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COLLEGE OF BIOLOGICAL AND PHYSICAL SCIENCES

SCHOOL OF COMPUTING AND INFORMATICS

Older Adults and Technology Adoption: Investigating the Use of Online Banking Among the Seniors in Nairobi County

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P54/85720/2016

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Submitted in Partial Fulfilment of the Requirements for the Degree of Masters of Science in Information Technology Management

August 2019

DECLARATION

I declare that this research project is my original work. It has not been presented to any other university for the award of a degree. To the best of my knowledge and belief, this work contains no material previously published or written by another person except where due reference is made.

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ACKNOWLEDGEMENT

This project has been a challenging but rewarding process, which would not have been completed without the assistance and support of many people.

I am highly thankful to God for leading me through this vigorous journey of my academic life. My sincere gratitude is extended to my supervisor, Dr Ruhiu, for his professional guidance, encouragement and commitment of time and energy throughout this study. Special thanks to my lecturers too.

Finally, I would especially like to express my appreciation to my family for being so strongly supportive, patient, and understanding while I was completing my study.

It has been a great learning experience!

ABSTRACT

The overall global diffusion of technology into many domains of banking and financial services has accelerated the shift from traditional banking methods to more ICT-based such as Online Banking. Convenience and efficiency are the main motivating factors to using online banking from a customer's point of view. However, recent studies have concluded that many customers do not have sufficient awareness about Internet banking and also mostly people do not trust these internet banking services for carrying out their business transactions. A cohort where high percentages of this kind of people occur appears to be the older adults, who are defined in the study as people with 55 years and above.

The present study aimed to explain Internet banking use among the older adults, by applying the STAM approach (Senior Technology Acceptance and Adoption Model). The scope of the research was Nairobi county citizens aged above 55 years who held an account with any of the commercial banks in Kenya. A sample size of 236 individuals was used. Questionnaires were distributed to customers either inside banking halls or while entering in various bank branches. Data collected was later analysed using SPSS software where various data analysis techniques including Descriptive statistics and Multiple Regression Analysis were employed.

Results revealed that only 19.1% of the respondents had used IB frequently enough to infer adoption. Further results indicated that seniors' intention to use internet banking was significantly influenced by perceived self-efficacy, perceived usefulness, trust, technical experience and social influence, in their order of influencing strength. Also, facilitating conditions and ease of learning and use were significant factors that determined their actual use of internet banking.

This research attempted to fill the knowledge gap existing regarding factors influencing the adoption of internet banking among seniors in Kenya. The study suggests future research to apply a longitudinal study approach in order to test how the predictive effect of different factors varies across time. Also, the use of probability sampling in identifying the study respondents should be applied. Lastly, the study suggested that further related studies examining adoption of other technology services by their older consumers should be undertaken. This will help in identifying new different factors that may influence the acceptance, use and diffusion of many other different e-services save for the service cited in this study (online banking).
Banking institutions can use this knowledge in their quest to increase their senior online banking customers.

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1.1 Background

Technology is rapidly spreading globally. However, its diffusion is uneven, and its acceptance is irregular. Every new idea or concept has a differing pace of uptake, ranging from early adopters to late adopters, and in some instances those who reject entirely new ideas (Phang, 2006). Many online services have been adequately effectual and adopted by the community at large such that their previous physical counterparts have been phased out or are environmentally and socially objectionable. For instance, paperless systems are largely preferred over printed copies, especially where a large number of printed documents bring up issues of storage space, costs and more importantly environmental concerns. Nonetheless, according to the older generation, paperless systems are just a partial change. Many fail to feel the switch from physical paper to paperless since they often engage in activities that make use of both the digital and printed records (Cresci, Yarandi, & Morrell, 2010). Moreover, many place great trust in a printed copy since it is physically tangible and can be physically stored.

Also, the acceptance of any new technology is bound by caution (McLean, 2011). Critical systems, like those used in treating sick people or deploying sophisticated weaponry, are expected to operate perfectly without a single flaw since they are not human but digital. With certain systems, the technology must be flawless in order for people to accept and use them. People seem to tolerate human flaws or errors but are less accepting any form of computer error (Luo, Li, Zhang, & Shim, 2010). While people entrust human bank tellers to give correct amounts of money when making a withdrawal, they tend to have a different kind of trust in automatic teller machines (ATM) programmed to dispense banknotes through their money cartridges. The former is human trust whose basis is the mutual understanding amongst teller and clients, reinforced by responsibilities and obligations (McKnight, Choudhury, & Kacmar, 2011) while the latter is a one-sided business, that involve clients accepting cryptoprocessors

and their capability to recall a 4-digit Personal Identification Number (PIN). ATMs do not dispense the correct number of banknotes since they need to keep their jobs, neither do they recognise clients, rather they acknowledge the presence of a magnetic strip card and a correct input of a four-number PIN.

The older adults form the basis of their decisions on what to accept with different criteria compared to younger people, as they prefer to trust their instinct rather than preordained sets of technical constituent (McLean, 2011). They are more receptive of new ideas that require trusting a person but tend to be less accepting of those that require trust in technology (McLean, 2011). Hence restrictions or removal of human interaction when handling crucial processes like financial transactions may be uncomfortable or unacceptable to many older persons (Cook, Sansurooah, & Szewczyk, 2015). In differentiating acceptance and trusted acceptance (Renaud & Biljon, 2008) explains trusted usage and trusted acceptance as where a person uses technology with confidence that it will perform in accordance to its exact intended purpose.

In the eyes of older generation, new technologies appear to favour the younger age (Obi, Ishmatova, & Iwasaki, 2013). Digital systems seem to be more common with the younger generation compared to the older. There is a well-marked generational and cultural gap, firmly defended by the majority of the older cohort who accomplished their achievements mainly without the help of this digital age (Cutler, 2011). This explains the questioning that older adults have towards new technology and the promises of a better life through ICTs (McLean, 2011). While there are seniors who are excited to try new technologies and embrace them, there are many late adopters or non-adopters. Older people often make careful decisions when interacting with humans, and they are much more cautious when dealing with digital systems and people behind them. As people age, they incorporate more understanding, skills and experience when making decisions with regards to their acceptance of technology (McLean, 2011).

This research was grounded on two emerging trends facing humanity: the growing aging population (people are living longer due to improved health and technology) and the exponential progression of new technology and ICT usage (Cutler, 2011). ICT systems have been adopted almost everywhere to provide diverse e-services ranging from governmental, social, organisational and financial services (Phang, 2006). The use of technology amongst the older persons is increasing swiftly, in line with the diffusion of technology uptake. However, young people have a more technological understanding of ICTs compared to those from older age brackets (Cresci, Yarandi, & Morrell, 2010).

Older generations represent a unique group of computer users because, for a majority, their vocational work and occupations have involved a lot less direct interactions with ICT systems. For example, many senior executives in companies have been enjoying secretarial support and middle management for decades; for many, their computer interactions have been indirect, with the help of other employees with up-to-date computer skills and are much more familiar with the latest 21st-century ICT opportunities (Cook, Sansurooah, & Szewczyk, 2015). This inadequacy of technology understanding can be risky because while early use of ICTs happened alongside physical or rather face to face systems, today ICTs are independent and appear to be the mainstream interaction systems. Everyone - including the old - is expected to embrace ICTs when learning, researching, communicating and banking among other operations (Rogers, 2004). Often older people face challenges when trying to carry out a task that depends on the Internet and skills needed to manoeuver through a device with Internet connections (Wagner, Hassanein, & Head, 2010). These problems range from technological issues like ICT illiteracy to social concerns such as confidentiality, trust and perceived self-efficacy and also resources issues such as affordability.

This research considered the usage of financial ICT, particularly online banking, by senior citizens; those of 55 years and over. Various classifications of “seniors” or “older adults” exist.

Nielsen defines “seniors” as users aged 55 years or older, without giving an upper limit. He notes that computer users who age 55 and above, are 43% slower compared to users aged below 55. Nielsen points out that the success rate for completing online tasks is typically a third less for those over 55 years of age than for those under 55 years old. Nielsen uses a simple definition. For him, “Seniors” are simply users aged 55 and older (Nielsen , 2015). Rogers notes that older adults have a low desire to learn new technologies and also highlights their slower adoption rate of mobile technologies (Rogers, 2004).

For the purpose of this study, older adults who age 55 years and above, were considered and referred to as seniors throughout the paper. Moreover, this age represents a major social milestone for a majority of Kenyan older people, which is useful for this study as it not only incorporates the changes in someone’s working/retiring identity but also their autonomy as well their financial stability.

1.2 Problem Statement

Overall global diffusion of ICT is responsible for the numerous implemented digital systems. The growing trends of financial technologies (Fintechs) such as peer-to-peer payments, micropayments and artificial intelligence have greatly improved the adoption of a range of online financial services (Jayaratne, 2017). Banking information and operations are currently controlled with the use of ICTs.

Convenience and efficiency are the main motivating factors to using online banking from a customer’s point of view. For example, customers who use online banking services enjoy the luxury of not going to the bank branches, making long queues in the bank or being constrained to using bank services during normal bank opening hours only. Financial institutions and are trying to make their online platforms more attractive to all customers by offering lower charges than normal, better and attractive rates on deposits and loans, and quick and easy access to

banking services and information. These incentives benefit users in the form of cost-cutting, convenience and time-saving (Njuguna, 2012; Amin, 2009).

According to a report by McKinsey 2018, four in every ten banking clients in Africa have a preference of using a digital channel for bank transactions; where the greater percentage is the middle-income customers. Although there is a variation on the basis of individual levels of income, the general picture reveals that Africa banking clients are excited to use these digital channels. In Kenya, 43% of customers prefer digital, compared to 33% that favour traditional branches (McKinsey, 2018). But, are seniors currently embracing or even ready to use these modern technologies to manage their finances?

While there are plenty of studies that have been done focusing on the general adoption of online banking, little has been done in regards to investigating the adoption by seniors in Kenya. Several studies have documented seniors to have an attractive financial status. Hence, they represent mature clients who not only hold significant purchasing powers but also have the neediness of managing their assets with care in the course of their lifetime. Thus, this makes the 55+ years cohort particularly lucrative to providers of financial services.

However, senior citizens have come to use computers later in their lives as novices unlike other users; thus insomuch they represent a unique group of computer users (Jayaratne, 2017). According to Cook 2015, seniors have built their life experiences based on face-to-face interactions, written ink on paper signature-endorsed mode of communicating and handshake commitments; hence, they misunderstand the digital shift to passwords, pin codes and online transactions. The use of cyber-facilitated banking channels in their routine financial operations is a relatively novel aspect for seniors. (Cook, Sansurooah, & Szewczyk, 2015).

Even though it is clear that older adults also use one form or another of internet banking solution, whether to simply check their account balances or interest rates (Jayaratne, 2017), the

state or level of acceptance and use in Kenya is not well known. For banks to expand consumers online banking adoption, major improvements must be made and they should address concerns from all segments of their consumers. Hence, it would assist the banking industry to have a better understanding of key influencing factors for senior clients in online banking adoption.

Therefore, a perspective study to explore the factors that affect adoption by seniors in Kenya is necessary. This research explored factors such as perceived usefulness, ease of learning and use, trust, social influence, perceived self-efficacy and, facilitating conditions.

1.3 Research Objectives

The primary objective of this research was:

To investigate factors that affect how Kenyan seniors accept online banking and their intentions and behaviours towards its adoption.

Specific objectives:

1. To determine significant factors that influence the acceptance of online banking among Kenyan seniors.
2. To determine how trust impact on the acceptance and use of online banking services by seniors in Kenya.
3. To determine whether perceived self-efficacy predicts the acceptance of online banking services by Kenya seniors.
4. To determine strategies that can be implemented to enhance online banking adoption among older adults in Kenya.

1.4 Significance

The findings of this study provide valuable insights to the late adopters of technology, specifically older people with regards to their acceptance and usage of online banking.

Moreover, the findings from this work redound to benefit the society, since ICT use plays a vital role in the general wellbeing of older people. Thus financial agencies and banks can effectively gain more inclusion of older users.

Financial institutions will draw from this study's findings to understand better the needed balance between a client's ICT capabilities and an online access system that can gain the inclusion of older people who have an appetite to use technology but with limited skill. The findings will provide clearer insights into the behavior of older people towards adoption of online banking. This can help banks in coming up with policies that remedy the existing plans or devise proper plans that will better the adoption of this Internet-based technology.

The findings of this study will greatly assist in improving other online access systems and platforms where older people's acceptance has been diminished previously. ICT experts will be able to understand the issues that hinder successful adoption of online banking applications by seniors and thus assist financial institutions in combating them.

This study is also important to researchers as it will contribute to future studies on use and acceptance of digital technologies for banking needs, particularly by older adults. Furthermore, this study is valuable as it suggests further research areas where future researchers and scholars can base their research on.

Chapter 2: Literature Review

The chapter purposes on reviewing the literature pertaining to older citizens and how they accept or reject ICTs that aid in financial services. The literature lay focus on areas where resistance and hesitation of using ICTs by the older people is associated with perceived risks such as being targets of cybercriminals. This chapter established the nature and scope of literature surrounding the use of technology, particularly focusing on older people and their take on online banking.

2.1. Electronic Banking

Electronic banking is an all-encompassing construct, which entails several digital channels of distribution. It is a wide platform which involves more than just using the Internet for banking services. Simply, the term electronic banking means the provision of services or information by banks to their clients through electronic channels such as telephones, ATMs, computers or mobile phones among many other electronic connections.

Banking through the internet, which basically is internet banking, is a type of electronic banking. The banking industry has opened to remarkable transformations due to internet technologies which are rapidly advancing in all sectors of financial operations such as internet banking, internet money and mobile banking, among others. The perception of customers towards the use of these online banking services with respect to factors such as ease of learning and use, privacy, the accuracy of records, convenience, security and real-time accessibility enable customer's adoption (Dasgupta, Paul, & Fuloria, 2011).

Often, both online banking and mobile banking are considered as electronic banking (Amin, 2009), but they are two different channels used by banks to provide their digital services to customers (Luo, Li, Zhang, & Shim, 2010). Internet banking is distinct from mobile banking. Whereas internet banking can be delivered through mobile platforms, mobile banking need not necessarily be internet banking. In differentiating the context of online banking from mobile

banking, consumers consider mobility as the most important feature in mobile banking, whereby customers who are time-critical consider the always-on feature as the most valued aspect of mobile banking (Amin, 2009).

Among the various financial ICTs, Internet banking, which basically involves carrying out financial activities over the Internet is one of the most fast-growing electronic banking throughout the world. The concept of Internet banking developed with the innovation of the World Wide Web, which happened during the 1980s, and was intended to benefit customers in terms of saving time, speed in banking transactions and easy access to their accounts (Campbell & Frei, 2010).

2.1.1. Internet Banking

Currently, the Internet is one of the main delivery channels for electronic banking. Internet banking has been defined by Dasgupta et al. (2011) as the provision of banking services using Internet technology as a remote channel of delivery. In the literature, “Internet banking” and “online banking” have been used often interchangeably, referring to the same thing. Also, Internet banking doesn’t essentially have to be carried out using a computer. It can, for instance, be done on mobile phones with internet access, or even other wireless devices such as tablets. Internet banking offer numerous benefits to both customers and banks.

According to Barclays Kenya (2018), Internet Banking has revolutionised the way customers conduct their banking as now customers are able to easily manage their bank accounts and transactions from the comfort of their homes, offices or even when moving - all that is needed is a connection to the internet. Internet Banking services are convenient, simple and quick but the best part is you rarely have to visit your bank branch. One can access their account information, view statements, download and print the statement, view proof of payment and download and print them, transfer funds from one bank account to another account within the

particular bank or even to accounts at other banks, view credit card statement, link accounts, pay bills, undertake foreign exchange transactions, purchase airtime and load MPESA and other mobile banking platforms, query interest rate, send or receive emails to and from the banker, access bank accounts 24/7 from anyplace in the world https (Barclays, 2018). Internet banking services available vary from bank to bank.

Most financial institutions are using the internet banking channel to receive instructions and deliver their products and services to their customers. Internet banking has been defined as the structural coordination that allows users to access their bank account and banking products and services information through a bank's website within the convenience of their location and without any need to use telephone lines, faxes or send letters with their original signatures (Amin, 2009).

Internet banking can be used to view account details and checking bank statements, paying bills, transferring money from one account to another, applying for an account or loan, among other uses. It provides more possibility of reaching more customers. Internet banking appeals to bank customers with its many benefits such as convenience, reduced costs, more client control in service delivery, reduced wait time and easier access to bank services with no space or time constraints when managing their personal finances. However, these benefits come with some challenges that tend to discourage some customers from using the service like steep rise in online banking crimes and to loss of privacy, which tend to undermine its success (Njuguna, 2012).

Dasgupta et al. (2011) acknowledged Internet banking limitations opposing the widespread penetration of mobile phones, by suggesting that mobile banking provides a good commercial opportunity for banks to cater for rural clients who may not easily have access to the Internet. Thus, pointing out that the main client segment of internet and mobile banking are certainly not similar.

Owing to the technologies advancements, traditional methods of banking have overs the years shifted from phone banking to ATMs and to online and mobile banking. Mobile banking, however, has been adopted widely in both developing and developed countries, impacting the market significantly (Jayaratne, 2017).

2.1.2. Adoption of Internet Banking in Kenya

Adoption of IB is defined as perceptible readiness to employ internet banking technology for the purpose it has been aimed to support. In its earliest emergency, regardless of the many benefits that internet banking offered its customers, a large proportion of them were remarkably reluctant to adopt the service (Campbell & Frei, 2010). When the innovation first emerged in 1981, people did not adopt it; so the innovation failed until the mid-1990s when the next wave of innovation emerged (Campbell & Frei, 2010). According to Rodgers (2003), it can be difficult to get an innovation adopted even when it has obvious advantages. However, a different trend is showing as a recent report by McKinsey, 2018 indicates that African banking customers expressed strong preferences for Internet and mobile banking over traditional branches. Thus, they are among the most enthusiastic adopters of these digital channels in the developing regions (McKinsey, 2018).

With the high internet penetration, Africa's banking clients are as well 'connected' as their fellows in other developing nations. McKinsey 2018, research found that 52% of Africans living in an urban setting, use the Internet regularly. Also, most of the Internet users in Africa use mobile devices to access the web—and a large majority are young. One in every four urban Africans is usually online for not less than 10 hours per week. Considering how digitally savvy they are, it is no surprise that African banking clients have a strong preference for internet banking methods (McKinsey, 2018). Nonetheless, Africa's banks still have room for growth in digital sales and transactions, compared to other regions (McKinsey, 2018)

Facing the rapid expansion of e-payment systems all over the world, the Kenyan banking industry has not remained an exception in uptaking the use of these financial ICT systems. Most banks in Kenya have set up internet banking and mobile banking among other electronic banking channels, to improve service delivery to their clients. However, it is important to accompany the introduction of these electronic systems with programs that will help broaden customer horizons by familiarizing them with these more innovative ways of carrying out banking matters (Njuguna, 2012).

Literature reveals that the adoption of internet banking has been more rampant among young and middle adults but less in relatively younger and older groups. This is further supported by Dasgupta et al. 2011 study which indicate that the typical users of mobile banking are the younger generation, as the elderly are more resistant to change and have a negative attitude towards electronic banking service. McLean, 2011 argue that while the younger consumers tend to seek for more information compared to the older, the older consumers tend to display more service satisfaction and loyalty towards the same.

2.2. Context of Seniors and the Use of Online banking Technology

Nielsen defined "seniors" as users aged 55 years or older, without giving an upper limit. He noted that computer users who age 55 and above, are 43% slower compared to users aged below 55. Nielsen points out that the success rate for completing online tasks is typically a third less for those over 55 years of age than for those under 55 years old. Nielsen uses a simple definition. For him, "Seniors" are simply users aged 55 and older (Nielsen , 2015). Rogers notes that older adults have a low desire to learn new technologies and also highlights their slower adoption rate of mobile technologies (Rogers, 2004).

This literature stipulates the need to consider accessibility and the cost of technology as determining factors which influence adoption of ICTs by seniors. Accessibility issues can range from challenges associated with using a device such as screen size and restricted font

sizes, to the issue surrounding physical context like visual sensitivity as a hindrance of technology use for banking purposes. There are three main areas to study within this topic.

2.2.1 Accessibility

The first area of concern is older people accessibility to ICT systems. With the informational and cultural gap between older people who are amateurs with matters technology and the younger generation, it is undeniable that this cohort is technologically disadvantaged by physical and cognitive challenges of aging. Therefore, older people are hampered by accessibility issues (Morris, 2007). The literature highlights the ease or difficulties of accessibility as an important factor in acceptance or rejection of new technology.

The literature draws inferences towards the use of internet banking technology on portable devices such as smartphones, whose screen size limits older people from accessing. Inability to read, interpret and understand different media expressed via ICTs in different settings like vocal communication, narration or font size (Rogers, 2004; Morris, 2007).

The literature establishes three accessibility issues pertaining use of banking applications on smartphones. Older people tend to use their phones in a more limited fashion compared to younger users because they find the procedures difficult to master, the displays hard to read and at times the buttons are difficult to press accurately (Renaud & Biljon, 2008). Accessibility issue has prompted some research work into specific gadgets for older individuals such as the *'Raku-Raku'* device from *NTT DoCoMo*, which was a cell phone with a disentangled interface and fundamentally bigger buttons (Fujitsu, 2012). Nonetheless, gadgets like these can amplify the digital divide instead of bridging it due to their purposely unique and more restricted usefulness (Renaud & Biljon, 2008).

The literature points out that while there are different software developments that help enormously with accessibility issues, those improvements have not been reliably deployed in

the targeted markets, and numerous new ideas presently are yet to be acknowledged and depended upon.

2.2.2 Cost of Using Technology

The second area evaluates the balance between the cost of new technology versus the value of the same technology. Most developers assume that new technology will be of benefit to its intended user. This is not always the case. Benefits of using new technology need to be thoroughly weighed against the initial cost (Obi, Ishmatova, & Iwasaki, 2013). Often older people claim that with internet banking, there are extra costs such as buying a computer, internet access fees, and the extra effort, time and costs needed to learn about online banking. Opinions may vary, but still, there is a significant number of older people who cite the costs of technology as being prohibitive even after taking into account the expected benefits of its use. The cost of technology has an impact on how older people make decisions regarding ICT usage (Phang, 2006).

A research study on the adoption of internet banking in Kenya (Njuguna, 2012) revealed household income as a major factor impeding the adoption of online banking by possible customers. This points out that a fair number of older people find the cost associated with internet banking to be far beyond their limits, and other accompanying issues like computer literacy makes it cost prohibitive.

2.2.3 Training and Usability

The third factor to consider is on training and usability. In some cases, older people worry that they may lack adequate skills and capabilities on matters ICT, to enable them perform a task. There is a need for more training that focuses on usability, as new innovations demand greater ICT understanding (Jayaratne, 2017). Availability and access to skills development, through education and training is an influential factor in assessing perceived ease of use (Venkatesh, Morris, Davis, & Davis, 2003). The literature infers that good training benefits older people in

that their self-efficacy is boosted and computer anxieties lowered. Enhanced self-esteem and the feeling of ICT competence has been attributed to frequent use of computers (Obi, Ishmatova, & Iwasaki, 2013).

The literature points to the need for an emphasis to upskill older people so as to facilitate perceived acceptance and use of technology. The usability of new technology and the training method, are major differentiators between acceptance of technologies by an older person and a younger counterpart (Cutler, 2011). Often older individuals will not readily anticipate using new technologies if they perceive they will be less confident and more likely inaccurate while using the technologies compared to other users. (Campbell & Wabb, 2012).

2.3. Trust, Acceptance and Usage of Internet Banking by Seniors

Trust is predominantly depicted as a social construct and is often associated with risk. In ICT context a trusted system is one that users feel safe to use and believe that the system can perform tasks without causing any form of harm to the user. A majority of the older people are apprehensive when engaging with ICTs due to two trust-related issues: trust in self-capability and trust in technology systems and their reliability (Neogi & Cordell, 2010).

Usage of technology reinforces a user's trust in the systems. Usually, if a new technology is not used by its intended consumers, it may be difficult for it to be accepted into the society. Diffusion of technology and its acceptance denoted a representation of numerous iterations of technology acceptance models - where each raises concerns on reliance and trust issues. Models of technology acceptance strongly link usage to trust (Venkatesh, Morris, Davis, & Davis, 2003).

For seniors, the shift from traditional banking to modern banking represents a major threat through vulnerabilities that were previously non-existent. Many old people are aware of the potential risks in online financial elder abuse and thus resisting the use of ICTs as a protective

measure (Soar & Su, 2014). Older people fully understand trustworthiness concept. The notion of trust, to some, relies greatly on the need for that trust to be coupled with established trusted relationships. This need of a trusted relationship thus extends to other people with whom a firm set of expectations are formed (Wagner, Hassanein, & Head, 2010). Some older people claim that without a second party, there is no trust. Others, however, will trust technology on the basis that there is a connection with a person, and not just a non-human piece of technology (Wagner, Hassanein, & Head, 2010).

2.3.1. Security Issues

Seniors, especially the novice computer users, are vulnerable to informational and financial risk from usage of systems they are less familiar with. More and more are suffering from cyber crimes such as identity theft, reputational damage, phishing, credit card fraud, ransom-ware and social engineering (Blanton, 2012). Their use of ICTs is now extending to many interactions that put them at a higher risk of experiencing cybercrimes. Consequently, older people might not be able to make critical decisions when using technologies since they find it difficult to ascertain the systems to trust and which not to trust.

Older people are reluctant to switch from physical banking to the self-service internet banking, claiming mistrust in the security of the bank's online platform and their ICT and Internet understanding (Campbell & Frei, 2010). The literature points out that criminals target the older cohort due to their security vulnerabilities. Phishing is the most discussed form of exploitation of the old. Information security literature that mainly focuses on old people describe reservations and unwillingness on their part to expose private data to systems that they perceive as not trustworthy, or insufficiently secured to stop or counteract illegitimate activities. The literature indicates that the older adults are the major targets of online financial deception and other forms of scam as they are more vulnerable.

Through Social engineering and phishing**,** scammers often steal finances and change computer access information in order to lock the real user out of their very own system. The literature indicates that there is a global widespread of phishing attacks and older people are more targeted. Moreover, criminals reduce their risk in focusing on the older cohort, as many of them are too embarrassed to report these extortion incidents. Furthermore, older people are more vulnerable to phishing since it can be rather difficult for them to differentiate between genuine and fake websites. They often mistakenly engage fake sites since the website identify with genuine brand logos, images among other elements that influence them into believing that they are on the genuine website

Malware is another further developed attack that introduce Keyloggers and Trojans on users' personal computers. The malware is designed to record and send keystrokes of passwords, logins and key financial information like account details (Whitman & Mattord, 2010). Elder people who have a habit of sharing chain messages put themselves at a greater risks of malware, resulting to subsequent loss of data, finances, and PC corruption (Blanton, 2012).

Advance Fee Scams is also another scheme that lure the older people by tricking them into believing that they have some pending beneficial incentives awaiting their confirmation (Blanton, 2012). An example is the notorious Nigerian scam messages, that promise millions of money awaiting transfer to the bank account of the targeted computer user, upon verification of their account details. Often a person is asked to hand over small amounts of cash in order to begin the verification of money transfer. It can advance to a second demand for cash and the ploy can continue until to a point where the computer user realises that they have been scammed, or they run short on cash. Other similar scammers use the ruse of a lottery win. The review reveals the lack of ability of older individuals to sense the dangers in such exchanges and chances of deception and fraud (Blanton, 2012). Moreover, while online financial fraud

can befall anyone using e-services, there is enough proof showing older persons being at substantially high risk compared to other age sets.

The literature highlights hesitation or resistance to using banking applications by the old is mainly based on difficulties of installing and comprehending the required protective measures.

2.3.2 Technological Self Efficacy

Older people are hesitant to use technology or limit their technology usage due to perceived inadequacy of technical ability, understanding and training in themselves. By citing lack of self-confidence when using ICTs, older people express a need to help their fellows, especially those whose daily works and routines are not dependant on ICTs (Soar & Su, 2014). Some of the routines such as banking and paying bills have been repeatedly mentioned as activities that need an individual's trusted capabilities and governance.

Domestic identity theft is an example of a challenge to trust in technology for financial uses. This mainly happens to older individuals whereby financial abuse is carried out by a family member or close friends for material benefit. In cases where an elderly does not trust his/her own capabilities owing to their inadequate technology skills and lack of confidence, they may end up trusting other people even in instances where they worry that their trust could be misused (Rengamani, Upadhyaya, Rao, & Kumaraguru, 2010).

Systems driven by ICTs need a form of monitoring from a regulatory body that guarantees people with low levels of ICT proficiency can carry on expecting trusted experience from the systems (Neogi & Cordell, 2010). Older people with an amateur knowledge of ICT can exhibit computer-related anxiety ranging from mild worries to high levels of technophobia.

2.3.3 Credibility of the Systems

This trust barrier draws focus on the reliability of ICTs. Older people are wary of the confidence of computer systems to perform as expected and to the full satisfaction of the client. The literature highlights lack of trust in online banking systems with limited or no human interaction, such that one has to fully rely on the technology system. Older people, in particular, show widespread mistrust in such systems where the human element is less or not available, whereby inquiries or questions are addressed to faceless and nameless points of contact (Neogi & Cordell, 2010).

Other trust issues arise from perceived occurrence of security glitches such as privacy breach, financial theft, data loss and identity theft. The literature indicate that older people mistrust cloud systems as a form of data storage (Cresci, Yarandi, & Morrell, 2010). Older people place more trust on tangible things rather than virtual aspects i.e the automated aspect of technologies.

Much literature has been written on technology acceptance and very less on rejection, leaving a major gap (Rogers, 2004). It is widely assumed that new technology will immediately or eventually be accepted and little is explained of those who reject or wish to retract from using ICTs.

2.4. Models of Technology Adoption

There is a range of models used to explain ICTs take up. Some use behaviours to describe technology acceptance and while others perception is their basis. One of the oldest of these models is the Diffusion Theory which formed a starting point for many other theories. The most popular collection of these theories are TAM, TAM2, and UTAUT which are based on two-pronged constructs: “perceived use” and “perceived ease of use”. They have largely dominated this literature

2.4.1. The Theory of Reasoned Action (TRA)

This early theory was developed in the field of social psychology. The theory gives more emphasis on cultural factors like social influences, beliefs, customs and practices (Fishbein & Ajzen, 1975). TRA explains that acceptance of new ICTs is based on social psychology. "… a person's performance of a specific action is determined by his or her behavioural intention to perform it, which is determined by the person's attitude and subjective norm, concerning the action". Therefore, the expected outcome of ICT use is directly allied with the user's attitude, along with the attitude of those around them. Fishbein and Ajzen (1975) describe "subjective norms as the person's perception that most people who are important to him think he should or should not perform the behaviour in question".

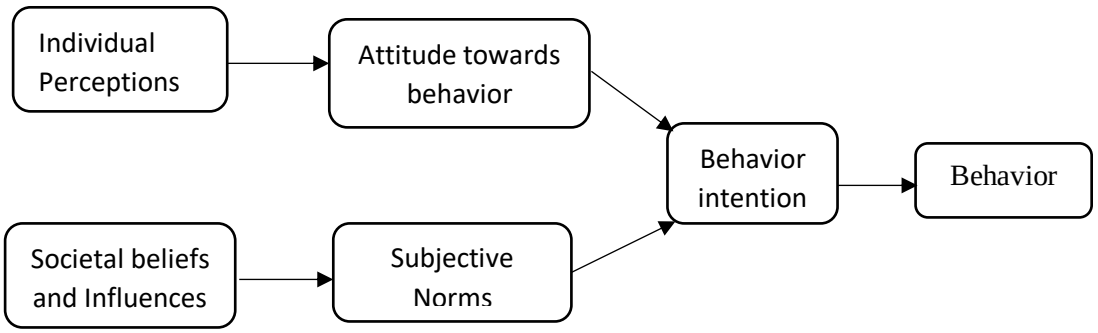

Figure 1 - Theory of Reasoned Action by Fishbein and Ajzen (1975)

TRA has a broad appeal, and unlike other models of technology adoption, it fully allows possibilities of a rejection as an expected outcome. However, TRA does not cater for late technology adopters such as older people.

2.4.2. Theory of Planned Behavior (TPB)

Theory of Planned Behaviour (Ajzen, 1985) is an extended version of TRA. It took the previous TRA theory and added one more key construct; perceived behavioural control (PBC). The model argues that a person's behaviour intention is determined by three factors: "attitude", "subjective norms" and "perceived behavioral control".

Attitude reflects individuals' optimism or otherwise, when performing a behavior. Subjective norms depict the influence or perceived judgements from other people, who are deemed as important. PBC identify anticipated or rather expected external or internal obstacles that could hinder behaviour performance (Ajzen, 1991). All the three variables are vital in establishing behaviour concerned with technology use.

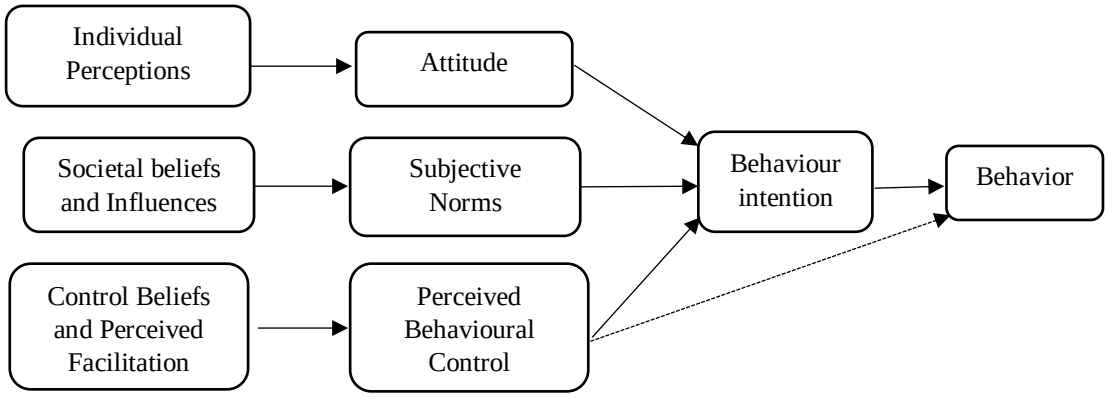

Figure 2 - Theory of Planned Behaviour (TPB) by Ajzen 1985

While both TPB and TRA models offer explanations for activities that involve internet banking and other electronic banking decisions, the two theories remain inadequate in cases of late technology adopters, with specific to older people.

2.4.3. Technology Acceptance Model (TAM)

TAM was established to specifically help in understanding users acceptance in the field of information technology (Davis, 1989). The model tracks the TRA models' constructs, attitude and specific beliefs against external elements that influence intended use and actual use of ICTs. To accomplish this, TAM suggested that in summary two specific constructs directly influence the use of ICTs; "*perceived usefulness"* and "*perceived ease of use".*

Perceived usefulness is a form of measure of the possibility that usage of certain ICT systems will result in improved work performance.

Perceived ease of use captures users' expectations and beliefs about how unproblematic and easy it would be to use a particular system.

Both determine the attitude towards use and subsequently intention that then determine usage of ICT.

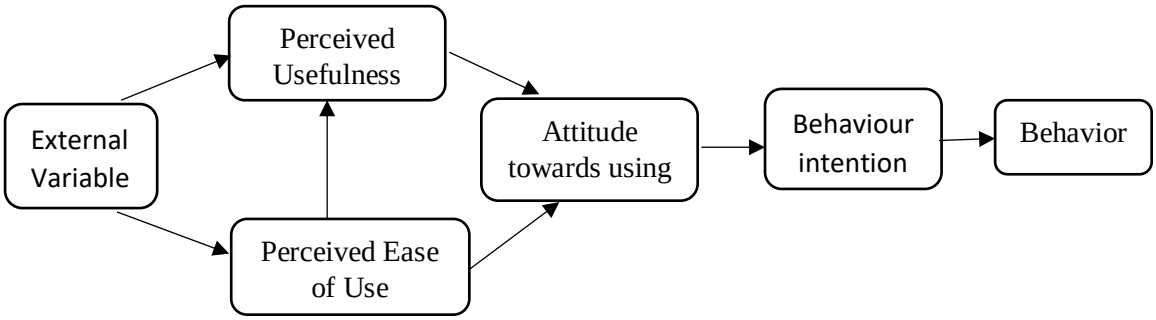

Figure 3 - TAM Davis, 1986

2.4.4. Extended Technology Acceptance Model (TAM2)

TAM has been a reliable predictor of ICT acceptance by users for over a considerable period. Despite this consistency, other contributing factors that influence ICT usage were added to extend the original TAM, forming TAM2. Venkatesh and Davis (2000) who proposed the TAM2 model incorporated two other constructs; social influence and cognitive instrumental processes

Inclusion of subjective norms is in line with earlier work of Fishbein & Ajzen on the TRA theory. A person may choose to act in a particular manner even if they are not personally drawn to behave in such way. TAM advocates have hence acknowledged that social influence has an effect on user behaviour.

The cognitive instrumental processes variables introduced in TAM2 include job relevance, output quality and result demonstrability while those under social influence include subjective norms, image and voluntariness. Job relevance indicates one's perception of whether or not certain technologies are applicable to their job while output quality illustrates a person's

experience of how well or otherwise a system will perform when assigned a task and result demonstrability shows visible outcomes of using a given technology system.

Subjective norm can be described as individuals' perception that people who they deem as important to them think that they should or shouldn't use a given technology. Image refers to the extent to which someone perceives that using a technology would enhance their social status within a group. Voluntariness is the degree to which people perceive that their decision to use a technology is non-mandatory.

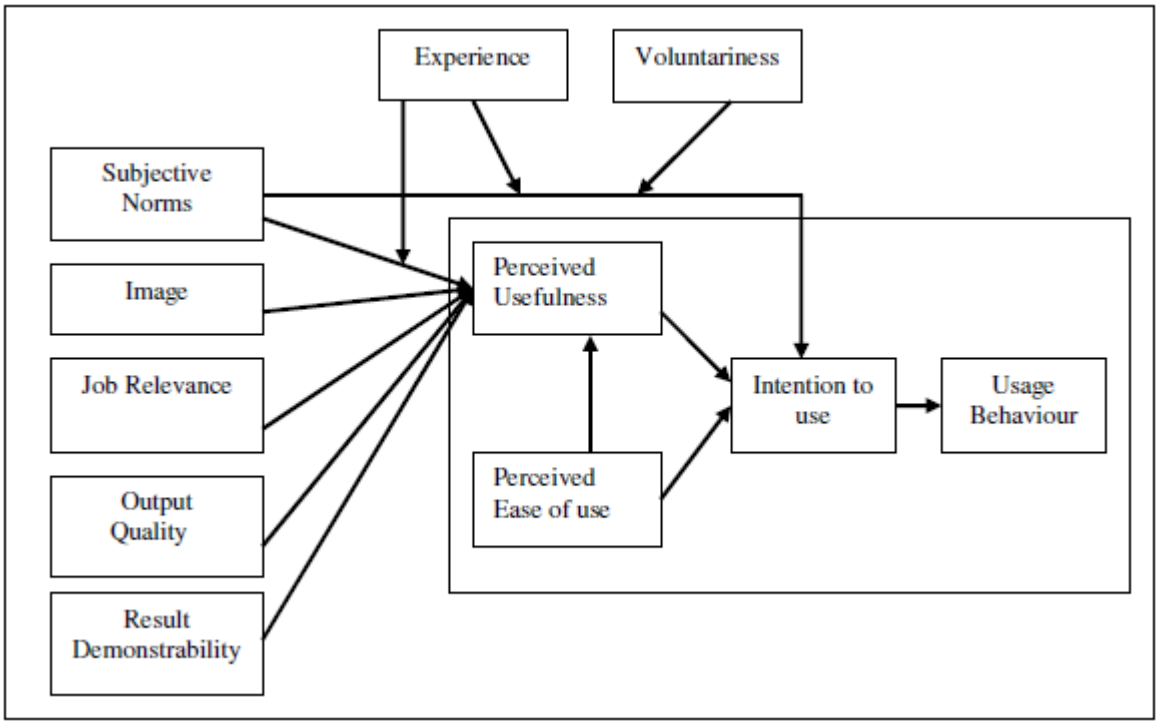

Figure 4 - Extended Technology Acceptance Model

2.4.5. Unified Theory of Acceptance and Use of Technology (UTAUT)

The UTAUT model goes beyond the TAM frameworks by expounding more in details on user intention and subsequently user behaviour. With the purpose of understanding adoption of information technology, Venkatesh et al. (2003) empirically studied and compared eight prominent models and their extended versions by using data from four organisations.

Venkatesh et al. (2003) then combined essential elements in those eight models, formulating a unified model, UTAUT, and further empirically validated the model. The theory draws elements from within eight prominent models and their extended versions which include: Theory of Reasoned Action (TRA), Theory of Planned Behaviour (TBD) and DTPB, TAM and TAM2, a model combined TAM and TPB, Innovation Diffusion Theory, Motivational Model (MM), Social Cognitive Theory (SCT) and Model of PC Utilization (MPCU). Thus the notion of a unified theory.

UTAUT highlights four core constructs that predict intent to use and the actual usage and gives room for more research analyses of moderating factors that could either constrain or amplify the core determinants effects. The core constructs that determine behavioural intentions include performance expectancy, effort expectancy and social influence, while facilitating conditions determines the actual usage (Venkatesh, Morris, Davis, & Davis, 2003). This theory further suggested that age, gender, experience and voluntariness of use can influence and moderate the four main constructs.

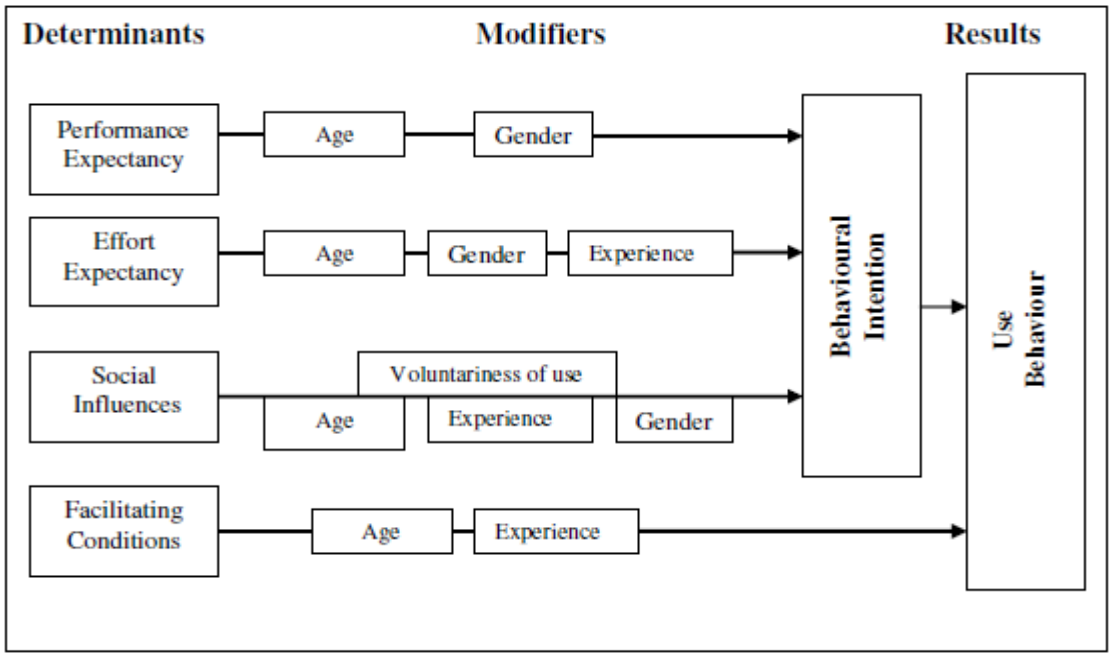

Figure 5 - Unified Theory of Acceptance and Use of Technology

Performance expectancy is “the degree to which a person believes that if they use a particular technology it would help in enhancing his/her job performance”. UTAUT being a combination of previous models, five constructs from prior models were used to formulate performance expectancy: TAM’s perceived usefulness, relative advantage from IDT, outcome expectation from SCT, job fit from MPCU and external motivation from MM. Performance expectancy has two moderators; age and gender. Venkatesh et al. (2003), claimed performance expectancy to be the strongest predictor of intention to use.

Effort expectancy is “the level of ease associated with the use of a certain ICT system”. It refers to the effort required while using a system; whether a system is simple or complicated to use. User-friendly systems tend to be easily accepted as users prefer them. Venkatesh et al. (2003) drew effort expectancy from similar concepts in other theories and models, which are: perceived ease of use from TAM, ease of use (IDT) and complexity (MPCU). Effort expectancy is moderated by the age, gender and experience variables.

Social influence is described as the degree to which a person perceives that significant others (such as friends or co-workers) believe he or she should use a certain new system. UTAUT used the social influence construct to represent other similar variables which includes subjective norms (TRA, TPB/DTPB, TAM and TAM2), social factors (MPCU) and image (IDT). Social influence is moderated by all four factors i.e. age, gender, voluntariness of use and experience.

Facilitating conditions refers to “the degree to which an individual perceives that an organisational and technical infrastructure exists to support the use of a system”. The construct is moderated by age and experience. Other similar constructs from prior models include compatibility and perceived behavioural control.

Moderating Factors

Note that the Venkatesh et al. (2003) UTAUT model has four moderating factors which include: gender, age, experience and voluntariness.

Age - Morris & Venkatesh, 2003; Venkatesh et al., 2000; and Morris, 2007 study in an organizational context where there is sustained technology usage, revealed that young workers were driven by only attitude beliefs pertaining usage while the elder workers were influenced by both perceived behavioural control and attitude beliefs.

Experience - Venkatesh (2003) considered prior experience with computers as an antecedent to common technological self-efficacy beliefs. Experience is also reported to affect one's perceptions of usefulness and ease of use.

Gender - Reports from numerous studies indicate that the male gender has a higher likelihood of adopting online banking compared to females. In research conducted by, Morris & Venkatesh (2000) found that the decision-making process of a male and female differ in various ways. Among other reasons is that men appear to be more task-orientated compared to females, and also peer influence has a higher effect on females. Studies on internet banking adoption reveal that females tend to be more cautious as they perceive more risk in online purchases than men while men concerns' tend to revolve around service fees like internet access.

Conclusion of the models

This literature review reveals many technology acceptance theories but doesn't show a theory that sufficiently illustrates the relationship between trust and use of ICT precisely explaining senior's behavior. These theories have generalised a range of potential technology users, failing to differentiate late adopters from early adopters. With the TAM models inadequacies in addressing rejections of some ICT systems by the late adopters such us the older people, several editions of TAM have been adapted to help address specific needs of such people. One such model is the Senior Technology Acceptance and Adoption Model.

2.4.6. Senior Technology Acceptance and Adoption Model (STAM)

With the need for a TAM version that focuses on specific variable pertaining to older people and their use of ICTs, Renaud and Biljon proposed a Senior Technology Acceptance Model (STAM) in the paper "Predicting technology acceptance and adoption by the elderly: a qualitative study". The model considers the distinctive characteristics, capabilities and limitations of older people in technology acceptance. STAM, which was developed based on TAM, also pays special attention in differentiating *acceptance* and *adoption* of ICTs amongst the elderly users.

Technology adoption is best described as a progressive process that starts with awareness and ends with actual usage while acceptance is more about attitude (Renaud & Biljon, 2008). Acceptance could be considered as a pre-adoption stage and has the value for predicting the adoption possibility.

The STAM theory is based on constructs in the diagram below and the newly introduced variables are defined as follows:

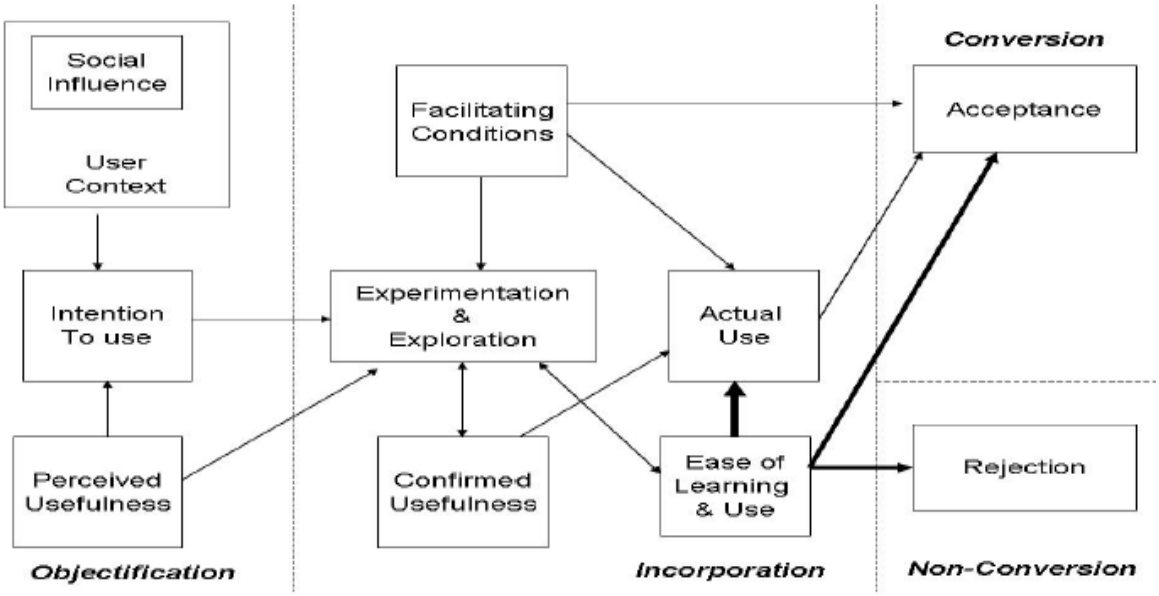

Figure 6 - Senior Technology Acceptance and Adoption Model

The STAM model consists of three phases; objectification, incorporation, and conversion or non-conversion which are explained as follows:

Objectification phase - determines the role that a product will play. For example, what function will be used by the users? How is it carried? Where is it placed? Social factors, perceived usefulness and user context are the constructs that influence the objectification phase. By introducing the incorporation phase, STAM finds a way to form a bridge that links 'intention to use' to 'actual use'.

Incorporation phase – the process of interacting with the product. This phase involves learning process (using instructions manual) and identifying difficulties in using a product (usability problems). Experimentation and exploration are considered as a dynamic factor that shows how much trialability can influence technology acceptance. Actual use is shown to be influenced by perceived ease of learning and use, confirmed usefulness and facilitating conditions.

The **conversion/non-conversion phase** involves potential users either accepting or rejecting the given technology.

- User Context, for example, social influence, demographic variables, and personal attributes like age and individual capabilities or understanding. Social influence has been a predominant variable in other previous models, therefore described as a variable within user context.
- Intention to Use is influenced by user context and perceived usefulness.
- Experimentation and Exploration phase describes when users start using a certain technology for the very first time and form their first impression with regards to its ease of use. Note that the experience obtained from experimenting and exploring will form a feedback to confirmed usefulness. Also, it aligns with Rogers' (2003) trialiability of innovation attribute.

- Ease of learning & use is derived from TAM's perceived ease of use. Note that final conclusions on ease of use stage is influenced directly by exploration and experimentation. While other models have not incorporated ease of learning as a technology acceptance determining aspect, STAM sees the need to, because difficulties of learning and understanding to use a computer is a major determining factor for the older people and so is the fear of not succeeding.
- Actual use is predicted indirectly by experimentation outcomes, which then lead to determining the ease of use and learning. Facilitating conditions under experimentation and the subsequent ease of use and learning determine the actual use.
- Acceptance or rejection of technology is finally determined by ease of use and the actual use, where the former is a stronger influence on acceptance.

Similar to UTAUT, STAM omits attitude as a determinant (Renaud & Biljon, 2008) The model replaces the attitude variable with modules illustrating progression from first usage to actual acceptance.

2.5. Conceptual Framework

While many researchers have adapted different theoretical models to establish the relationship between the older people and their usage of new ICTs, relatively not much efforts have been made so far to come up with a model that predicts the behaviour of the older population. One exception, though, is the STAM model. Renaud and Biljon used UTAUT, TAM, and various other works as theoretical underpinning to propose a model that explains older adults' technology adoption. STAM model comprises of three phases that older adults go through when deciding whether to accept or even reject any new technology: the objectification phase, incorporation phase and conversion phase.

During the objectification stage, users form an intention to use the new technology based on perceived usefulness and user context, which includes social influences (similarly to UTAUT

and TAM). During the incorporation stage, the users experiment and explore the new system, in the course of which they validate their perception on the system's usefulness and its ease of learning and use. By introducing the incorporation phase, Renaud and Biljon make a major differentiating factor between STAM and other prior models. During this stage, which links "intention to use" to "actual use", users acquire hands-on experiences of the new technology. The incorporation phase considers exploration and experimentation as a dynamic factor for a senior's acceptance of new technologies.

The STAM model is quite meaningful in the context of this study as it targets older technology users who may have certain unique capabilities, needs, experiences, preferences and limitations different to those of younger users. Thus, this study utilised STAM as a suitable framework to help understand and ascertain factors that majorly influence adoption of ICTs for financial services by older people.

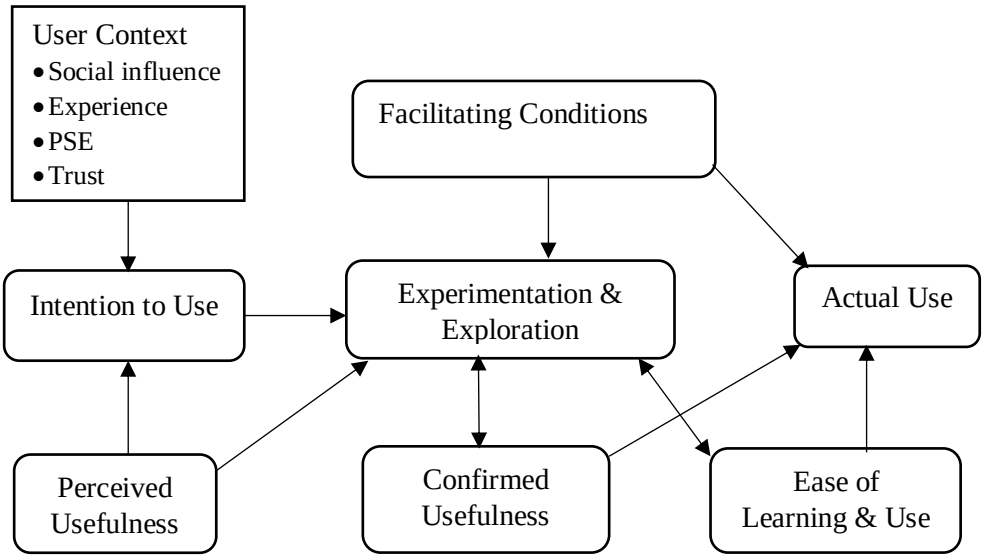

Figure 7 Conceptual Framework adapted from STAM Renaud and Biljon 2008

The study closely followed the original STAM model. However, an amended version was used to fit the study's context (internet banking) and to accomplish its objectives. Also, two new constructs – perceived self-efficacy and IB trust - were added from the literature; thus the

research model had three dependent variables and seven independent variables discussed as follows.

Independent variables included:

Perceived Usefulness

Perceived usefulness has been described as "the degree to which a person believes that using a system will enhance his or her job performance" (Davis, 1989).

The construct perceived usefulness in STAM was developed from six prior models, namely, performance expectancy from UTAUT, TAM's perceived usefulness, relative advantage from IDT, job fit from the Model of PC Utilization, external motivation from MM and outcome expectation from Social Cognitive Theory.

Empirical studies on internet banking, validate that the higher the perceived usefulness, the more likely the intention to usage. Amin (2009) used UTAUT as a tool to research internet banking adoption, and the results showed that performance expectancy greatly influenced intention to adopt while Dasgupta et al. (2011) identified relative advantage as a crucial determinant. Based on the above discussions and the STAM model, this study therefore sets up the following hypotheses:

H1a: Perceived usefulness positively influences intention to use internet banking by seniors.

H1b: Perceived usefulness positively influences experimentation of internet banking by seniors.

Ease of Learning and Use

Ease of learning & use arises from TAM's perceived ease of use defined as "the extent to which a person believes that using the system will be free of effort" (Davis, 1989). Some ICTs are perceived to be too complicated (no perceived ease of use). From the literature, prior studies on the adoption of internet banking Amin (2009) and Dasgupta et al. (2011) support perceived ease of use as a significant construct influencing individual intention to use ICTs for financial services. Renaud and Biljon (2008) in the STAM theory, however, argues that a user will form

their first impression of ease of use when they first start using the technology (Whether Experimentation or Actual Use). The model indicate that ease of use and learning influences the actual use of a technology. Based on this, the research proposes the following hypotheses:

H2a: Ease of learning and use positively influences actual use of internet banking by seniors.
H2b: There is a statistically significant relationship between ease of learning and use and experimentation of internet banking.

Social Influence

Venkatesh (2000) defined social influence as "the degree to which an individual perceives that others believe he or she should use the new system" STAM used the social influence construct to represent other similar variable which includes subjective norms (TRA, TPB/DTPB, TAM and TAM2), social factors (MPCU), image (IDT) and social influence (UTAUT). The STAM model shows that social influence influences intention to use.

Many researchers have found social influence to be important in helping to persuade people to accept and use any form of new technology. In the electronic banking literature, Amin et al. (2009) conducted a research study in major banks in Malaysia empirically revealed that consumers' intention to use internet banking was greatly influenced by the people around them. Likewise, Dasgupta et al. (2011) studies on internet banking supported that social norms played a significant role in influencing a person intention to adopt. Hence the researcher proposed the hypothesis below:

H3: Social influence has a positive effect on intention to use internet banking by seniors.

Technology Experience

Inadequate technology experience or lacking some familiarity with similar digital services can result in older adult dismissing new technology or not knowing of its potential uses (no perceived usefulness) (Renaud & Biljon, 2008). The literature reported that, in an online context, experienced users are more likely to adopt new information systems more than inexperienced users. Thus the following hypothesis was proposed:

H4: Technology experience positively influences intention to use Internet banking by seniors

Facilitating Conditions

Facilitating conditions are defined as "the degree to which an individual believes that an organizational and technical infrastructure exists to support the use of the system" (Venkatesh V. , 2000). Variable from the model of PC Utilisation, perceived behavioural control (TPB/DTPB), compatibility (IDT) and facilitating conditions (UTAUT) were all influential in formulating this construct in STAM.

The literature on internet banking adoption illustrates that respondents who had convenient access to computers and the internet displayed more proficiency in using computers which in turn resulted in a higher likelihood of adopting internet banking.

In the STAM model *Facilitating conditions* has an influence on both *experimentation* and *actual use*. This is expected, as normally older people tend to seek support and help when using new technologies (Venkatesh et al. 2003). Hence, the following hypotheses were proposed:

H5a. Facilitating conditions positively influences experimentation of IB by seniors.

H5b. Facilitating conditions positively influences actual use of IB by the seniors.

Trust

Older people, in particular, show a widespread lack of trust in online systems with limited or no human interaction. McLean, 2011 research findings showed that senior consumers are more risk aversive, making them more cautious when dealing with digital systems. The older cohort prefers banking interactions that involve trusting a person but tend to be less accepting of those that require trust in technology. McLean, 2011 argues that while younger consumers tend to seek for extra information compared to the older, older customers display more service satisfaction and loyalty towards the same.

Through an investigative study on consumers' attitude towards internet banking, Dasgupta et al. 2011 used security and confidentiality to depict perceived risk, and the findings revealed that perceived risk is a major factor that influence internet banking adoption. As per the

literature, different scholars conceptualise concerns of risk, trust, security and privacy in different perspectives, depending on how the research interprets the concerns. This study used trust as one construct to represent all issues on credibility, risk, security and privacy concerning internet banking adoption. Based on the above discussion the researcher proposed the following hypothesis:

H6: Trust positively influences intention to use Internet banking by seniors.

Perceived Self-Efficacy

After a considerable analysis of the eight models, Venkatesh et al. (2003) preliminary considered that three determinants; facilitating conditions, behavioural intention and perceived self-efficacy would directly influence actual behaviour. However, after a longitudinal study and empirical tests on the three constructs at different time-points, it was confirmed that perceived self-efficacy played no direct role as a factor that influenced actual behaviour. After further studies, Venkatesh et al. (2003) concluded that perceived self-efficacy is an indirect construct, that is captured by effort expectancy, thus dropping perceived self-efficacy as a direct determining factor that influence behaviour. UTAUT studies equally supports that line of reasoning (Venkatesh, Morris, Davis, & Davis, 2003).

However, the literature reveals that older people are hesitant to use technology or limit their technology usage due to perceived inadequacy of technical ability and understanding in themselves. By citing lack of self-confidence when using ICT, they worry that they may lack adequate skills and capabilities, to enable them to perform a task such as internet banking (Dasgupta, Paul, & Fuloria, 2011). Furthermore, some internet banking studies support self-efficacy as a core determinant that influences an individual's intention towards adoption of internet banking. From the above discussions, there is a need to ascertain the role that perceived self-efficacy plays in older people internet banking adoption. Hence the following hypothesis was proposed:

H7: Perceived self-efficacy positively influences intention to use internet banking by seniors.

The dependent variables in the proposed research model are:

Intention to Use (IU)

Intention to use is defined as "an individual's subjective possibilities that they will perform the behaviour in question" (Venkatesh et al. 2003). Davis (1989) has another definition as "the readiness of an individual to act, use, or adopt a behaviour towards a specific thing". Intention is described as an individual's willingness to try to do something or plans made for the same (Ajzen, 1991). This construct was measured by the intention, prediction, and planned use of internet banking services. In the STAM model, social factors and perceived usefulness have a marked influence on intention to use, which affects experimentation of internet banking services. Hence the hypothesis below was raised:

H8: Intention to Use will have a positive influence on experimentation of Internet banking services by seniors

Experimentation and Exploration

Renaud & Biljon (2008) describes experimentation and exploration as when a user starts using a certain technology for the very first time and forms their first impression with regards to its ease of use. It also aligns with Rogers' (2003) trialiability innovation attribute. According to Renaud & Biljon (2008), "experimentation and exploration confirm the usefulness and may lead to future acceptance (collected by participants' reflection)".

STAM incorporates confirmed usefulness as a construct that is dependent on experimentation. It is through the experimentation module, that the usefulness of a system is confirmed. This study, therefore, sets up the following hypotheses:

H9a: There is a statistically significant relationship between confirmed usefulness and experimentation of internet banking by seniors

H9b: Confirmed usefulness positively influences Actual use of Internet banking by the seniors.

Actual Use of Internet banking

According to Renaud & Biljon (2008) Actual use is predicted indirectly by experimentation outcomes. Facilitating conditions, perceived usefulness and ease of learning & use all under experimentation influence actual use (Renaud & Biljon, 2008).

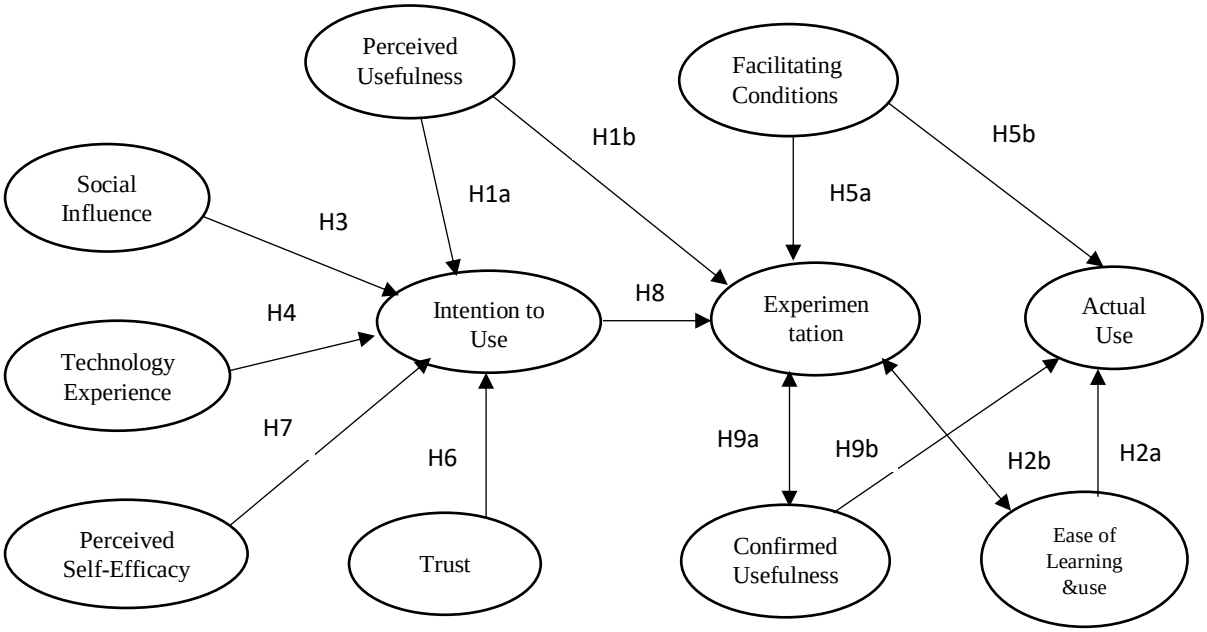

Figure 8 - Research model depicting the hypotheses

Chapter 3: Methodology

3.1 Introduction

This chapter highlights the adopted procedures and methods that were used to conduct the study so as to achieve the research objectives raised in chapter one.

3.2 Research Design

A descriptive research approach was used to investigate the adoption of online banking by older people. This research required a well-defined framework, a clearly defined sample from a population, a more structured instrument of data collection and a pre-planned design for content analysis; which all fall under the descriptive research umbrella. Furthermore, the need for comparison of variables and establishing relationships between the variables also found qualitative research as most appropriate for such an investigation.

3.3 Population of the Study/Target Population

The study's setting was Nairobi County as it has a high concentration of people using banking services. Population of a study depicts a group of people who hold the same attributes (in this study, they reside within Nairobi county and are aged 55 years and over).

The target study population was Nairobi county citizens aged above 55 years, which was projected to number around 146,927 in 2014 (KNBS, 2015). The inclusion conditions are that for every participant, they must have used any form of banking service in managing their finances. Since they were using banking services, these group of participants were selected for the survey as they would be able to understand the subject of research and thus make informed decisions when participating.

The research was carried out in three main areas within Nairobi County; Nairobi West, Nairobi East, and Westlands.

3.4 Sampling Design

This study used a non-probability sampling design called quota sampling. Due to the target population diversity and the available resources for the study, using probability sampling would have been difficult as the sampling frame for the population could not be obtained. Non-probability sampling design is advantageous in that it's easier and cheaper to carry out in comparison to full probability sampling techniques.

The sample size used for this research was 300 senior citizens, which was calculated based on Slovin's formula $n = N / (1+N e^2)$, which computes a sample size (n) using a given population size (N) and an error margin(e). Therefore, using the Slovin's formula, an optimal sample size of 300 citizens was determined, given a 5% margin of error:

- Population size (N) = 146,927 (Nairobi citizens aged between 55 - 75 years)
- Sample size (n) = 146,927 / (1+146,927 *0.0025) $\simeq$ 298.25
- Hence, the estimated target sample size, resulting from the formula, is 298

Hard copies of the survey were submitted to citizens and responses were collected immediately after, for further analysis.

Acquaintances and willing volunteers that came forward with an interest to participate were used as informants to help identify other people who qualify for this research.

3.5 Data Collection Methods

In this research, a well-structured questionnaire was used to collect primary data. Personal interviews were used to administer the questionnaire; this method allows the researcher to do a personal follow up and seek clarification where necessary. Face-to-face interaction method also, reduced and eliminated the rate of error in responses and guaranteed to return the required sample size. Personal interactions also assured quality of collected data by reducing item non-response rate.

3.6 Questionnaire Design and Development

Concerning instrument construction, all items that were used in operationalizing the constructs of each variable being investigated were derived from the original STAM model and modified to fit this study's subject (internet banking adoption by seniors). These modifications were done so as to use appropriate wording and phrases that relate to the context of internet banking. Further, in order to capture the overall use of online banking by seniors, extra questions were used.

Table 1 represents model constructs and definitions, their corresponding measurement items as used in this study; and the literature references that informed their operationalization. Most of the indicators were operationalized based on definitions by Venkatesh et al, and Renaud & Biljon. Technology Experience was however operationalized as prior experience in usage of computers and the internet, including the frequency of usage of both currently.

Table 1 The Study Model's Constructs Measurement Statements

Measurement Statements	**Factor To Test**	**Adapted From**
Use of internet banking enables convenient access to banking services at any time	**Usefulness: "**the extent to which a person believes that using IB will enhance his or her job performance"	Davis (1989) Renaud & Biljon., (2008) Venkatesh et al., (2003)
Using online banking saves time since banking tasks are accomplished more quickly. For example, one doesn't have to wait in line		
Using internet banking improves the quality of banking services		
Ease of Learning to use the internet banking system	**Ease of Learning and Use: "**the extent to which a person believes that using IB will be free of effort"	Renaud & Biljon., (2008) Venkatesh & Davis, (2000)
Ease of access to IB through a phone or computer and making banking transactions		
Clear and understandable interactions with internet banking system		
Your peers and close friends think that you should use IB	**Social Influence: "**the degree to which an individual perceives that	Renaud & Biljon., (2008)

Most members of your family think that you should use online banking	his or her peers, and important others believe he or she should use IB"	Venkatesh et al., (2003)
Having people close to you using internet banking		
Availability of help if you encounter a problem when using online banking	**Facilitating Condition: "**the degree to which a person perceives that technical infrastructure exists to support the use of a system"	Renaud & Biljon., (2008) Venkatesh et al., (2003)
Banks providing conditions and terms acceptable to you		
Ability to easily have access to computers and Internet at home or work		
An assurance from the bank that all online banking transactions are indeed secure	**Trust:** "Trust in the entity providing the service and the ability to provide online banking services"	Carter & Belanger, (2005) McLean (2011)
The reputation of the bank conveys assurance of internet banking integrity		
A guarantee that your information remains confidential and your privacy will not divulge when using online banking services		
Enough knowledge about computers and being comfortable using them for internet banking	**Perceived Self-Efficacy:** the degree to which a person is confident in her/his ability to use online banking.	Bandura, (1982) Venkatesh et al. (2003)
Feeling confident when using a computer and the Internet for financial services		
Someone clearly showed you how to use online banking		
I intend to use internet banking in future	**Intention to Use:** the degree to which an individual intends exert effort to use IB	Renaud & Biljon., (2008) Venkatesh et al., (2003)
I would choose to use internet banking when dealing with bank affairs		
Would you want to use IB on a trial basis to see what it can do?	**Experimentation**	Roger (2003)
How long have you been using a computer?	**Technology Experience:** the period of past usage of computers and the internet; and the frequency of usage for both currently.	Venkatesh et al., (2003)
Approximately how often do you use computers?		
For how long have used the Internet?		
How often is your usage of the Internet currently?		

The questionnaire was carefully written by use of simple and clear words so as to encourage participants to contribute and voice their viewpoints.

The questionnaire was designed to comprise four sections and investigates. The first part collected the demographic data of the respondent. This section focused on respondents' classification whereby personal data (gender, age, education level) were captured. The second part assessed the respondent's current computer knowledge, internet banking knowledge and experience. The third section evaluated behavioural intentions and behaviour towards internet banking using a 5-point liker scale (ranging from "very low" to "very high"), where each participant choose the most appropriate response within their encouragement level. Constructs of social influence, perceived usefulness, facilitating conditions, ease of learning and use, perceived credibility, and perceived self-efficacy were evaluated in this section. The fourth section measured the actual usage of internet banking services by older people.

3.7 Reliability and Validity

In order to determine if a study was a success or not, there are two measurements that should be taken into consideration: validity and reliability analysis. Reliability measures how accurate the data collected is; an example is if the research was done again, identical results should be found. In technology acceptance model, however, reliability is the extent to which a variable or an indicator, is consistent and stable with what it is assumed to measure.

For this study, reliability analysis was done by use of SPSS V25 for all the variables in the research model. Cronbach's coefficient alpha is the most common test for reliability in SPSS. Hence, to determine inter-item reliability and internal consistency for each construct, Cronbach's alpha reliability test was performed for each of the construct ("social influence", "usefulness", "facilitating conditions", "ease of learning and use", "perceived self-efficacy", trust, experimentation, "intention to use" and "actual use"). Neuman (2006), was useful in providing guidance on how to interpret the reliability coefficients; any value of .70 and above

is acceptable and indicates the adequacy of internal consistency. Chapter 4 section 3 discussed the results of the reliability analysis.

Validity indicates whether a research study measures what they meant to measure and nothing else (Neuman,2006). Furthermore, validity concerns the degree to which collected data indeed accurately measure what it's actually intended to measure.

3.8 Data Analysis Approach and Statistical Tools

The statistical tool used in this study to screen and analyse data was the Statistical Package for the Social Sciences (SPSS) V25 software. Data analysis of the research work included descriptive statistics, which was used to analyse the demographic data, correlation and regression analysis, hypothesis testing and research questions analysis.

Demographic data

The sample used must be a proper representative of the target population, in order to provide accurate answers to research questions. Therefore, the survey participants were requested demographic data (gender, age, professional status).

Descriptive Statistics

Descriptive statistics included computation of min, max, mean and standard deviation for variables of interest.

Correlation and Multiple Regression Analysis

This analysis included computation of correlation coefficient and significance of a relationship. Correlation analysis was used to study the joint variation among the different variables that are in the conceptual framework, and to determine the level of correlation among the said variables. Regression analysis was used in identifying significant factors that would improve online banking adoption amongst senior Kenyans by identifying how a construct is related to another construct in the conceptual framework. The values of coefficients range from +1 to -1. A coefficient value closure to +1 showed a significant positive relationship and a value closure

to -1 showed significant negative relationship. If there was no relationship between the variables of interests, then the value of correlation coefficient would be near zero.

Hypotheses Testing

Seven hypotheses were tested using observed significance level or p-value approach with 95% confidence level (if $p <= \alpha$ (0.05), reject hypotheses). If the observed significance level or a p-value was found to be less than 0.05, then the hypothesis would be rejected.

Formats for Presenting Results

The results from the data analyses were presented in various tables and figures in chapter four. The results of the descriptive statistics, reliability tests (Cronbach's alpha value), the correlation coefficients (ρ), and p-value for the hypotheses evaluation were presented in tables.

3.9 Ethical Considerations

As ethical consideration is an important part of any research work (Neuman, 2006), it was ensured that standards of good practices were applied when conducting the research. Hence, no ethical concern arose from this study since all the data was collected anonymously. In addition, every respondent was informed that his/her contribution would be confidential. Moreover, each participant was informed at the beginning that their contribution was absolutely voluntary. When the purpose of the research was explained to the participants with the assurance of anonymity and guarantee of no personal information in the survey questionnaire, then the participants were more willing to participate in filling out the survey questions.

Chapter 4: Data Results and Analysis

4.1 Introduction

Reports of the findings and analysis of the collected data are covered in this chapter. Data for the study was obtained through face-to-face interactions with participants using a paper-based survey. Data from participants were collected and was entered manually to SPSS. The overall response rate for the survey was (78.67%), which is considered fairly high. The total number of questionnaires responded was 236 and each was checked in detail to remove the erroneous ones.

The chapter discusses the four stages, listed below, of analysis:

1. A descriptive analysis that comprises of demographic data relating to age, gender, education, computer knowledge and internet experience.
2. Survey reliability details: Reports on the Cronbach alpha of each survey items. The correlation matrix of all items was also established in order to determine the suitability of factor analysis.
3. Further, factor analysis was done on each scale in order to study, and confirm, the validity of the factor structures that represent each construct
4. Correlations and multiple regressions analyses were done to ascertain variables' relationship. The various potential predictors of *intention to use* and *actual use* were assessed through multiple regression analyses.

4.2 Descriptive Statistics

4.2.1 Demographic analysis

To demonstrate the demographic differences between users and non-users of Internet banking, descriptive statistics of percentage comparisons were conducted. Table 2 provides a general overview of the participants' details in terms of demographic information including age, gender, education levels, among others.

Table 2 Demographic Data for Study (N=236)

		Non-Users 191 (80.9%)		Users - 45 (19.1%)	
Variable		Frequency	Percent (%)	Frequency	Percent (%)
Gender	Male	72	37.7	28	62.2
	Female	119	62.3	17	37.8
Age	55 – 60	71	37.2	38	84.4
	61 – 65	64	33.5	7	15.6
	66 – 70	48	25.1	0	0
	70+	8	4.2	0	0
Education	High School & lower	74	38.7	0	0
	Diploma	68	35.6	12	26.7
	Bachelor	42	22.0	24	53.3
	Higher Education	7	3.7	9	20
How long have you been using a computer? (Technology Experience)	Never Used	48	25.1	0	0
	less than 1 year	88	46.1	0	0
	1 – 3 years	37	19.4	2	4.4
	3 – 5 years	11	5.8	8	17.8
	more than 5 years	3	1.6	35	77.8
How long have you been using the internet?	Never Used	37	19.4	0	0
	less than 1 year	64	33.5	0	0
	1 – 3 years	44	23.0	1	2.2
	3 – 5 years	35	18.3	6	13.3
	more than 5 years	11	5.8	38	84.4

Gender and Age

The female number of participants is comparable to that of the male; 52.5% being male and 47.5 % female (sees Appendix), which was slightly less than male respondents. One likely reason to this was that participants were selected using convenience sampling and the male gender happened to be more willing to partake the survey.

The age distribution showed that nearly half (46%) of respondents aged from 55 to 60 while the second largest group aged between 61 and 65 (30.5%). The 66 to 70 years old age group percentage was 20.5% while those older than 70 years was about 3%. (sees Appendix)

Education level

Most of the participants had reached fairly good education levels. About 33.9%, which is the majority of respondents, had a diploma, while 28% had a bachelor degree. Such people are assumed to have the computer or internet literacy needed for one to use online banking services. About 31.4%, had only a high school level or lower. Finally, a small percentage, about 6.8% had a postgraduate degree (masters or doctorate degrees).

Internet Experience

About 40% of the respondents had an internet experience of more than 3 years whereas only 15.7% had never used the Internet. Meaning, most participants possessed sufficient internet knowledge. The more the Internet experience, the more likely one would adopt online banking.

4.2.1. Internet banking usage characteristics

19.1% of the participants have used online banking services while 80.9% have not used IB. Collected data relating to the use of Internet banking revealed that a majority (62%) 28 of the 45 users have used the Internet for over three years whereas (38%) have used it for not more than three years.

The final descriptive analysis set concerned banking services that are carried out through Internet banking channels. These services were categorized into either basic or advanced services; whereby basics included: balance enquiry and accessing bank statements and paying bills, while advanced services included: Money transfers between accounts, applying for loans and others specified. The frequency analysis revealed that respondents highly used the online banking channel to access basic services in comparison to the more advanced ones, where the many scored high on their regular use of online banking for account balance and bank statements enquiries following paying bills (80% and 62% respectively). Advanced services usage was minimal, with occasional use ranging within 37.8% (money transfer) and 13% (loans

request) while other services over Internet banking channels scored 7% of occasional usage (check tables in Appendix).

4.3 Construct Reliability

Reliability refers to the extent to which a measuring instrument is free of random errors and produces consistent and stable results. It concerns the consistency of constructs (Hair J. et al., 2006). This study had seven independent variables and three dependent used in the forth part of the survey questionnaire. Independent scales are social influence (SI); perceived usefulness (PU); ease of learning and use (ELU); technology experience (TE); trust (TR); perceived self-efficacy (PSE); and facilitating conditions (FC). The dependent scales are intention to use (IU); experimentation (Expt) and actual use (AU) of internet banking by seniors. A reliability assessment was conducted by analysing the item-total correlations and internal consistency in order to verify that these scales did satisfy the model constructs accurately and consistently. The scales' reliability assessment procedure is shown in the following sub-sections.

4.3.1 Internal consistency

Internal consistency is a reliability measure that assesses the extent to which different items that survey the same scale produce similar results. The internal consistency of all latent variables was measured using Cronbach's coefficient alphas, whereby a coefficient value of 0.7 and above was considered acceptable.

As Straub (1989) stated, "high correlations between alternative measures or large Cronbach's alphas are usually signs that the measures are reliable".

Table 3, demonstrates the Cronbach's alphas (α) of each and every construct. The analysis showed that all the variables had a highly reliable internal consistency. i.e of more than 0.70. The Cronbach's α results ranged from 0.813 for perceived usefulness to 0.971 for actual use. Overall, the result shows that the survey questionnaire is highly reliable.

Table 3 Cronbach's Alpha Reliability Results

Construct	Cronbach's Alpha (α)	No. of Items	Comments
Social influence (SI)	.881	3	High Reliability
Perceived Usefulness (PU)	.813	3	High Reliability
Ease of Learning and Use (ELU)	.873	3	High Reliability
Facilitating conditions (FC)	.898	3	High Reliability
Technology Experience (TE)	.864	4	High Reliability
Trust (TR)	.895	3	High Reliability
Perceived Self-Efficacy(PSE)	.900	3	Excellent Reliability
Intention to Use (IU)	.945	3	Excellent Reliability
Experimentation (Expt)	.889	1	High Reliability
Actual Use (AU)	.971	1	Excellent Reliability

4.3.2 Item-total correlations

The analysis of Item-total correlations demonstrate the relationships between the research model variables. These relationships between variables help to test whether the research model will properly capture the key properties of a given sample.

Hair et al. (2006) stated that an item-total correlation value below 0.3 is a clear indication that the variable in question might be measuring a scale totally different from what the whole construct is measuring. Appendix 2 presents the results of the item-total correlation analysis, and all exceeded 0.3, which is an indication of how well the correlation matrix is suitable for factor analysis.

The exploratory Factor analysis basis was the correlation coefficient matrix of the 21 survey items: three items measuring the *perceived usefulness scale*, three items measuring the *ease of use and learning*, three items measuring *social influence*, three items for measuring *facilitating conditions*, three items for *technology trust* and three items measuring *perceived self-efficacy*. The dependent variable of *intention to use* was also measured through three items. Note that, the survey would represent a single factor if all items were perfectly correlated.

4.3.3 Sampling Adequacy: KMO and Bartlett's Test

Sampling adequacy was examined by assessing the Kaiser-Meyer-Olkin (KMO) output, which also examined the suitability of data for factor analysis. It ranges from 0 to 1, whereby a high measure of KMO (≈1) suggests that the process of factors analysis is applicable, while a low index of KMO (≈0) implies that grouping items into factors could be irrelevant. A KMO measure above 0.60 to 0.70 is considered adequate for using Factor Analysis for further analysis of data. Generally, it is recommended that Factor Analysis should not be conducted if the KMO turns out to be below 0.5 (since there would be an inadequate correlation with the other variables).

Table 4 presents the results of the survey sampling adecuacy. The KMO index of the survey is 0.928, which is way more than the recommended value of 0.7.

Table 4 KMO and Bartlett's Test

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.928
Bartlett's Test of Sphericity	Approx. Chi-Square	3583.938
	df	300
	Sig.	.004

Based on the analytical diagnostics of the three tests above, it was then confirmed that the data collected did pass all the assumptions; thus, it was possible to progress to factor analysis.

The correlation coefficients between the survey's items are in general greater than 0.3, which indicates that there were adequate relationships between the variables. The KMO statistic is well above the minimum accepted level of 0.60 indicating sampling adequacy. Therefore, in conclusion it was established that the data was indeed suitable for factor analysis.

4.3.4 Factor Analysis

The scale items factor loading was finally examined. In general, a factor loading less than 0.4 is deemed low, and and item with a low-loading factor must be suppressed (Hair J. et al., 2006). This study used a minimum factor loading value of 0.5 (which is the recommended cut-off loading level) to make sure that all variables were practically significant (Hair J. et al., 2006). As presented in Table 5, the factor loadings every item exceeded the 0.50 cut-off.

Item loadings on distinct factors resulted from the exploratory factor analysis, which indicates that eight different factors were, in fact, underlying. It also confirms once again that the study's variables were indeed internally consistent. Any item loading to a latent construct below 0.4 was suppressed from the output.

The communalities of individual items (which is the summation of the squared factor loadings on each item) demonstrated how perfectly the model worked for every item. Items' communalities are viewed as regressions R^2 and they express the percentages of items' variances, as demonstrated by all factors that retained. Table 5 that all items' communalities were close to 1; thus further verifying the general assessment of the model's performance.

Table 5 Exploratory Factor loadings and items' communalities

Based on principal components analysis of the 25 items in the survey, with Varimax rotation (N = 236)

	Factor								
	1	2	3	4	5	6	7	8	Communality
PU1	.342			.833					.694
PU2				.827					.683
PU3	.428			.797					.636
ELU1			.866						.750
ELU2			.876						.768
ELU3	.355		.855						.731
SI1						.928			.862
SI2						.960			.922
SI3						.967			.935
FC1					.821				.674
FC2					.787				.619
FC3	.421				.727				.529
TE1								.751	.612
TE2			.321					.803	641
TE3								.814	672
TE4								.794	.664
PSE1	.889								.813
PSE2	.844								.772
PSE3	.838								.762
TR1		.832							.691
TR2		.823		.476					.678
TR3		.788							.622
IU1							.714		.837
IU2							.872		.767
IU3							.800		.640

As shown in the table above, each group of items significantly loaded to a single common factor. This was after a couple of cross loading items were removed and the analysis was re-run with the items remaining. This led to a solution comprising of 25 variables with a clearer 8-factor structure, just like the theoretical model. Also, each factor had at least 3 items with loadings greater than 0.4 as those with much less were removed.

4.4 Construct Validity

Hair et al. (2006) define validity as "the extent to which a set of measured variables actually represent the theoretical latent construct they are designed to measure". It is the extent to which a test or scale accurately measures what it is intended to measure. Although reliability analysis is necessary, it is not sufficient. A scale may be highly reliable (consistent) but also may not have the validity (accuracy). A measure may also be highly valid (accurate) and not have reliability (consistency) (Holmes-Smith, 2011). Construct validity is assessed by using either convergent validity or discriminant validity.

Convergent validity.

This describes "the degree to which measures of a specific construct should converge or share a high proportion of variance in common" (Hair *et al.*, 2010). Simply, convergent validity ascertains that two constructs measures that should be theoretically correlated, are indeed correlated (related). Convergent validity can be measured by use of Composite Reliability (CR) and Average Variance Extracted (AVE). In establishing convergent validity, Hair et al. (2010), suggested that CR should be above 0.60 or preferably exceeding 0.70. Also, the AVE must be above 0.50 and most importantly, the CR should be more than the AVE. The calculations were done manually for all the constructs using the formula suggested by Hair et al (2010).

Table 6 Convergent Validity for the Constructs

Construct	**Composite Reliability**	**Average Variance Extracted**
Social influence (SI)	.966	.705
Perceived Usefulness	.906	.618
Ease of Learning and Use	.914	.728
Facilitating conditions (FC)	.864	.558
Technology Experience (TE)	.852	.546
Trust	.929	.766
Perceived Self-Efficacy	.890	.670
Intention to Use	.904	.701
Actual Use	.911	.837

Discriminant Validity

Also referred to as divergent validity, discriminant validity "is the extent to which a construct is not unduly related to other similar, yet distinct, constructs" (Hair J. et al., 2006). It shows when an item measurement correlates strongly with the construct to which it is associated with theoretically, but weakly with every other construct.

Discriminant validity is assessed by comparing the square roots of Average Variance Extracted (AVE) to the factor correlation values between constructs; whereby the square roots of AVE should be higher than the correlations for discriminant validity to be supported (Hair J. et al., 2006).

In table 7, the diagonal cells represent the square-roots of AVE while the other cells show the absolute correlations values between constructs. Adequate discriminant validity was confirmed since the elements in the diagonal cells (square-roots of AVE) were higher than those in the off-diagonal cells (correlations).

Table 7 Discriminant Validity Results for the Measurement Model

	SI	PU	ELU	FC	TE	TR	PSE	BI	Expt	AU
Social influence (SI)	**.951**									
Perceived Usefulness (PU)	.172	**.786**								
Ease of Learning and Use (ELU)	.473	.307	**.853**							
Facilitating conditions (FC)	.218	.322	.256	**.747**						
Technology Experience (TE)	.406	.104	.250	.236	**.832**					
Trust (TR)	.495	.276	.384	.412	.449	**.875**				
Perceived Self-Efficacy (PSE)	.104	.150	.425	.236	.314	.242	**.819**			
Intention to Use (IU)	.195	.206	.196	.204	.386	.276	.446	**.837**		
Experimentation (Expt)	.305	.249	.486	.583	.420	.382	.361	.208	**.932**	
Actual Use (AU)	.117	.048	.106	.092	.152	.128	.182	.308	.134	**.915**

The values of the square root of the average variance extracted are on the diagonal

4.5 Testing the model hypotheses

The ultimate purpose of the study is to assess the causal or predictive relationships between the constructs, and subsequently confirm or disconfirm the study's conceptual model and the study hypotheses. Therefore, after the statistical analysis and results which indicated that the research model demonstrated satisfactory reliability and validity, the next step was to test the theoretical hypothesis and the relationships between constructs.

This stage involved a test of nine hypotheses relating to the objectives of the research. Multiple regression analyses were performed to investigate possible relationships between dependent variables *Intention to Use* ***IU*** and *Actual Use* ***AU*** the independent variables: ***PU***: *Perceived Usefulness;* ***ELU***: *Ese of learning and Use;* ***SI***: *Social Influence*; ***TE***: *Technology Experience*; ***TR:*** *Trust in IB services;* ***PSE***: *Perceived Self-Efficacy*, ***FC****: Facilitating Conditions*

4.5.1 Correlation results

Before the multiple regression analyses were conducted, bivariate correlations between variables were extracted. Table 8 displays the correlations between six variables and the dependent construct, *intention to use*. All appear to be positive and significant and range from 0.401 (*Social Influence*) to 0.637 (*perceived self-efficacy*). Displayed in the last column are the variation percentages in *intention to use* as explained by each potential predictor by use of simple regression.

Table 8 Correlation between the variables

	IU (DV)	PU	ELU	SI	FC	TR	PSE	$\mathbf{R^2}$
PU	.610**	1.000						0.3
ELU	.561**	.641**	1.000					0.3
SI	.401**	.454**	.450**	1.000				0.1
TE	.582**	.445**	.539**	.512**	1.000			0.3
TR	.573**	.456**	.458**	.424**	.522**	1.000		0.3
PSE	.637**	.426**	.425**	.341**	.461**	.592**	1.000	0.4

**correlation is significant at the 0.01 level (2-tailed). N=236

4.5.2 Multiple Regression results

After confirming that not a single predictor had zero correlation with dependent variables, multiple regression analyses were conducted on all predictors. The first regression test was done for hypotheses H1a, H3, H4, H6 and H7 (concerning *perceived usefulness, social influence, technology experience, trust,* and *perceived self-efficacy*) and the dependent variable of *Intention to Use*.

The second multi-regression test was conducted for hypotheses H1b, H2b, H5a, H8 and H9a (*Perceived usefulness, ease of learning and use, facilitating conditions, Intention to Use and confirmed usefulness*) against the dependent variable of *IB experimentation*.

Finally, a third test was also done for hypotheses H2a, H5b and H9b (*Ease of learning and use, facilitating conditions and confirmed usefulness*) against *actual use of internet banking* which is the dependent variable.

Statistically, P-values less than 0.05 are considered as significant according to Fisher and Neyman-Pearson approaches to testing statistical hypotheses.

Table 9 Multiple regression Results R^2= .432 DV: *Intention to Use on the 5 predictors*

Predictor	**Standardized Coefficients B**	**P value Sig**
PU	.264	.001
SI	.108	.027
TE	.179	.000
TR	.238	.012
PSE	.316	.000

Intention to use is predicted by Perceived Usefulness (β = 0.264), Social Influence (β = 0.108), Technology Experience (β = 0.179), Trust (β = 0.238) and Perceived Self-Efficacy (β = 0.316), The Adjusted R^2 is 43.2 %, which means that the model, or the drivers of intention to use, significantly explains 43 percent of the variance in intentions towards use of IB services by

seniors. This is a good proportion for this research, and hence it shows that the model has been well constructed.

Table 10: Multiple Regression Results R^2= .293; DV: *Experimentation of IB services*

Predictor	**Standardized Coefficients B**	**P value Sig**
PU	.237	.004
IU	.218	.000
FC	.182	.013
ELU	.245	.000

Experimentation is explained by Perceived Usefulness (β = 0.237), Intention to Use (β = 0.218), Facilitating Conditions (β = 0.182) and Ease of Learning and Use (β = 0.245). The standardized regression weight for these variables R^2 is 29%, which means that the model significantly explains 29 percent of variance in the adoption of internet banking by seniors. These constructs were all found to have positive standardized estimates which proves the reliability of the model.

Table 11: Multiple Regression Results R^2= .246; DV: *Actual use of internet banking services*

Predictor	**Standardized Coefficients B**	**P value Sig**
FC	.196	.009
CU	.372	.001
ELU	.234	.000

Actual Use of Internet banking by seniors is predicted by Facilitating Conditions (β = 0.196), Confirmed Usefulness (β = 0.372) and Ease of Learning and Use (β = 0.234). These variables totally account to 24% of the variance in actual use of Internet banking by seniors (R^2= 0.246 coefficient of determination). This is an indication of the good explanatory power of the model for model adoption.

For the hypothesis H9b relating to the dependence of confirmed usefulness of internet banking services on Experimentation, results of a linear regression reported that the path coefficient

between confirmed usefulness and experimentation was significant at (β = 0.428, p = 0.002). Experimentation explained 6.4% of the variance in Confirmed usefulness.

4.5.3 Hypothesis testing results

According to Fisher and Neyman-Pearson statistical theory of hypothesis testing, P values of less than 0.05 are regarded as statistically significant. Therefore, if a p-value is less than 0.05 (which is the significance threshold) then it is concluded that there is sufficient evidence to support the hypothesis at the chosen level of significance.

The various hypotheses defined in Table 12 are grouped according to the relevant variables.

Table 12: Hypothesis Testing [Beta Weights and P-Values]

Casual Path (Hypothesis)	Coefficients estimate(β)	P Value	Hypothesis testing result
PU → IU (H1a)	.264	.001	Supported
PU → Expt (H1b)	.237	.004	Supported
ELU → AU (H2a)	.234	.000	Supported
ELU ↔ Expt (H2b)	.245	.000	Supported
SI → IU (H3)	.108	.037	Supported
TE → IU (H4)	.179	.000	Supported
TR → IU (H6)	.238	.012	Supported
PSE → IU (H7)	.316	.000	Supported
IU → Expt (H8)	.218	.000	Supported
CU ↔ Expt (H9a)	.428	.028	Supported
CU → AU (H9b)	.372	.001	Supported
FC → Expt (H5a)	.182	.013	Supported
FC → AU (H5b)	.196	.019	Supported

Perceived Usefulness

Statistical analysis confirmed that there was indeed a positive and significant relationship between perceived usefulness (PU) and intention to use (IU) with β=.264, p <.05. Further, the

effect of perceived usefulness (PU) on experimentation of IB was strongly significant (β=.237, p <.05). Hence, the research result supports hypotheses H1a and H1b which state:

H1a: Perceived usefulness positively influences intention to use IB by seniors.

H1b: Perceived usefulness positively influences experimentation of IB by seniors

Ease of Learning and Use

The research had two hypotheses relating to ease of learning and use, which stated:

H2a: Ease of learning and use positively influences actual use of IB by seniors.

H2b: There is a statistically significant relationship between ease of learning and use and experimentation of Internet banking.

The statistical analysis of the data collected relating to these hypotheses showed positive and significant results (β=.234, p <.05) and (β=.245, p <.05) respectively. Based on these results, both hypotheses were supported.

Social Influence

Social influence was measured using perceptions of how social communication affects seniors' intentions to use IB. The hypothesis states:

H3: Social influence has a positive effect on intention to use Internet banking by seniors.

This study's results revealed that social influence can significantly impact (β=.108, p < .05) on senior users' intention to use internet banking. Thus the hypothesis was supported.

Technology Experience

Technology experience was measured based on computer and Internet usage history (the duration and frequency of use). The results showed that Technology Experience has a statistically significant positive effect (β=.179, p <.05), on intention to use. Hence, the results, support hypothesis H4 which was:

H4: Technology experience positively influences intention to use IB by seniors

Facilitating conditions

The study hypothesized:

H5a. Facilitating conditions positively influences experimentation of IB by seniors.

H5b. Facilitating conditions positively influences actual use of IB by seniors.

Results confirmed that facilitating conditions had a statistically significant positive influence on both experimentation and actual use; hence the above two hypotheses were supported.

Trust

The hypothesis was stated as:

H6: Trust positively influences behavioural intention in the adoption of IB by seniors.

Internet and IB trust level was tested through three statements in the questionnaire. The study results confirmed that trust (TR) had a significantly positive effect (β=.238, $p < .05$) on Intention to Use (IU) internet banking services by seniors. Thus supporting the hypothesis.

Perceived Self Efficacy

H7: Perceived self-efficacy positively influences intention to use Internet banking by seniors.

Perceived self-efficacy was tested using statements that looked at whether older adults believed that they had the abilities and necessary skills to conduct online banking transactions. Statistical analyses on the data relevant to the hypothesis mentioned above showed positive and significant results (β=.316, $p < .05$), meaning that the hypothesis was supported.

Intention to use

In the context of this study, it was hypothesised:

H8: Intention to use positively influences experimentation of Internet banking by seniors.

The statistical analysis regarding the above hypothesis revealed significant and positive results (β=.218, $p < .05$).

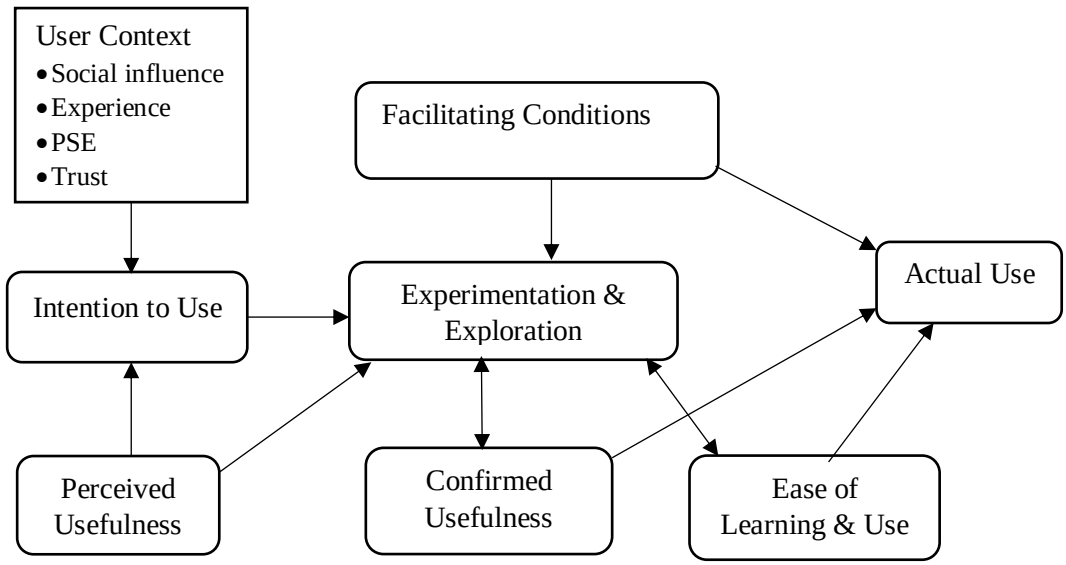

Figure 9: Final Framework

4.6 Discussion of the Findings

The findings from the data analysis were discussed and interpreted, and the results were compared to other research studies within a similar field.

Demographics

After comparing the gender, education levels and technology experiences between users of IB and the non-users, significant differences were observed.

Education Levels

A majority of Internet Banking users (80%) had attained at least a diploma, while 41.4% of the non-users had only a high school education or lower. Agarwal & Prasad (1999) reported that education levels positively associate with perceived ease of use beliefs; those with lower education levels are likely to be more sensitive to ease of learning and use of the technology hence a barrier. Rogers (2004) also argued that education can lead to a positive perception of perceived usefulness and thus, higher levels of education should increase perceived ease of use by improving attitude and reducing anxiety. Additionally, researches show that increased education level leads to an increase in internet banking adoption (Amin, H. 2009, Dasgupta et al 2011)

Gender

62.3% of respondents that did not use Internet banking were observed to be of the female gender. Reports from numerous studies indicate that the male gender has a higher likelihood of adopting internet banking compared to females (Wang, Lin, & Laurn, 2009). In a research done at a pre-training phase, Morris & Venkatesh (2000) found that the decision-making process of a male and female differ in various ways. Among other reasons is that men appear to be more task-orientated compared to females (Venkatesh & Morris, 2000). Studies on internet banking adoption reveal that females tend to be more cautious as they perceive more risk in online purchases than men while men concerns' tend to revolve around service fees like internet access.

Discussions related to the research's STAM model.

These findings are discussed with respect to the constructs of the proposed STAM research model: Usefulness, ease of learning and use, social influence, technology experience, facilitating conditions, trust and perceived self-efficacy and their relationship with the dependent variables, intention to use(IU), experimentation(Expt) and Actual Use (AU).

4.6.1. Perceived Usefulness

In this study, the perceived usefulness used is the degree to which seniors believe that their use of IB services will assist them to facilitate transactions with their bank; with regards to IB benefits such as saving time and money and improved quality of banking services. The statistical analysis on the effect of perceived usefulness (PU) on intention to use (IU) reveals a significant positive result (β=.264, p <.05). Also, the effect of perceived usefulness (PU) on the experimentation of IB was strongly significant (β=.237, p <.05). This study considers perceived usefulness to be among the most strong predictor of intention. Thus, senior users with a favourable perceived usefulness are likely to have an interest in the experimentation and later adoption of different IB services.

This suggests that seniors' perceived usefulness for IB services might be increased by focusing on the usefulness of the internet banking services. Simply, if the benefits and advantages of internet banking systems were to be promoted and demonstrated to senior citizens in an interactive manner, their acceptance and usage of IB services would in all likelihood increase. In this specific context of older people, other researchers such as Wang et al. (2009), Cutler (2011) and Jayaratne. (2017), observed similar results though in different national settings. This finding supported the previous claim made by Davis (1989), Venkatesh and Davis (2000), Venkatesh et al. (2003) and Renaud & Biljon (2008) that perceived usefulness plays an important role in technology acceptance.

4.6.2. Ease of Learning and Use

The ease of learning and use (ELU) in this study was defined as the extent to which seniors believe that it is easy to learn and use online banking services.

The findings showed that the easier it is for seniors to learn and use IB, the more likelihood of potential users considering experimenting and using the IB services. Moreover, this significant influence of ease of learning and use can be supported by designing simple internet banking systems which are not complex to use, using simple and easy to understand words and phrases, providing instructions and clear procedures for IB use and incorporating a web-based assistance tool.

This finding is similar to those of other studies on seniors' technology adoption such as Morris et al. (2011), Phang, C. W. (2006) and Jayaratne. (2017) who uncovered that an older customer will have an interest in using technology if he or she perceives the technology to be easy to use and useful. Therefore, the user-friendliness of applications is important to senior consumers and will, in turn, impact their decision to continuously use and adopt Internet banking.

4.6.3. Social Influence

In this study, the social influence construct was defined as the degree to which seniors perceive other people opinions as important and can influence their decision to use Internet banking. The study's results revealed that social influence can significantly impact (β=.108, $p < .05$) on seniors' intention to use internet banking. This confirmed that social influence from friends, family or colleagues can have an influence on seniors' decision to continuously use internet banking.

Similar results were observed by Jayaratne. (2017), Cutler (2011) and Campbell et al. (2012), who also studied technology acceptance by the seniors but in different context. These results are in line with the previous claim made by Davis (1989) and Venkatesh et al. (2003) that social influence constructs are significant in technology acceptance.

This result implies the importance of considering multiple actors who can have an effect on the cognitive behaviour of an individual. One strategic marketing approaches that would encourage seniors to continuously use and adopt online services is word-of-mouth communication (Campbell et al. 2010).

4.6.4. Technology experience

Technology experience is considered one of the important factors that affect behaviour intention (Venkatesh V. , 2000). As it had been hypothesized, the results showed that Technology Experience has a statistically significant positive effect (β=.179, $p <.05$), on intention to use. According to the findings of this study, it was revealed that experienced users were more probable to accept and continuously use IB than inexperienced users. These results are in line with the popular belief that the experienced user's adoption uptake is always higher than those inexperienced users.

This results are in line with that of Renaud & Biljon (2008) who revealed that Inadequate technology experience can be the reason as to why older adults dismiss new technology or may not be aware of its potential uses.

The literature reported that, in an online context, experienced users were more likely to adopt new information systems than inexperienced users. The result of this study is consistent with the results of several studies, including Venkatesh et al. (2003) and Venkatesh and Morris (2000) which regard computer experience as a moderating variable in technology adoption. Therefore, this result indicates that past computer experiences can amplify intentions to use new technologies, in that when one's tenure in using computers increases so does their perception towards technology. Also, prior computer experience increases actual levels of necessary skills that one needs to have in order to boost their confidence and consequently intentions to use the technology.

4.6.5. Trust

Lack of trust in technology is one major formidable barrier to acceptance and continuous use of any e-servives, especially where personal or financial information is needed (McKnight, Choudhury, & Kacmar, 2011). In this study, trust was measured based on two principles: **i**) trust in online banking services and **ii**) trust in the Internet (technology), which is the extent to which a Web user trusts in the security, reliability and proficiency of the Internet and believes that a desired task can be accomplished satisfactorily (Kelton, Fleischmann, & Wallace, 2008). The study results confirmed that trust (TR) had a positive and significant effect (β=.238, p <.05) on Intention to Use (IU) internet banking services by seniors. Meaning seniors' acceptance and use of IB services is significantly influenced by their trust in both of trust elements.

Research studies in the literature have revealed that seniors remain reluctant to accept using IB because of personal issues concerning trust, security and privacy. The results are consistent with the findings of McLean (2011), Luo, Li, Zhang, & Shim. (2010) and Phang, C. W. (2006). The finding showed trust is one of the main factors that affect the intention to use internet banking services; in particular when a user is required to submit personal information which is confidential such as details of their bank account, identification number, or contacts

information. Therefore, to increase internet banking services usage among older adults, the level of their trust in IB and its E-Systems should be increased and developed as trust and levels of confidence play a crucial role in the acceptance and continued use of any e-services. A majority of the senior consumers believe that carrying out a transaction face to face is more secure than using the Internet for the same.

4.6.6. Perceived Self-Efficacy

Perceived self-efficacy, in this study, is the degree to which seniors believe in their confidence or rather capabilities to use online banking. Perceived self-efficacy was tested by looked at whether senior citizens believed that they had the necessary skills and capabilities for them to perform online banking transactions. The statistical analyses on data concerning the hypothesis showed a positive and significant outcome (β=.316, $p < .05$); meaning that a user with higher levels of perceived self-efficacy has a higher likelihood of adopting IB compared to another who perceive him/herself to be lacking in such skills.

This finding is comparable to other from previous studies (Wang et al., 2009; Luo Li, Zhang, & Shim, 2010; Phang, C. W. 2006) that established the need for relevant levels of perceived self-efficacy when deciding to adopt any technology by the older adults.

4.6.7. Facilitating Conditions

In this study, facilitating conditions referred to the accessibility to technological resources and the support needed for one to use online banking. The results asserted that the facilitating conditions construct has a significant and direct effect on experimentation and actual usage of Internet banking; which indicates that respondents actually use IB services when they have the appropriate facilitating conditions that support them in doing so.

With regard to seniors, facilitating conditions include general ICT infrastructures such as internet connectivity, accessibility and reliability of the IB websites, technical support service, and other available services that would assist them to adopt internet banking. Hence, it is

essential to have appropriate facilitating conditions (i.e both technical and support resources) so as to improve the adoption rate of IB services among older adults.

The result generated was similar to other empirical studies done by Amin et al. 2009, Venkatesh et al. 2003, and Jayaratne. 2017.

4.6.8. Intention to Use

Intention to use (IU) is "the extent to which an individual is likely to engage in a particular behaviour or action" (Davis, 1989). Generally, the stronger the intentions to carry out an action, the more likely that the action will be carried out (Ajzen, 1985). This study discussed the likeliness of a senior to use internet banking.

The statistical analysis regarding this hypothesis revealed significantly positive results (β=.218, $p < .05$). These results showed that, averagely, respondents with a favourable behavioural intention for IB services are also more likely to try them out. This is in line with Renaud and Biljon (2008) work in the STAM theory.

4.6.9. Experimentation and Exploration

According to Renaud & Biljon (2008), experimentation and exploration phase confirms the usefulness of a technology and may lead to its future acceptance. A poor experience during the experimentation and exploration phase may cause a negative perception that the system is complex to use and this, in turn, is likely to lead to rejections unless the facilitating conditions and usefulness are powerful enough to discount this poor experience.

The results showed that usefulness and ease of use of internet banking is reinforced by experimentation and exploration of the said technology. Meaning, experimentation helps senior users to perceive a sense of ease and confirms usefulness of the technology to them.

Luo et al. (2010) claimed that past experiences in using certain technologies lead to positive beliefs of an individual's personal ability to use the said technology or another related one. The claim was asserted in this study as it was observed that participants who had already

familiarized themselves with Internet banking, through experimentation, had a likelihood of perceiving IB as easy to use and as a service which would be of use to their lives. This in turn significantly impacted on their actual usage.

Chapter 5: Conclusions and Recommendations

According to the descriptive statistics, although some respondents had the technology experience and awareness of internet banking, they, however, didn't use it. A majority of the respondents were fearful that if they used internet banking, their financial information would be revealed, at some point, in a manner that would compromise their privacy. Many respondents also expressed that they perceived internet banking as "not trustworthy". Nevertheless, trust is a multidimensional construct and it is obscure to identify trust with banks, service providers, applications developers, and other third parties. Hence, the importance of training seniors on how to use online banking securely.

5.1 Linking the Study Findings to the Original Objectives

The study's main aim was to research on factors that influenced the adoption rate of online banking among seniors, within the Nairobi county context. This section summarizes how the specific objectives were achieved by the time the study was concluded.

Objective 1*: To determine significant factors that influence the acceptance of online banking by seniors in Kenya.*

The Senior Technology Acceptance Model (STAM) was closely examined and used in identifying its constructs effects on the adoption of internet banking services in Nairobi county. The findings of the model's effect are as follows.

With respect to the main variables in the STAM model, the results revealed that Usefulness, social influence and technology experience contribute significantly in influencing intentions to use online banking by senior citizens in Kenya. Similarly, both facilitating conditions and ease of learning and use had a strong positive influence on actual use of internet banking services. The results were compared with those of other researchers, such as Jayaratne. (2017), Morris et al. (2011), Phang, C. W. (2006), Cutler (2011) and Campbell et al. (2012) among other researchers, who also studied technology acceptance by the seniors but in different contexts.

In general, it was established the results generated were in agreement with the reputable work of Renaud & Biljon (2008).

Objective 2 and 3*: To determine whether and how trust and perceived self-efficacy predict the adoption of internet banking services by seniors.*

The research started off by developing a study contextual model informed by the knowledge acquired through relevant literature review. This led to the adaptation of the STAM model to include two new constructs *perceived self-efficacy* and *trust* as direct determinants of Intention to Use. The discussed and interpreted findings in Chapter 4 are able to give a feedback to the above research objective. In summary, it was observed that both trust and perceived self-efficacy are important factors affecting intentions to use internet banking. Trust was expected to be the factor with the greatest impact on Internet banking operations and surprisingly it emerged third after perceived self-efficacy and usefulness.

Thus the second research objective was achieved based on theoretical investigation and qualitative research.

Objective 4: *To determine strategies that can be implemented to enhance online banking adoption among Kenyan older adults.*

Internet banking studies have made various recommendations that would help in improving the quality of the e-service and increase the level of Internet banking adoption by the public at large. For example, Dasgupta & Fuloria (2011) proposed: (1) informing customers about the features and benefits associated with the use of IB, (2) offering some guidance on internet banking usage especially to people with low self-efficacy when it comes to using the internet, (3) giving continued assurance of improved privacy and security when using IB, (4) improving the public image of the bank and (5) offering a simple support system for setting up procedures. The mentioned recommendations are still to present applicable to all customers. Moreover, in the case of seniors, banks may require more effort to lead older clients into their Internet

banking services. New technology is accepted with lots of caution by this segment and is in most cases voluntarily avoided (McLean, 2011). Based on the findings of the first three objectives of the study, some guidelines were presented for financial institutions and e-services providers to improve the usage of internet banking among older adults.

Awareness is one of the foundation stones of successful adoption of any e-system services projects. Increasing awareness of internet banking services and benefits can lead to increase in its adoption and usage levels. Banks should lay emphasis, to their senior clients, of the convenience that comes with using Internet banking, such as not having to always go to their bank branch or having to queue. Conducting a comprehensive awareness and addressing any misunderstanding or issue about internet banking systems and the numerous benefits of its adoption would be important.

Attracting clients by the 'ease of learning and use' feature. It is necessary to adapt webpages that are simply designed, so as to have an easy and friendly environment to work with. The design should be simple with improved clarity, navigability and visibility for clients to easily operate in.

If banks segment their market, they should focus on the specific preferences and needs of their senior customers. For example, respondents that rated 'Perceived Usefulness' highly had more Internet experience. In this line, it would be worthwhile to consider that successful adoption of IB could be in personalizing services to attract the older adults segment.

Regarding the ‘ease of learning and use’, banks must pay attention to their clients perceiving their online banking channels to be easy, and a minimum experience should give them enough confidence to use of these services. A way to do so would be by designing webpages that seek to optimize the aesthetics and usability of IB (Cresci, Yarandi, & Morrell 2010), especially in cases of the seniors, who are digital natives. Thus customer feedback survey should be

conducted regularly. Also, demonstration of services is necessary and should be provided both online and physically.

The findings presented trust and perceived self-efficacy as important factors affecting the intention to use internet banking services by the seniors. Some respondents voiced that internet banking is "not particularly trustworthy". Factors that affect senior citizens' trust in online banking services should be addressed in internet banking strategies and future projects. Customers' confidence in IB should be built. For example, there should be a guide and simple instructions on how to use the internet safely and also security guarantees should be put forward using both technical and non-technical language. Moreover, it is important that seniors be encouraged to trust internet banking services; consequently, this will enhance their confidence levels, by educating them on the utilization of security technologies and programs that protect their systems and data.

5.2 Research Contributions

This research is an important effort toward a profound understanding of different factors influencing the adoption of online banking services by the seniors in Nairobi county. The research contributions have been divided into two subsections: theoretical contribution and practical contribution.

Theoretical contribution

This study has a number of contributions to the body of knowledge in information systems, IT adoption by senior citizens in particular.

The first theoretical contribution of the study is demonstrating the validity of the STAM model by Renaud & Biljon (2008) in the context of Nairobi senior citizens. As per the feedback from 236 senior respondents within Nairobi county, evidence from this empirical study shows that the STAM model can significantly explain the variances of intention to use and actual use. The

results ascertain that factors identified are capable of providing an adequate explanation of senior consumers in their decision-making process in the adoption of Online Banking.

Secondly, the study added "trust" and two other resource-based variables ("perceived self-efficacy" and "technology experience") to the STAM model and they were all found to have a positive influence on seniors' intention to use IB.

Thirdly, this study observed the key influences on IB Adoption by seniors. Perceived usefulness, perceived self-efficacy, trust, social influence, and technology experience (ordered in their strength of influence) were five salient factors that predict senior's intention to use online banking, along with ease of learning and use, confirmed usefulness and facilitating conditions, which projected the actual use. Hence, the third theoretical contribution of this research is enriching the existing theory-based seniors' technology acceptance research work and asserting the key factors affecting intention and actual usage in seniors' adoption of online banking.

Furthermore, the study did validate and confirm the significant roles of trust and perceived self-efficacy as potential factors which influence acceptance and usage of online banking by seniors in Kenya.

Practical contribution

This study has contributed to the practice of online banking adoption by investigating and identifying core influencing factors in the adoption process, by senior consumers, based on the STAM model. Throughout the study, various factors were identified, so solutions have been suggested to financial institutions in order for them to accelerate and increase the use of online banking among older adults in Kenya. Also, this research analysis contributes to the body of knowledge in the subject area of online banking adoption. Finally, the study findings are important to the banking sectors and the directors and IT departments of these sectors. It provides comprehensive analyses of factors that influence the acceptance and use of online banking from the perspective of seniors.

This study expands the body of knowledge in the area of IT adoption and IB usage by the seniors within Kenya, as an example of a developing nation, by utilizing the STAM model. It is hoped this research will contribute to the literature on technology adoption by senior citizens in Kenya and fill the currently existing gap in the said literature.

5.3 Research limitations

The first major limitation of this work was the cross-sectional design used, which was necessary for this research, given the limited time allocated for the study. A number of technology acceptance studies are longitudinal, meaning that data was repeatedly collected over a given study period in order to observe changes in variables at different points in time. However, this study's data was collected at one specific time period, making it a cross-sectional study. Intention to use, experimentation and actual use of internet banking services were all measured at the same point of time. However, for the adoption of newer IT systems, it is necessary that observations are made over several points of time in order to determine differences relating to intention to use' and actual usage (Venkatesh et al., 2003).

The second potential limitation was the necessity to use non-probability sampling in selecting the survey respondents. Convenience sampling technique was used to reach the total number of participants. This had its advantage, as it was easy to collect data. However, this sampling technique has its limitation, as the sample used in this study does not generally represent the entire research target population.

Another limitation concerns the population of the study. The population was based on Nairobi County senior citizens only. Therefore, it is important to emphasize that this study's results can be generalised and any recommendation can only be applicable to senior citizens in Nairobi. This will be of help to the financial institutions in seeing why this population segment may not be using online banking and understand what would encourage them to do so.

Finally, the research was done in a specific domain, which is online banking. Given this, it is not clear if the findings of the study can apply more broadly to other different forms of technologies.

The mentioned limitations notwithstanding, this study provided useful findings which contribute considerably to understanding factors that influence acceptance of internet banking by the seniors in Kenya. Thus, the study can serve as a foundation to guide further research in this subject area.

5.4 Future Research Recommendations

First, it might be of importance for future researches to apply a longitudinal study approach so as to test how the predictive effect of different factors varies across time. It would particularly be interesting to understand how the intention to use factor actually impacts experimentation and actual use across time, and this cannot be tested in a cross-sectional study. Therefore, as a suggestion for future research, a longitudinal study would give a better and more accurate interpretation of the STAM model and its fundamental factors. Furthermore, this would provide a better comprehension of relationships between intention to use, experimentation and actual use of online banking services by the seniors in Kenya.

The use of probability sampling in identifying the study respondents should be applied, in future research, thus increasing the confidence of generalizing study findings across entire populations.

Since only 19.1% of the respondents used internet banking, this research work is merely a representation of a starting point for studying the crucial factors that influence seniors' intentions to use online banking and their actual use. Since internet technology has been rapidly advancing and in particular, the convergence of financial services and the internet has been evolving over time, more studies on online banking use by the seniors is necessary.

Finally, this study aimed at finding out the appropriate factors that would improve the adoption of online banking services among senior citizens. In future, further related studies examining

adoption of other technology services by their older consumers should be undertaken. This will help in identifying new different factors that may influence the acceptance, use and diffusion of many other different e-services save for the service cited in this study (online banking). A repeat of the structure of this study may also be necessary, but with users of different age ranges, including millennials, generation X etc. for comparison purposes.

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Appendices

Appendix A: Questionnaire

Qualifying questions

Age: Below 55 ☐ 55 and over ☐

Do you have an active bank account at any branch? Yes ☐ No ☐

If your answer is Below 55 and **No**, thank you for your time, you can stop now. Otherwise, please proceed.

Section 1: Respondent's Classification

Gender: Male ☐ Female ☐

Age: 55 – 60 ☐ 61 – 65 ☐ 66 – 70 ☐ 70 + ☐

Highest attained level of education:

High school & below ☐ diploma ☐ bachelor ☐ higher education ☐ Others ☐

Section 2: Technology Experience (Please tick the box that matches your status)

Have you ever undertaken computer training of any kind? Yes ☐ No ☐

How long have you been using a computer?

Never Used ☐ less than 1 year ☐ 1 – 3 years ☐ 3 – 5 years ☐ more than 5 years ☐

Approximately how often do you use a computer?

Almost Never ☐ Rarely ☐ Occasionally ☐ Frequently ☐

How long have you been using the Internet?

Never Used ☐ less than 1 year ☐ 1 – 3 years ☐ 3 – 5 years ☐ more than 5 years ☐

How often do you use the Internet?

Almost Never ☐ Rarely ☐ Occasionally ☐ Frequently ☐

Have you used Internet banking? Yes ☐ No ☐

Experimentation:

Would you want to use IB on a trial basis before registering for the service, to see what it can do?

Yes ☐ No ☐

Section 3: Determinants of acceptance behaviour of internet banking technology

To what extent would the following factors encourage you to become an internet banking customer? Using a 1 to 5 rating scale, please circle the number that indicates your level of encouragement discouragement to use internet banking, in the following statements.

The number '1' means that the factor has very low levels of encouragement to use IB, while '5' indicates that the factor would highly encourage you to use internet banking.

	Statements				
Perceived Usefulness	**Very low**				**Very high**
Use of internet banking enables convenient access to banking services at any time	1	2	3	4	5
Using online banking saves time since banking tasks are accomplished more quickly. For example, one doesn't have to wait in line	1	2	3	4	5
Using internet banking improves the quality of banking services	1	2	3	4	5
Ease of Learning and Use	**Very low**				**Very high**
Ease of learning to use the internet banking system	1	2	3	4	5
Ease of access to IB through a phone or computer and making banking transactions	1	2	3	4	5
A clear and understandable interaction with internet banking system	1	2	3	4	5
Social Influence	**Very low**				**Very high**
Having people close to you using internet banking	1	2	3	4	5
Most members of your family think that you should use online banking	1	2	3	4	5
Your peers and close friends think that you should use Internet banking	1	2	3	4	5
Facilitating Conditions	**Very low**				**Very high**
Availability of help if you encounter a problem when using online banking	1	2	3	4	5
Banks providing conditions and terms of using IB that are acceptable to you	1	2	3	4	5
Ability to easily have access to computers and Internet at home or work	1	2	3	4	5
Perceived Self-Efficacy	**Very low**				**Very high**
Knowing enough about computers and being comfortable using them for internet banking	1	2	3	4	5

Feeling confident when using a computer and the Internet for financial services	1	2	3	4	5
Someone clearly showed you how to use online banking	1	2	3	4	5
Trust	**Very low**				**Very high**
The reputation of the bank conveys assurance of internet banking integrity	1	2	3	4	5
An assurance from the bank that all online banking transactions are indeed secure	1	2	3	4	5
A guarantee that your information remains confidential and your privacy will not divulge when using online banking services	1	2	3	4	5
Intention to Use (Likelihood of using Internet Banking)	**Very low**				**Very high**
Intentions to use internet banking	1	2	3	4	5
Prediction of use internet banking in the near future	1	2	3	4	5
Intentions to choose internet banking when dealing with bank affairs	1	2	3	4	5

Section 4: Actual use

For how long have you been using internet banking services?

Never ☐ Under 1 year ☐ 1 – 3 years ☐ 3 – 5 years ☐ more than 5 years ☐

How often do you use online banking for the following services? Please tick where appropriate

Services/Frequency	Never	Rarely	Occasionally	Frequently
Balance Enquiry / Accessing bank statement				
Money Transfer				
Paying Bills				
Applying for loans				
Others (please specify) _____				

Appendix B: Descriptive data analysis

Frequency Tables

Education_level

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	High school & below	74	31.4	31.4	31.4
	diploma	80	33.8	33.8	65.2
	Bachelor	66	28.0	28.0	93.2
	Higher education	16	6.8	6.8	100.0
	Total	236	100.0	100.0	

Computer_Experience

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Never Used	48	20.3	20.3	20.3
	Less than 1yr	88	37.3	37.3	57.6
	1 – 3 years	43	18.2	18.2	75.8
	3 – 5 years	22	9.2	9.2	85.2
	5 + years	35	14.8	14.8	100.0
	Total	236	100.0	100.0	

Internet_Usage

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Never Used	37	15.7	15.7	15.7
	Less than 1yr	64	27.1	27.1	42.8
	1 – 3 years	45	19.1	19.1	61.9
	3 – 5 years	41	17.3	17.3	79.2
	5 + years	49	20.8	20.8	100.0
	Total	236	100.0	100.0	

Age

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	55 – 60	109	46.2	46.2	46.2
	61 – 65	71	30.1	30.1	76.3
	66 – 70	48	20.3	20.3	96.6
	70+	8	3.4	3.4	100.0
	Total	236	100.0	100.0	

Gender

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	124	52.5	52.5	52.5
	Female	112	47.5	47.5	100.0
	Total	236	100.0	100.0	

Balance_bank_statement_enquiries

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	rarely	0	0	0	0
	occasionally	9	37.5	20.0	20.0
	frequently	36	18.8	80.0	100.0
	Total	45	100.0	100.0	

Paying_bills

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	rarely	8	17.8	17.8	17.8
	occasionally	9	20.0	20.0	37.8
	frequently	28	62.2	62.2	100.0
	Total	45	100.0	100.0	

Money_transfer

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	rarely	20	44.4	44.4	44.4
	occasionally	17	37.8	37.8	82.2
	frequently	8	17.8	17.8	100.0
	Total	45	100.0	100.0	

loans_application

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	rarely	39	86.7	86.7	86.7
	occasionally	6	13.3	13.3	100.0
	frequently	0	0.0	0.0	100.0
	Total	45	100.0	100.0	

Appendix C:

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.928
Bartlett's Test of Sphericity	Approx. Chi-Square	3583.938
	df	300
	Sig.	.014

Section 1: Correlation Matrix 21 items

Inter-Item Correlation Matrix

	PU1	PU2	PU3	ELU1	ELU2	ELU3	SI1	SI2
PU1	1.000	.611	.775	.404	.367	.370	.492	.378
PU2	.611	1.000	.739	.522	.424	.411	.409	.344
PU3	.775	.739	1.000	.475	.680	.469	.554	.427
ELU1	.404	.522	.475	1.000	.756	.672	.597	.502
ELU2	.367	.424	.680	.756	1.000	.761	.356	.444
ELU3	.302	.411	.469	.672	.761	1.000	.575	.520
SI1	.492	.409	.504	.597	.356	.575	1.000	.642
SI2	.378	.344	.427	.502	.444	.520	.642	1.000
SI3	.472	.435	.385	.541	.352	.570	.806	.693
FC1	.428	.429	.431	.444	.404	.520	.506	.488
FC2	.314	.376	.478	.427	.457	.461	.511	.395
FC3	.454	.388	.555	.455	.499	.550	.547	.418
PSE1	.521	.472	.446	.535	.421	.633	.615	.523
PSE2	.519	.377	.537	.538	.469	.563	.651	.522
PSE3	.465	.367	.473	.485	.384	.549	.575	.403
TR1	.661	.603	.669	.815	.675	.781	.793	.713
TR2	.804	.539	.719	.709	.675	.768	.754	.746
TR3	.633	.619	.724	.792	.663	.778	.839	.674
BI1	.744	.498	.683	.742	.603	.724	.801	.638
BI2	.688	.652	.704	.722	.598	.739	.760	.642
BI3	.774	.671	.769	.772	.556	.837	.838	.687

Inter-Item Correlation Matrix

	SI3	FC1	FC2	FC3	PSE1	PSE2	PSE3	TR1
PU1	.472	.428	.314	.454	.521	.519	.465	.661
PU2	.435	.429	.376	.388	.472	.377	.367	.603
PU3	.385	.431	.478	.555	.546	.537	.473	.669
ELU1	.541	.444	.427	.455	.535	.538	.485	.815
ELU2	.352	.404	.457	.499	.421	.469	.384	.675

ELU3	.570	.520	.461	.550	.633	.563	.549	.781
SI1	.806	.506	.511	.547	.615	.651	.575	.793
SI2	.693	.488	.395	.418	.523	.522	.403	.713
SI3	1.000	.726	.659	.692	.791	.781	.747	.773
FC1	.726	1.000	.679	.775	.783	.771	.717	.684
FC2	.659	.679	1.000	.797	.769	.703	.738	.674
FC3	.692	.775	.797	1.000	.825	.786	.749	.733
PSE1	.791	.783	.769	.825	1.000	.810	.803	.754
PSE2	.781	.771	.703	.786	.810	1.000	.741	.813
PSE3	.747	.717	.738	.749	.803	.741	1.000	.707
TR1	.773	.684	.674	.733	.754	.813	.707	1.000
TR2	.719	.664	.607	.738	.764	.752	.664	.734
TR3	.784	.762	.722	.744	.790	.874	.765	.822
BI1	.780	.646	.614	.693	.776	.859	.728	.824
BI2	.752	.742	.674	.712	.793	.788	.766	.769
BI3	.806	.738	.670	.750	.845	.843	.773	.845

Inter-Item Correlation Matrix

	TR2	TR3	IU1	IU2	IU3
PU1	.804	.633	.744	.688	.774
PU2	.539	.619	.498	.652	.671
PU3	.719	.724	.683	.704	.769
ELU1	.709	.792	.742	.722	.772
ELU2	.675	.663	.603	.598	.556
ELU3	.768	.778	.724	.739	.837
SI1	.754	.839	.801	.760	.838
SI2	.746	.674	.638	.642	.687
SI3	.719	.784	.780	.752	.806
FC1	.664	.762	.646	.742	.738
FC2	.607	.722	.614	.674	.670
FC3	.738	.744	.693	.712	.750
PSE1	.764	.790	.776	.793	.845
PSE2	.752	.874	.859	.788	.843
PSE3	.664	.765	.728	.766	.773
TR1	.734	.822	.824	.769	.845
TR2	1.000	.693	.826	.686	.778
TR3	.693	1.000	.789	.784	.796
IU1	.826	.789	1.000	.801	.870
UI2	.686	.784	.801	1.000	.883
UI3	.778	.796	.870	.883	1.000

Coding of Different Constructs

Construct	Variable Code	Questionnaire statement
Perceived Usefulness	PU1	Use of internet banking enables convenient access to banking services at any time
	PU2	Using online banking saves time since banking tasks are accomplished more quickly. For example, one doesn't have to wait in line
	PU3	Using internet banking improves the quality of banking services
Ease of Learning and Use	ELU1	Ease of Learning to use the internet banking system
	ELU2	Ease of access to IB through a phone or computer and making banking transactions
	ELU3	A clear and understandable interaction with internet banking system
Social Influence (SI)	SI1	Having people close to you using internet banking
	SI2	Most members of your family think that you should use online banking
	SI3	Your peers and close friends think that you should use IB
Facilitating Condition	FC1	Availability of help if you encounter a problem when using online banking
	FC2	Banks providing conditions and terms acceptable to you
	FC3	Ability to easily have access to computers and Internet at home or work
Trust	TR1	The reputation of the bank conveys assurance of internet banking integrity
	TR2	An assurance from the bank that all online banking transactions are indeed secure
	TR3	A guarantee that your information remains confidential and your privacy will not divulge when using online banking services
Perceived Self-Efficacy	PSE1	Knowing enough about computers and being comfortable using them for internet banking
	PSE2	Feeling confident when using a computer and the Internet for financial services
	PSE3	Someone clearly showed you how to use online banking
Intention to Use	IU1	Intentions to use internet banking
	IU2	Prediction of use internet banking in the near future
	IU3	Intentions to choose internet banking when dealing with bank affairs

Section 2: Reliability Statistics

Perceived Usefulness

Reliability Statistics

Cronbach's Alpha	N of Items
.813	3

Perceived Self-efficacy

Reliability Statistics

Cronbach's Alpha	N of Items
.900	3

Ease of learning and Use

Reliability Statistics

Cronbach's Alpha	N of Items
.873	3

Trust

Reliability Statistics

Cronbach's Alpha	N of Items
.895	3

Social Influence

Reliability Statistics

Cronbach's Alpha	N of Items
.881	3

Intention to Use

Reliability Statistics

Cronbach's Alpha	N of Items
.945	3

Facilitating Conditions

Reliability Statistics

Cronbach's Alpha	N of Items
.898	3

Actual Use

Reliability Statistics

Cronbach's Alpha	N of Items
.971	5

Section 3: Correlations, Multiple Regression and ANOVA Test (H1 to H4; H6 & H7)

Correlations

	IU	PU	ELU	SI	TE	TR	PSE
IU	1.000	.610	.561	.401	.582	.573	.637
PU	.610	1.000	.641	.454	.445	.456	.426
ELU	.561	.641	1.000	.450	.539	.458	.425
SI	.401	.454	.450	1.000	.512	.424	.341
TE	.582	.445	.539	.512	1.000	.522	.461
TR	.573	.456	.458	.424	.522	1.000	.592
PSE	.637	.426	.425	.341	.461	.592	1.000

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	PSE, SI, TE, PU, TR, ELU[a]		Enter

a. All requested variables entered.
b. Dependent Variable: IU

Coefficients[a]

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	-3.045E-16	.025		.000	1.000
PU	.264	.035	.264	7.742	.001
ELU	.145	.036	.145	2.437	.014
SI	.108	.030	.108	2.514	.037
TE	.179	.032	.179	5.672	.000
TR	.238	.033	.238	3.125	.012
PSE	.316	.033	.316	9.567	.000