industry structure and an array of distribution channels are restructuring the retail banking industry. The Internet, including the mobile Internet, is recognised as a significant factor and enabler in this process of fast-pace change and innovation. The Internet has not only transformed and revolutionised the retail banking industry but has also allowed for the provision of additional functionality, 24-hour accessibility and time- and cost-saving advantages. The Internet dissolves conventional boundaries between financial institutions, including retail banks, and empowers consumers to determine and define their own financial future. A great challenge for retail banks, therefore, is to refocus their attention on their consumers and gain a better understanding of what their needs and wants are from a financial services perspective. This has compelled retail banks to take a closer look at their internal procedures and strategies in order to manage the fast-evolving needs

and expectations of their consumers, including, amongst others, cost savings, customised products and services as well as more personalised attention.

While some South African banks have conducted their own studies, these are often concentrated on specific aspects and are driven primarily by several strategic and (internal) political objectives. Generally, the results of these studies are not publicised and often fail to represent an industry-wide picture. It is also important to note that the South African situation differs reasonably significantly from that in other countries due to its explicit industry configuration and regulations, population characteristics, banking information systems and technologies and Internet infrastructure. As such, the results from international studies, in all likelihood, are not applicable in the South African context. This study recommends the target market strategy on mobile banking acceptance through influencing mobile banking behaviour.

In accordance with the findings of this study, the section that follows outlines a number of recommendations for encouraging mobile banking usage behaviour amongst the South African Generation Y cohort.

6.5.1 Continue to monitor Generation Y students' attitudes towards mobile banking

In the present competitive financial and technological environment, consumers are inundated with a wide selection of financial and technological products and services, which may lead to confusion. Retail banking role players that make an effort to understand consumers' attitudes may be in a better position to create consumer preferences by introducing and developing technological banking products and services as well as designing advertising campaigns that aim at differentiating the retail bank's products and services from those of its competitors. Retail banking role players should note that understanding attitudes towards mobile banking is imperative, as attitude arguably has a strong direct and positive effect on consumers' intentions to use a new system or technology (Sommer, 2011:91), including mobile banking.

The findings indicate that Generation Y students have a positive attitude towards mobile banking. However, this study only provides a snapshot in time, and the antecedents that determine their attitudes towards mobile banking may change over time. For example,

while the ease of use of mobile banking was not found to be a predictor of attitudes towards mobile banking in this study, this may change, as ease of use becomes a more prominent characteristic of this self-service technology. As such, it is recommended that retail-banking role players continuously monitor Generation Y students' attitudes towards mobile banking.

6.5.2 Simplify the ease of use of mobile banking

Perceived ease of use refers to the extent to which an individual believes that utilising a specific system would be free of physical and mental effort (Davis, 1989:320). It is believed that an innovation or system that necessitates little technical skills and operational efforts is more likely to be adopted, which, in turn, generates better performance (Ndubisi, 2006:18). In this study, perceived ease of use was found to have a significant direct positive influence on Generation Y students' mobile banking usage behaviour. As such, it is suggested that retail banks strive to simplify the mobile banking self-service technology continuously to ensure that it remains simple and easy to use and that consumers do not perceive it as complex or difficult to use. This can be achieved through the provision of simple and clear mobile banking information and innovative educational tools such as tutorial videos that demonstrate to consumers how easy it is to use mobile banking. Retail banks can also reinforce the ease of use of mobile banking in other distribution channels; that is, a retail-banking employee can assist a consumer wanting to transfer money in the branch to do so with mobile banking. Once consumers see how easy it is, they will likely repeat the action. To this end, retail banks may be able to attract the Generation Y cohort and grow their patronage of mobile banking. In addition, it is recommended that the mobile banking channel be easy to navigate, provide a consistent customer experience and integrate seamlessly with other distribution channels, such as Internet banking and branch networks. In this regard, retail banks can consider removing steps in the mobile banking process, thereby making the current transacting process simpler to perform. Furthermore, retail banks can consider incorporating hands free, voice command capabilities into the current mobile banking system, allowing consumers to make use of their voice to control their banking transactions, thereby simplifying the mobile banking process. In addition, retail banks can provide live chat platforms in addition to secure messaging. It may also be worthwhile for retail banks to consider the use of research projects, simulations and games, such as those

developed by the Serious Games Institute of South Africa (SGI-SA), used to imitate real-life events, allowing the player of the game to find solutions for a number of problems that may arise. By playing a game related to mobile banking, consumers may perceive mobile banking as easy to use. A social game on Facebook may also be employed in this regard. In essence, it may be wise for retail banks to offer complex capabilities in a simple and practical manner that creates differentiation without sacrificing customer value.

6.5.3 Work towards making pro-usage behaviour of mobile banking a societal norm in South Africa

In this study, subjective norms were found to have a significant direct positive influence on attitudes towards mobile banking. This indicates that Generation Y students take into consideration the opinions of significant others concerning mobile banking usage. Retail banks need to recognise that in reaching out to Generation Y consumers, they are also indirectly appealing to members of their family and peer group (Cox *et al.*, 2008:12). Retail banks, therefore, are advised to reach out to these Generation Y networks, or create new ones, to communicate effectively with these new consumers. If retail banks, alongside other financial institutions, such as insurance and investment companies, worked towards making electronic usage behaviour a societal norm in South Africa, this might have a significant positive influence on the demand for innovative products and services, including mobile banking services. Social networking media may be utilised to make electronic usage behaviour trendy amongst Generation Y students, which may result in a snowball effect on the wider Generation Y cohort and even the country at large. In addition, popular young celebrities may also play an essential role in this regard.

6.5.4 Add features to the mobile banking service that give consumers greater control over their banking

Perceived behavioural control is the degree to which an individual perceives the ease or difficulty of performing a particular behaviour and his or her perceived capability to produce a successful outcome when performing that behaviour (Ajzen, 1991:183-184). In this study, perceived behavioural control was found to be a significant predictor of Generation Y students' attitudes towards mobile banking. Therefore, it is advised that retail banks continuously add features to the mobile banking service that give consumers

greater control over their banking. To this extent, retail banks may want to consider adding additional features such as a branch locator tool, car and asset-, fees-, home- and personal-loan repayment calculators as well as wealth projection tools. Moreover, a foreign exchange portal with all the foreign exchange information requirements including a spot calculator to help consumers convert between the South African Rand and other major currencies can be added to the mobile banking service. In addition, a functionality that allows for the creation of a summative report tracking the spending patterns of consumers at specific shops, restaurants, and the like can be added as a feature to mobile banking. This would likely aid consumers in their budgeting endeavours. In this way, retail banks' mobile banking platform may serve as consumers' own personal financial educator. Furthermore, retail banks may want to consider mobile wallets and cashless transacting, particularly for street vendors and schoolchildren, given South Africa's high crime rate. This can be provided together with an instant digital receipting service. It may also be wise for retail banks to consider the introduction of secure virtual storage havens such as digital safe boxes, allowing consumers to store and import digital banking information using their mobile devices. In order to increase consumers' confidence and influence their perceived self-efficacy of using mobile banking, it is recommended that multimedia content, including demonstrations via video presentations, be offered at a retail bank branch and on the retail bank's Website, together with some helpful tips regarding the enabling requirements for using mobile banking. This will likely highlight the user-friendliness of this service. Moreover, retail banks may want to consider strategically deploying employees within their retail bank branch channels to focus mainly on educating and communicating to consumers about the features and advantages of electronic banking services, as well as explain to consumers how mobile banking functions and what is necessary to conduct mobile banking transactions. The above-mentioned recommendations may not only improve mobile banking usage rates, but may also equip consumers with a greater autonomy to control their banking undertakings.

6.5.5 Monitor and influence mobile banking usage behaviour

The findings of this study suggest that Generation Y students are active in terms of their mobile banking usage. Table 5.14 indicates that 59 percent of Generation Y students use mobile banking, and 31 percent do not use mobile banking, but are interested in doing so. As such, mobile banking is a reality for the retail banking industry and its purpose and

prominence is likely to grow in the near future. PwC (2014:1) indicates that powerful forces are reshaping the retail banking industry, including consumer expectations, technological capabilities, regulatory requirements, demographics and economics. Together, these forces are creating an imperative to change. Moreover, Deloitte (2014:1) highlights that competitive realities in the retail banking landscape are in a state of flux and few can anticipate how mobile banking will eventually shape competition within the retail banking industry. Therefore, it is recommended that retail banks continuously monitor mobile banking usage, especially during this period of uncertainty and opportunity, by benchmarking their mobile banking operations against the best-performing rivals in their key markets. In addition, it is advised that retail banks understand and influence consumers' mobile banking usage behaviour, thereby giving them a better chance to remain competitive, relevant, and financially successful. Constant enhancements and adjustments are the only means really to ensure that retail banks are not left behind as the competitive landscape, and in particular the banking needs and behaviour of Generation Y consumers, continues to shift.

6.5.6 Continue to monitor the perceived integrity of the retail bank

Mobile banking is grounded in technology, security, authentication and trust principles (Lin, 2011:254). Trust is described as an individual's belief that others, including people and organisations, will behave as expected rather than opportunistically (Gefen *et al.*, 2003b:54). Moreover, trust plays an important role in environments where a significant degree of uncertainty and risk prevail, such as any online and mobile Internet setting. As such, trust is essential in understanding consumer behaviour in e-commerce and m-commerce. Furthermore, trust is important for the adoption of new technological innovations, such as mobile banking (Lin *et al.*, 2011:616). Trust, in the form of integrity, is increasingly playing an important role in influencing consumers' beliefs or perceptions of mobile banking. Integrity is essential for building consumer relationships, given that consumers deposit their hard-earned money in the bank, and consequently, allow retail banks control over their assets. A relationship between the retail bank and the consumer is not likely to exist if consumers did not trust the undertakings of their retail bank (Lin, 2011:254). Retail banks, therefore, are advised to make an effort to foster trust in consumers.

The findings of this study propose that Generation Y students perceive their retail banks as having the necessary integrity in providing mobile banking. As such, retail banks are encouraged to demonstrate constantly their ability to provide safe and secure value-adding services, their intention to be fair and honest concerning consumers' banking requirements and demonstrate good intent in terms of empowering consumers. To this end, retail banks are advised to introduce biometric mobile banking solutions, with the purpose of boosting customer convenience and mobile banking security offerings. In addition, it is recommended that retail banks ascertain that they are capable of delivering on promises made during, amongst others, marketing initiatives. These initiatives will likely assist consumers with familiarising themselves with the retail bank and the retail bank's mobile banking channel. If consumers believe that their retail bank has the necessary integrity, it will likely have a positive influence on consumer loyalty, which, in turn, may not only lead to increased bank market share, but also a meaningful mobile banking market share. Retail banks could benefit from ensuring that the level of service and quality received within the retail bank branch is translated and experienced by consumers when performing mobile banking transactions. This is likely to have a positive influence on the retail bank's integrity and may build improved trust in both the retail bank branch and virtual environment, which, in turn, may lead to increased mobile banking usage.

6.5.7 Ensure that mobile banking offers a relative advantage

Relative advantage is described as the extent to which an innovation is perceived as being more effective and superior than its precursor (Nor & Pearson, 2008:41). Consumers make use of electronic banking channels, including mobile banking because they find the systems useful for conducting banking transactions (Maduku & Mpinganjira, 2012:176). In this study, perceived relative advantage was found to have a significant direct positive influence on Generation Y students' attitudes towards mobile banking. The relative advantage of mobile banking, therefore, is imperative to ensure increased acceptance.

Retail banks are challenged frequently in demonstrating that the utilisation of mobile devices to undertake banking transactions will be worthwhile for potential consumers and that functionality will be provided. It is recommended, therefore, that retail banks offer basic banking services via mobile banking, such as account balance checks and inquiries, inter-account transfers, account payments and the provision of bank statements. In

addition to these basic offerings, and in order to gain a competitive advantage and increased market share, it may be wise for retail banks to maximise on their creative capacity to offer many other banking services through mobile banking not offered by their competitors by continuously analysing their competitors' products and services and their stance in the industry. Retail banks, therefore, are encouraged to position their mobile banking offering as creating superior value and usefulness to consumers. As such, the focus should be on providing distinct benefit and value through their mobile banking offering. This can be achieved through the introduction of a digital safe box as well as the possibility of linking mobile banking to the home automation system to facilitate the payment of automatic grocery restocking. Furthermore, socially mindful, Generation Y's interest in mobile banking can be stimulated if mobile banking has social and environmental benefits. In addition, it is suggested that retail banks communicate effectively, using all channels of engagement, such as digital media and touch points, both the tangible and intangible advantages of using the mobile banking channel to consumers, in particular the advantage of convenience with respect to time and place independence. Communicating the benefits of mobile banking should be a never-ending communications priority. Therefore, it is advised that retail banks find a prominent and permanent place on their Website to feature the advantages of mobile banking. This way every time consumers visit the retail bank's Website, the retail bank is presented with another opportunity to drive consumers to mobile banking. This can also be achieved through the formulation of an effective marketing communication strategy driven throughout the entire retail bank, from top management to consumer-facing employees.

6.5.8 Ensure the system quality of mobile banking

In this study, perceived system quality was included as a trust-related factor and includes issues concerning structural assurances and information quality. The findings of this study suggest that Generation Y students trust that the mobile banking system likely has adequate structural assurances, can provide quality and relevant information and that the system is likely to be user-friendly in terms of navigation and loading of texts and graphics. As such, it is recommended that retail banks design a mobile banking system that is uncomplicated and free of any mental effort. This includes the design of the interface, the mobile banking Website, processes and programmes. Mobile banking should be user-friendly with clear instructions on how to undertake a specific transaction.

It is advised that icons be employed in this regard to ensure that mobile banking instructions can be understood by all levels of users. In addition, it is suggested that retail banks ensure that their mobile banking system is stable and reliable for banking purposes.

In South Africa, several incidents of electronic fraud, or cybercrime, have been reported (Fichardt, 2015). As such, it is advised that retail banks have the necessary structural assurances in place to ensure that the mobile banking system is perceived as safe and secure. This includes security features such as encryption, which safeguard sensitive information. It may also be wise for retail banks to devote significant efforts in establishing ways in which they can enhance trust in terms of system quality. Retail banks can achieve this by, amongst other things, implementing measures to mitigate electronic fraud as well as communicate to their consumers the steps employed to enhance the security of electronic banking systems. This will likely serve to keep consumers informed and may bolster their trust of the system. This is important, as one simple system error can easily lead to a tarnished perception of system quality, and consequently, distrust of mobile banking. If possible, retail banks should consider strategies like money-back guarantees, enhanced consumer service and collaborations with credible businesses that possess a seal of approval. In addition, it is recommended that retail banks further improve mechanical resources within the structure of the main internal framework. This is because, as mobile banking becomes more popular compared to other electronic banking channels, problems and technical difficulties may arise as a result of the influx of banking transactions being made at the same time. Therefore, retail banks are advised to invest time and effort into better equipping their systems with more powerful and advanced computer technologies, such as biometric mobile banking solutions.

In addition, it is suggested that the information provided through mobile banking be purposeful and clear. Information requested by the consumer should be displayed in a logical format, be relevant and accurate, as this may contribute to the overall trust building process. It is recommended that retail banks conduct regular surveys to determine the functionality requirements of their consumers.

6.5.9 Segment markets and engage in data mining

The findings of this study indicate that female Generation Y students trust mobile banking more in terms of perceived system quality than male students do. Furthermore,

this study suggests that older age groups (20 years and older), hold a more positive attitude towards mobile banking, perceive mobile banking as more easy to use, view the opinions of significant others as more important and believe that using mobile banking is more within their control than younger students do. It is recommended, therefore, that retail banks segment markets and engage in data mining. This finding also highlights that retail banks should not adopt a ‘one-size-fits-all’ approach. To this extent, and to assist retail banks with better understanding their different consumer segments, it is advised that retail banks increase their use of financial and customer analytics, customer intelligence, and performance management, and look beyond the transactional nature of their existing systems. This will likely ensure that retail banks provide better service to their consumer segments and a greater opportunity to cross-sell, depending on the nature of the various consumer segments.

Comprehending the needs and behaviours of consumers is a core building block for long-term financial relationship building (Kanchan *et al.*, 2012:3). Retail banks, therefore, are advised to engage more regularly with their consumers to establish what their current or future financial needs are. This can be achieved through conducting random Internet surveys or brief consultation sessions with a bank consultant when they visit a branch. This is likely to aid the segmentation process as well as give an idea on how to satisfy each segment’s needs.

6.5.10 Offer cost-saving incentives to encourage mobile banking use

Although the perceived cost of mobile banking was not specifically tested in this study, previous studies indicate that cost is an important factor to consider in technology adoption (Nel & Raleting, 2012; Redlinghuis & Rensleigh, 2010; Wu & Wang, 2005), including mobile banking. Therefore, it is recommended that retail banks take into account the cost structures of their electronic banking channels. Driving down the costs of mobile banking should be included as a core strategic objective. This can be achieved through introducing price bands. Consumers processing large volumes of transactions via mobile banking should receive a discount on transaction charges. Moreover, consumers could receive bank statements free of charge by means of a short message service (SMS). Those consumers choosing to perform banking transactions over the counter should be charged premium fees and those using mobile banking should be rewarded. This is likely to encourage mobile banking usage and should benefit both the consumer and the retail

bank in terms of cost and time savings. That is, consumers save money and time not having to travel to their nearest branch, and retail banks reduce expenditure not having to establish more branches and can afford more time in developing other banking innovations.

In addition, it is suggested that retail banks ensure that mobile banking cost-related information is available from a number of information services, such as the retail bank branch and the retail bank's Website. Ascertaining that consumers are knowledgeable about the fee structures of the products and services they pay for, will likely aid in the trust creation process. Furthermore, it is advised that the cost information pertaining to mobile banking be easily understandable by consumers. In addition, it is recommended that the cost information be of such a nature that the consumers are in a position to identify easily what amount they will be paying for each mobile banking transaction.

6.5.11 Educate consumers and retail banking staff on mobile banking services

In order to increase mobile banking usage, it is important that retail banks consider educating the less informed concerning the functionalities of mobile banking, safety measures that are in place to secure the virtual environment as well as the related benefits and costs. Educated consumers will likely be able to follow the various safety protocols, consequently, protecting them when performing electronic transactions. Moreover, retail banks are advised to demonstrate to consumers how they can derive the benefits of mobile banking. In this regard, direct mail can be a useful tool for educating and informing consumers, not only on the above-mentioned aspects, but also on the availability of new services offered through mobile banking. If consumers can identify and see the value of self-service technologies, they will likely be more willing to adopt and use these technologies.

The empowerment and education of retail banking staff is also important in this regard, as they are generally the primary source of information consumers look to when problems are encountered (Gleim, 2014). Retail banking staff should, therefore, be knowledgeable about mobile banking and its functionalities, and be confident and comfortable when communicating to consumers about it. Retail banks should remember that to encourage mobile banking usage is a sales pitch, and as such, retail-banking employees need to be

aware of the value propositions of mobile banking and accentuate the benefits when educating and informing consumers about it. It is suggested, therefore, that retail banking staff be educated on, amongst others, electronic banking fees in order to better shift consumer transactions to less expensive electronic channels. Additionally, retail banks would be in a better position to achieve greater consumer satisfaction through the advantages offered by electronic banking channels. Greater consumer satisfaction would subsequently translate to improved consumer retention (Gleim, 2014).

In addition, retail banks are encouraged to promote mobile banking using retail bank branches and ATMs. Mobile banking can be advertised on all flat screen televisions and posters inside the retail bank branch, as well as on ATM screens. Promotions could also be held at retail bank branches, where prizes could be offered to consumers who sign up and use the mobile banking facility. Retail banks can also launch marketing campaigns to direct awareness to potential users. This could include the use of radio, television, newspapers and social networking sites. These marketing campaigns should address the utility differences between the traditional banking channel and electronic banking channels as well as cost differences between the two channels. It may be wise for retail banks to become more innovative in the methods they employ to communicate this important message to consumers. To this end, emails may be particularly appropriate when promoting mobile banking due to so many people, specifically Generation Y individuals, now read emails on their mobile devices. There are three key points to consider when employing email as a promotional tool for mobile banking. First, retail banks should ensure that their emails are optimised for the mobile experience. Secondly, the emails should link directly to mobile banking, such as the mobile banking application, iTunes and Google Play App stores. Thirdly, the emails should incorporate tracking tags on logos and links to easily track and measure success. This enables retail banks to turn email into a mobile banking promotional tool easily.

6.5.12 Tailor mobile banking services to appeal to the Generation Y cohort

Generation Y members are driving digital finance services in South Africa. This is because this generation is classified as early adopters, who are familiar with convenient and transparent self-service digital channels and prefer to take active control of the transaction process (IT news Africa, 2015). In addition, the significant size of the

Generation Y cohort and the future higher earning potential of role model status of graduates (Bevan-Dye & Surujlal, 2011:49) make Generation Y students an important target segment for retail banks. As this generational cohort are known to be technologically astute and comfortable using online and mobile communication (KPMG South Africa, 2014), retail banks could incorporate new digital platforms to reach this target segment in terms of electronic banking offerings. Establishing a Facebook page and designing mobile telephone advertisements that appeal specifically to this age cohort, whether it be in terms of the music and visual copy or even the use of a local celebrity, will help retail banks engage better with this segment. Retail banks could also use Web 2.0 as a marketing tool, enabling Generation Y consumers to acquire all the necessary information concerning mobile banking without having to visit a retail bank branch. In order for retail banks to be the financial institution of choice concerning electronic banking technology for Generation Y consumers, it is recommended that retail banks keep their self-service technology options, including mobile banking, fresh and adopt new banking technologies when demanded by these consumers. In this regard, retail banks could conduct regular online polls to determine Generation Y consumers preferred channel of financial service delivery and determine how to address these consumers' banking needs. Retail banks that fail to get a handle on the technology Generation Y demands, risk losing this generation of consumers and subsequent generations to those financial institutions that are able to satisfy their banking needs. As retail banks look to the future, Generation Y is emerging as a key consumer segment to engage. To build positive and lasting relationships with these consumers, retail banks will likely need to revisit many of their strategies, mainly along the dimensions of banking distribution channels, marketing and products. Developing an in-depth understanding of the values that drive this group's financial and banking needs and preferences is important in this regard.

In the following section, the limitations and future research opportunities for the study are discussed.

6.6 LIMITATIONS AND FUTURE RESEARCH OPPORTUNITIES

The purpose of this study was to measure the extent to which perceived utility and trust in mobile banking influences Generation Y students' attitudes towards and usage behaviour

of mobile banking. As with most studies, including this study, certain limitations can be identified, consequently presenting opportunities for further research.

The first limitation identified is that the study utilised a non-probability convenience sampling method to undertake a survey among the study's participants (Section 4.5.3). Although several demographic questions were included to determine the degree to which the sample was representative of the target population, great care should be taken when interpreting the results of the study and in generalising the results to the population. Moreover, this study undertook a single cross-sectional research design (Section 4.3). Future research, by making use of a longitudinal research design, could provide valuable information regarding any changes in the factors that influence Generation Y students' attitudes towards and usage behaviour of mobile banking.

This study depended on self-reporting to determine attitudes towards and usage behaviour of mobile banking. Employing an observational research approach may provide a more accurate measure of actual mobile banking attitudes and usage behaviour.

The sample represented in this study was Generation Y students registered at three HEIs located in various regions of one province (Section 4.5.1). Despite the fact that the sample was representative of individuals across the nine provinces of South Africa (Section 5.5.1), an opportunity exists to conduct a study on a wider scale by determining mobile banking usage behaviour of students registered at HEI campuses in each of the nine provinces. This will possibly give a more accurate view of the participants' attitudes and usage behaviour.

The central participants of this study were full-time students attending HEIs, assuming that graduates would have a high earning potential and higher social status. This creates an opportunity for researchers to carry out studies on the non-student portion of the South African Generation Y cohort to determine whether there are differences in the antecedents of attitudes towards and usage behaviour of mobile banking, to examine whether a market gap exists to appeal to these consumers, and to draw comparative conclusions.

This study focused only on members of the Generation Y cohort that were between the ages of 18 and 24. This presents an opportunity to determine the attitudes towards and usage behaviour held by members from other generations alive today, whereby differences can then be identified.

6.7 CONCLUSION

In conclusion, the significant and rapid developments in mobile technologies and the upsurge of mobile phones and other mobile devices, have led to the development and introduction of mobile banking, which has changed the world of banking in many ways. The success of mobile banking, however, depends largely on consumers' acceptance thereof, and presently, compared to older generations, the youth are leading the way forward towards new technology adoption.

The present study expands on preceding research on consumer attitudes and usage behaviour of mobile banking by investigating the Generation Y cohort within the South African context. Given that Generation Y consumers represent the future, it is essential for marketers, strategists, policy makers, financial and business analysts, within the retail-banking sector, to understand Generation Y consumers' attitudes towards and usage behaviour of mobile banking in order to develop appropriate strategies to promote increased consumer acceptance and positively influence attitudes towards mobile banking and mobile banking behaviour.

This study proposed a model of the factors influencing South African Generation Y attitudes towards and usage behaviour of mobile banking. Attitudes towards mobile banking, perceived ease of use, subjective norms, perceived behavioural control, perceived integrity, mobile banking usage behaviour, perceived relative advantage and perceived system quality emerged as the factors that influence Generation Y students' attitudes towards and usage behaviour of mobile banking. This model may be applied to predict attitudes and behaviour across a wide array of technological products and services amongst different segments of the population.

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ANNEXURE A

COVER LETTER AND QUESTIONNAIRE

COVER LETTER



NORTH-WEST UNIVERSITY[®]
YUNIBESITHI YA BOKONE-BOPHIRIMA
NOORDWES-UNIVERSITEIT
VAAL TRIANGLE CAMPUS

GENERATION Y STUDENTS' PERCEIVED UTILITY AND TRUST IN MOBILE BANKING

Dear participant,

My name is Marko van Deventer. I am currently working towards my thesis under the supervision of Prof. Natasha de Klerk and co-supervision of Prof. Ayesha Bevan-Dye as part of the requirements for completing my PhD in Business Management at the North-West University (Vaal Triangle Campus).

The purpose of this research project is to determine the extent to which Generation Y students' perceived utility and trust in mobile banking influences attitudes towards and usage behaviour of mobile banking. Mobile banking refers to conducting banking activities using a mobile device, such as a mobile phone or an iPad. The study specifically focusses on Generation Y members as they account for approximately 40 percent of the South African population. Generation Y refers to individuals born between 1986 and 2005.

Please assist me by completing the attached questionnaire. The questionnaire is user-friendly and should not take you more than 10 minutes to complete. All responses are confidential and the results will only be used for research purposes, outlined in the form of statistical data.

Thank you most sincerely - your assistance and contribution is highly appreciated.

Marko van Deventer
21852898@nwu.ac.za
North-West University
Faculty of Economic Sciences & IT

QUESTIONNAIRE

SECTION A: Demographical Information

Please mark the appropriate box with a cross (X) or write down your answer.

A1	Name of your institution:	Traditional university	Comprehensive university	University of technology
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A2	Country of origin:	South Africa	Other (Please specify):
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A3	Province of origin:	Eastern Cape	Free State	Gauteng	KwaZulu-Natal
		Limpopo	Mpumalanga	Northern Cape	North West
					Western Cape
		Other (please specify):			

A4	Registered:	Full-time	Part-time
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A5	Current year of study:	1 st year	2 nd year	3 rd year	4 th year	Post graduate
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A6	Gender:	Male	Female
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A7	Ethnic group:	Black/African	Coloured	Indian/Asian	White
		Other (please specify):			

A8	Please indicate your mother tongue language:			Afrikaans	English	IsiNdebele	IsiXhosa
	IsiZulu	Sepedi	Sesotho	Setswana	SiSwati	Tshivenda	Xitsonga
	Other (please specify):						

A9	Age at your last birthday:	<18	18	19	20	21	22	23	24	25	>25
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MOBILE BANKING IS THE USE OF A MOBILE DEVICE, SUCH AS A MOBILE PHONE OR IPAD TO CONDUCT BANKINGTRANSACTIONS

SECTION B: Mobile Banking Background Information

Please mark the appropriate box with a cross (X) or write down your answer.

B1	Do you have a bank account?						Yes	No
B1A	If yes, please specify the name of your banking institution:							
	ABSA	African Bank	Capitec	FNB	Nedbank	Standard Bank	Other (please specify):	

B2	Which mobile device do you own/have?	iPad/Tablet	Smartphone	Feature phone/Normal mobile phone	Personal digital assistant (PDA)/Handheld PC	None
----	---	-------------	------------	-----------------------------------	--	------

B3	Can your mobile device launch an Internet browser?	Yes	No	Not sure
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B4	Do you use mobile banking?	Yes	No, but interested	No, not interested
B4A	If yes, please specify which of the following have you used mobile banking for (select all applicable):			

Buy airtime	
Buy electricity	
Buy data bundles	
Check account balances	
Receive statements (i.e. mini- and bank statement)	
Pay accounts (i.e. store account payment)	
Withdraw cash	
Transfer funds to relatives/friends	
Save money	
Manage accounts (i.e. inter-accounts transfers)	
Purchase groceries at a supermarket	
Other (please specify):	

SECTION C: Antecedents of Attitudes towards and Usage Behaviour of Mobile

Banking

Please indicate the extent to which you disagree/agree with each of the following statements by placing a mark in the appropriate box; 1 being strongly disagree and 6 strongly agree.

Perceptions of mobile banking:		Strongly Disagree	Disagree	Disagree Somewhat	Agree Somewhat	Agree	Strongly Agree
C1	Using mobile banking is a good idea.	1	2	3	4	5	6
C2	Using mobile banking is an appealing idea.	1	2	3	4	5	6
C3	My attitude towards mobile banking is favourable.	1	2	3	4	5	6
C4	It is easy to learn how to use mobile banking.	1	2	3	4	5	6
C5	Becoming skilful at using mobile banking is easy (i.e. knowing shortcut keys, advanced options).	1	2	3	4	5	6
C6	It is easy to remember how to use mobile banking.	1	2	3	4	5	6
C7	People who are important to me think I should use mobile banking.	1	2	3	4	5	6
C8	People whose opinions I value think I should use mobile banking.	1	2	3	4	5	6
C9	People who influence my decisions think that I should use mobile banking.	1	2	3	4	5	6
C10	I believe I could easily use mobile banking to conduct my banking activities.	1	2	3	4	5	6
C11	I believe using mobile banking is entirely within my control.	1	2	3	4	5	6
C12	I believe I have everything I need to use mobile banking.	1	2	3	4	5	6
C13	Banks that provide mobile banking services are honest with their customers.	1	2	3	4	5	6

Perceptions of mobile banking:		Strongly Disagree	Disagree	Disagree Somewhat	Agree Somewhat	Agree	Strongly Agree
C14	Banks that provide mobile banking services keep promises they make.	1	2	3	4	5	6
C15	Banks that provide mobile banking services act ethically in dealing with customers.	1	2	3	4	5	6
C16	I have used mobile banking in the past.	1	2	3	4	5	6
C17	I have recommended using mobile banking to my friends/family/peers.	1	2	3	4	5	6
C18	I do not intend ever switching from mobile banking to traditional banking.	1	2	3	4	5	6
I think, that mobile banking:		Strongly Disagree	Disagree	Disagree Somewhat	Agree Somewhat	Agree	Strongly Agree
C19	Enables me to complete my banking activities quickly.	1	2	3	4	5	6
C20	Is useful in conducting my banking activities.	1	2	3	4	5	6
C21	Enables me to complete my banking activities more conveniently.	1	2	3	4	5	6
C22	Has enough safeguards to make me feel comfortable using it.	1	2	3	4	5	6
C23	Has enough legal structures to adequately protect me when using it.	1	2	3	4	5	6
C24	Has enough technological advances to adequately protect me when using it.	1	2	3	4	5	6
C25	Can provide me with information relevant to my needs.	1	2	3	4	5	6
C26	Can provide me with sufficient information.	1	2	3	4	5	6

I think, that mobile banking:		Strongly Disagree	Disagree	Disagree Somewhat	Agree Somewhat	Agree	Strongly Agree
C28	Quickly loads all the text and graphics.	1	2	3	4	5	6
C27	Can provide me with accurate information.	1	2	3	4	5	6
C29	Is easy to navigate.	1	2	3	4	5	6
C30	Is visually attractive.	1	2	3	4	5	6

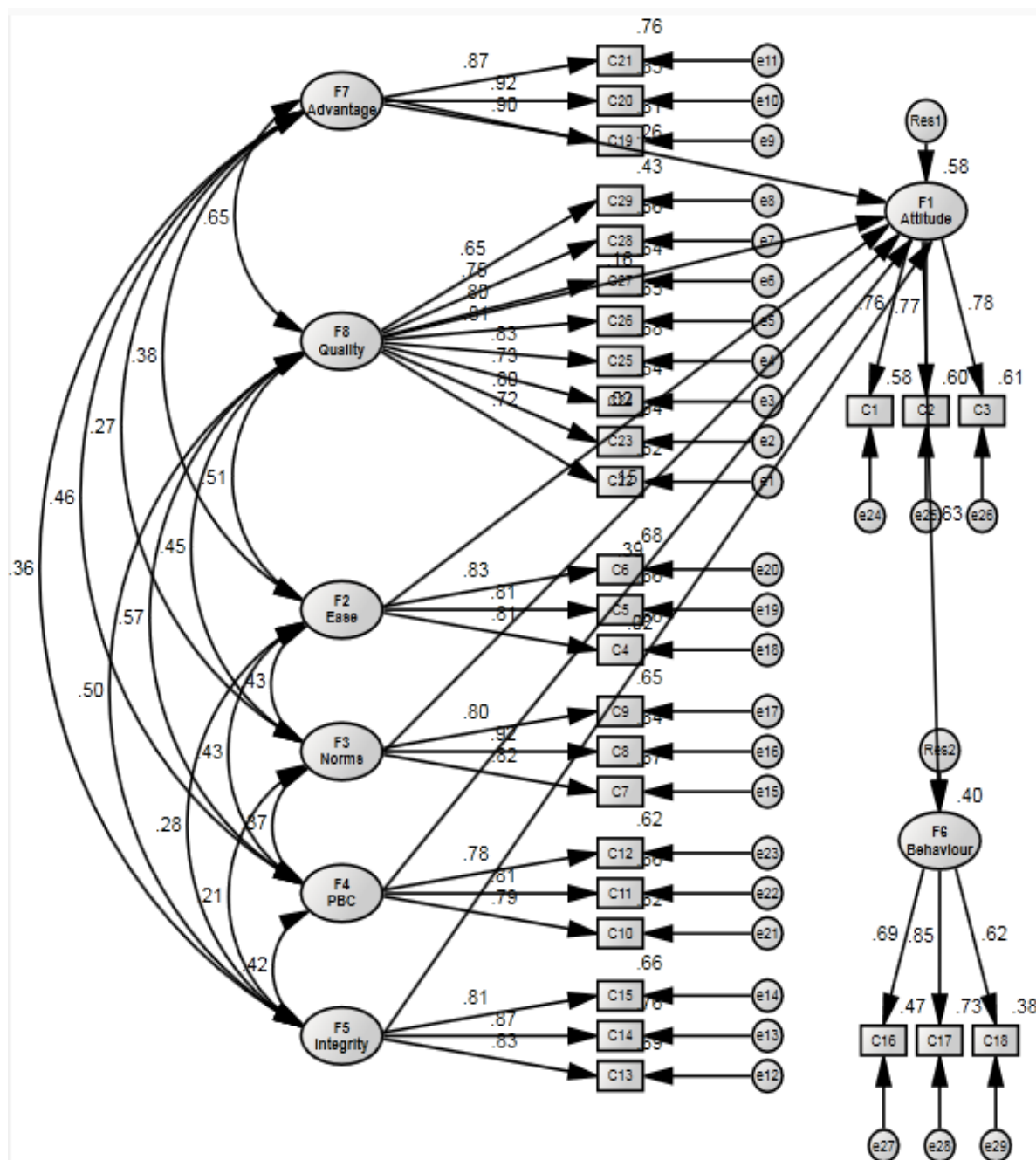
Thank you very much for your valuable contribution!

Ethical clearance number: ECONIT-ECON-2014-005

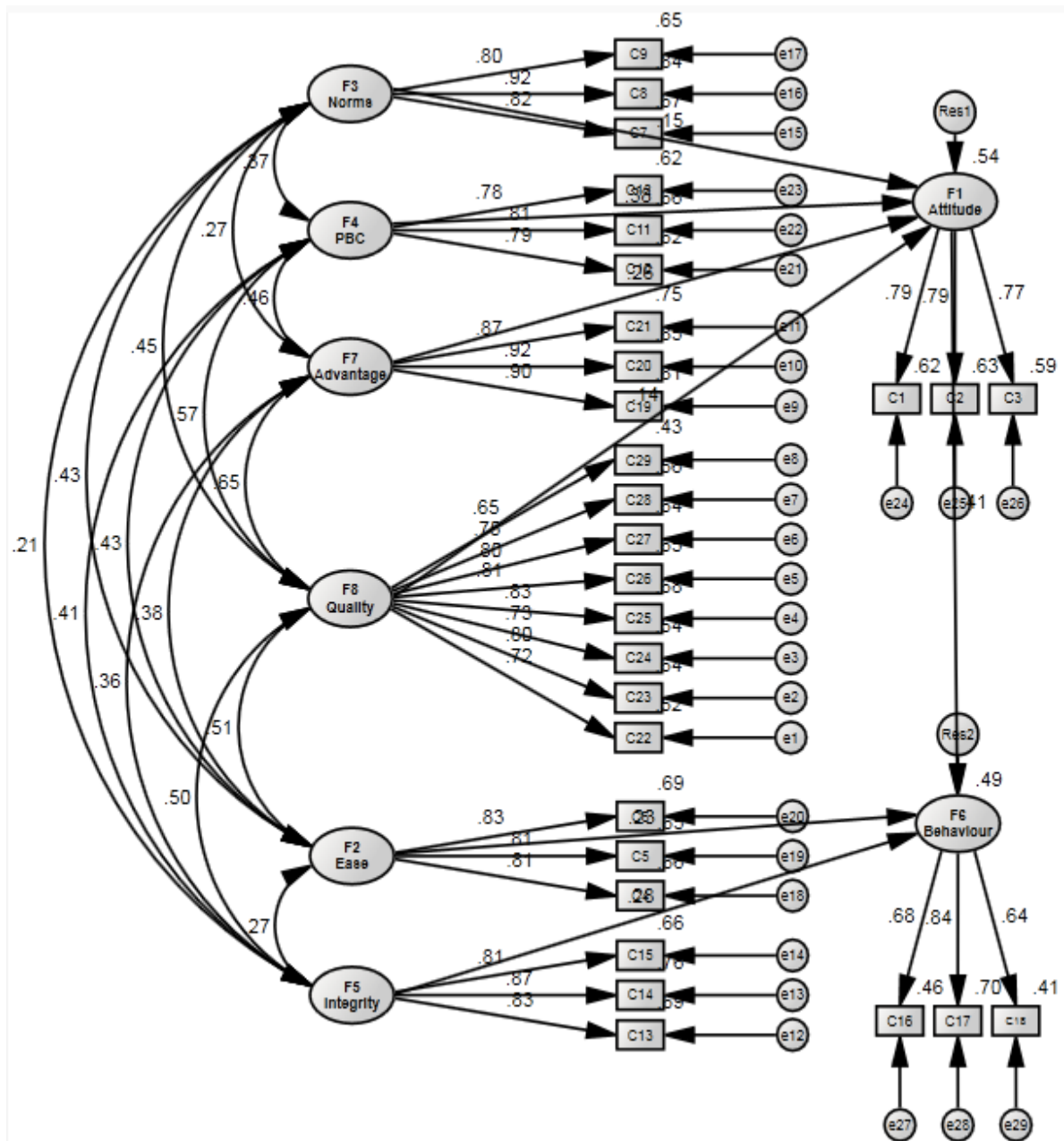
ANNEXURE B

STRUCTURAL MODELS

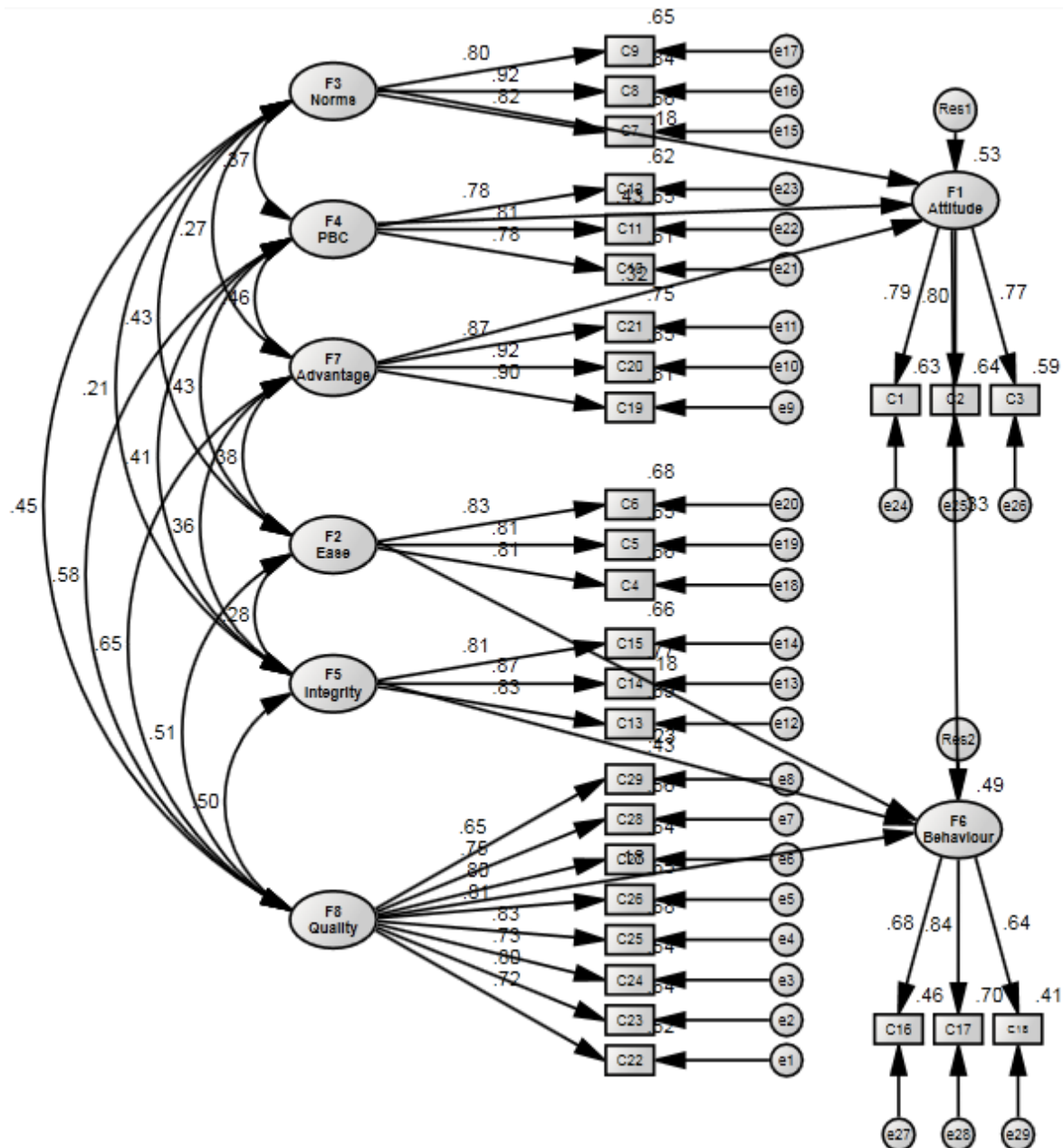
Structural Model A



Structural Model B



Structural Model C



ANNEXURE C

MULTIPLE COMPARISONS - TUKEY HSD

Dependent Variable	(I) Age	(J) Age	Mean Difference (I- J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Attitudes towards mobile banking	18	19	-.453592	.227532	.421	-1.12863	.22145
		20	-.628918*	.209897	.046	-1.25164	-.00620
		21	-.607997	.210696	.063	-1.23309	.01710
		22	-.811896*	.226752	.007	-1.48462	-.13917
		23	-.491254	.249658	.437	-1.23194	.24943
		24	-.781804	.281383	.083	-1.61661	.05300
	19	18	.453592	.227532	.421	-.22145	1.12863
		20	-.175326	.162194	.933	-.65652	.30587
		21	-.154405	.163226	.965	-.63866	.32985
		22	-.358304	.183484	.447	-.90266	.18606
		23	-.037662	.211137	1.000	-.66406	.58874
		24	-.328211	.247844	.840	-1.06351	.40709
	20	18	.628918*	.209897	.046	.00620	1.25164
		19	.175326	.162194	.933	-.30587	.65652
		21	.020921	.137582	1.000	-.38726	.42910
		22	-.182978	.161098	.917	-.66092	.29497
		23	.137664	.192003	.992	-.43197	.70730
		24	-.152885	.231760	.995	-.84047	.53470
	21	18	.607997	.210696	.063	-.01710	1.23309
		19	.154405	.163226	.965	-.32985	.63866
		20	-.020921	.137582	1.000	-.42910	.38726
		22	-.203899	.162137	.871	-.68493	.27713
		23	.116743	.192876	.997	-.45548	.68897
		24	-.173806	.232483	.989	-.86354	.51592
	22	18	.811896*	.226752	.007	.13917	1.48462
		19	.358304	.183484	.447	-.18606	.90266
		20	.182978	.161098	.917	-.29497	.66092
		21	.203899	.162137	.871	-.27713	.68493
		23	.320642	.210297	.730	-.30327	.94455
		24	.030093	.247128	1.000	-.70309	.76327

Dependent Variable	(I) Age	(J) Age	Mean Difference (I- J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Attitudes towards mobile banking	23	18	.491254	.249658	.437	-.24943	1.23194
		19	.037662	.211137	1.000	-.58874	.66406
		20	-.137664	.192003	.992	-.70730	.43197
		21	-.116743	.192876	.997	-.68897	.45548
		22	-.320642	.210297	.730	-.94455	.30327
		24	-.290549	.268300	.933	-1.08654	.50544
	24	18	.781804	.281383	.083	-.05300	1.61661
		19	.328211	.247844	.840	-.40709	1.06351
		20	.152885	.231760	.995	-.53470	.84047
		21	.173806	.232483	.989	-.51592	.86354
		22	-.030093	.247128	1.000	-.76327	.70309
		23	.290549	.268300	.933	-.50544	1.08654
Perceived ease of use	18	19	-.387604	.268318	.777	-1.18365	.40844
		20	-.767779*	.247522	.034	-1.50213	-.03343
		21	-.759560*	.248464	.039	-1.49670	-.02242
		22	-.404891	.267398	.736	-1.19821	.38843
		23	-.573713	.294410	.450	-1.44717	.29974
		24	-.735910	.331822	.289	-1.72036	.24854
	19	18	.387604	.268318	.777	-.40844	1.18365
		20	-.380175	.191268	.424	-.94763	.18728
		21	-.371956	.192485	.460	-.94302	.19911
		22	-.017287	.216375	1.000	-.65923	.62465
		23	-.186109	.248985	.989	-.92480	.55258
		24	-.348306	.292271	.897	-1.21541	.51880
	20	18	.767779*	.247522	.034	.03343	1.50213
		19	.380175	.191268	.424	-.18728	.94763
		21	.008219	.162244	1.000	-.47313	.48956
		22	.362888	.189975	.475	-.20073	.92651
		23	.194066	.226420	.978	-.47768	.86581
		24	.031869	.273304	1.000	-.77897	.84271

Dependent Variable	(I) Age	(J) Age	Mean Difference (I- J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Perceived ease of use	21	18	.759560*	.248464	.039	.02242	1.49670
		19	.371956	.192485	.460	-.19911	.94302
		20	-.008219	.162244	1.000	-.48956	.47313
		22	.354669	.191201	.512	-.21259	.92192
		23	.185847	.227449	.983	-.48895	.86064
		24	.023650	.274157	1.000	-.78972	.83702
	22	18	.404891	.267398	.736	-.38843	1.19821
		19	.017287	.216375	1.000	-.62465	.65923
		20	-.362888	.189975	.475	-.92651	.20073
		21	-.354669	.191201	.512	-.92192	.21259
		23	-.168822	.247993	.994	-.90457	.56692
		24	-.331019	.291427	.917	-1.19562	.53359
	23	18	.573713	.294410	.450	-.29974	1.44717
		19	.186109	.248985	.989	-.55258	.92480
		20	-.194066	.226420	.978	-.86581	.47768
		21	-.185847	.227449	.983	-.86064	.48895
		22	.168822	.247993	.994	-.56692	.90457
		24	-.162197	.316394	.999	-1.10087	.77648
	24	18	.735910	.331822	.289	-.24854	1.72036
		19	.348306	.292271	.897	-.51880	1.21541
		20	-.031869	.273304	1.000	-.84271	.77897
		21	-.023650	.274157	1.000	-.83702	.78972
		22	.331019	.291427	.917	-.53359	1.19562
		23	.162197	.316394	.999	-.77648	1.10087
Subjective norms	18	19	-.295097	.329326	.973	-1.27214	.68195
		20	-.621503	.303802	.388	-1.52282	.27982
		21	-.648682	.304958	.339	-1.55343	.25607
		22	-1.036232*	.328197	.029	-2.00993	-.06254
		23	-.662669	.361351	.526	-1.73472	.40939
		24	-1.258454*	.407270	.035	-2.46674	-.05017

Dependent Variable	(I) Age	(J) Age	Mean Difference (I- J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Subjective norms	19	18	.295097	.329326	.973	-.68195	1.27214
		20	-.326406	.234757	.807	-1.02288	.37007
		21	-.353585	.236251	.747	-1.05449	.34733
		22	-.741135	.265572	.081	-1.52903	.04676
		23	-.367572	.305597	.893	-1.27422	.53907
		24	-.963357	.358725	.105	-2.02762	.10091
	20	18	.621503	.303802	.388	-.27982	1.52282
		19	.326406	.234757	.807	-.37007	1.02288
		21	-.027178	.199134	1.000	-.61797	.56361
		22	-.414729	.233170	.563	-1.10650	.27704
		23	-.041165	.277902	1.000	-.86564	.78331
		24	-.636951	.335445	.483	-1.63215	.35825
	21	18	.648682	.304958	.339	-.25607	1.55343
		19	.353585	.236251	.747	-.34733	1.05449
		20	.027178	.199134	1.000	-.56361	.61797
		22	-.387550	.234675	.649	-1.08378	.30868
		23	-.013987	.279165	1.000	-.84221	.81424
		24	-.609772	.336493	.541	-1.60808	.38853
	22	18	1.036232*	.328197	.029	.06254	2.00993
		19	.741135	.265572	.081	-.04676	1.52903
		20	.414729	.233170	.563	-.27704	1.10650
		21	.387550	.234675	.649	-.30868	1.08378
		23	.373563	.304380	.883	-.52947	1.27660
		24	-.222222	.357689	.996	-1.28341	.83897
	23	18	.662669	.361351	.526	-.40939	1.73472
		19	.367572	.305597	.893	-.53907	1.27422
		20	.041165	.277902	1.000	-.78331	.86564
		21	.013987	.279165	1.000	-.81424	.84221
		22	-.373563	.304380	.883	-1.27660	.52947
		24	-.595785	.388333	.724	-1.74789	.55632

Dependent Variable	(I) Age	(J) Age	Mean Difference (I- J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Subjective norms	24	18	1.258454*	.407270	.035	.05017	2.46674
		19	.963357	.358725	.105	-.10091	2.02762
		20	.636951	.335445	.483	-.35825	1.63215
		21	.609772	.336493	.541	-.38853	1.60808
		22	.222222	.357689	.996	-.83897	1.28341
		23	.595785	.388333	.724	-.55632	1.74789
Perceived behavioural control	18	19	-.596755	.287418	.369	-1.44946	.25596
		20	-.849699*	.265141	.025	-1.63632	-.06308
		21	-.742285	.266150	.081	-1.53190	.04733
		22	-.946207*	.286432	.018	-1.79599	-.09642
		23	-1.009030*	.315367	.025	-1.94466	-.07340
		24	-.858312	.355442	.196	-1.91284	.19621
	19	18	.596755	.287418	.369	-.25596	1.44946
		20	-.252944	.204882	.880	-.86079	.35490
		21	-.145531	.206187	.992	-.75725	.46618
		22	-.349453	.231777	.740	-1.03709	.33818
		23	-.412275	.266708	.717	-1.20354	.37899
		24	-.261557	.313075	.981	-1.19039	.66727
	20	18	.849699*	.265141	.025	.06308	1.63632
		19	.252944	.204882	.880	-.35490	.86079
		21	.107414	.173793	.996	-.40820	.62302
		22	-.096508	.203498	.999	-.70025	.50723
		23	-.159331	.242537	.995	-.87889	.56023
		24	-.008612	.292758	1.000	-.87717	.85994
	21	18	.742285	.266150	.081	-.04733	1.53190
		19	.145531	.206187	.992	-.46618	.75725
		20	-.107414	.173793	.996	-.62302	.40820
		22	-.203922	.204811	.955	-.81155	.40371
		23	-.266744	.243640	.929	-.98957	.45609
		24	-.116026	.293672	1.000	-.98729	.75524

Dependent Variable	(I) Age	(J) Age	Mean Difference (I- J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Perceived behavioural control	22	18	.946207*	.286432	.018	.09642	1.79599
		19	.349453	.231777	.740	-.33818	1.03709
		20	.096508	.203498	.999	-.50723	.70025
		21	.203922	.204811	.955	-.40371	.81155
		23	-.062823	.265646	1.000	-.85094	.72529
		24	.087896	.312171	1.000	-.83825	1.01404
	23	18	1.009030*	.315367	.025	.07340	1.94466
		19	.412275	.266708	.717	-.37899	1.20354
		20	.159331	.242537	.995	-.56023	.87889
		21	.266744	.243640	.929	-.45609	.98957
		22	.062823	.265646	1.000	-.72529	.85094
		24	.150718	.338915	.999	-.85477	1.15621
	24	18	.858312	.355442	.196	-.19621	1.91284
		19	.261557	.313075	.981	-.66727	1.19039
		20	.008612	.292758	1.000	-.85994	.87717
		21	.116026	.293672	1.000	-.75524	.98729
		22	-.087896	.312171	1.000	-1.01404	.83825
		23	-.150718	.338915	.999	-1.15621	.85477