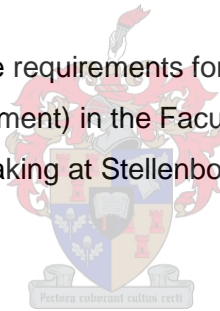# Self-Service Information Systems Adoption in the Western Cape: The influence of demographical factors

by

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Thesis presented in fulfilment of the requirements for the degree of Master of Philosophy (Information and Knowledge Management) in the Faculty of Centre for Knowledge Dynamics & Decision Making at Stellenbosch University.

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March 2016

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DECLARATION

By submitting this thesis electronically, I declare that the entirety of the work contained therein is my own, original work, that I am the sole author thereof (save to the extent explicitly otherwise stated), that reproduction and publication thereof by Stellenbosch University will not infringe any third party rights and that I have not previously, in its entirety or in part, submitted it for obtaining any qualification.

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Summary

The thesis explores the relationship between demographics and self-service information systems (SSISs), with SSIS considered as potentially technical, socio-technical or social. Alter (2008) is used to define SSIS and associated key concepts. In the literature reviewed, authors mainly focus on information systems as technology and rarely consider them as work systems (Alter, 2008) where systems could be technical, socio-technical or only social.

Chapter one explains the research problem and reasoning for exploring demographics. It briefly explains the history of self-service (SS) and its importance. The chapter also briefly considers previous studies to address the problem and to identify gaps in the research.

Chapter two summarises the literature on adoption and indicates where the emphasis is placed. It explores important concepts such as information systems (IS), SSIS and SS to clearly define the terms associated with adoption. It highlights that many studies are conducted in business environments or universities, not many include actual customers as participants in the use of information systems.

Chapter three discusses the survey methodology used, as well as ethical considerations. It indicates how the chosen method ties in with the research question and the aim of the study, it explains how sampling was done and how questions were designed, and concludes with a discussion of common errors.

Chapter four contains the findings of the survey. The sample consists of 305 cell phone users in urban parts of the Western Cape. According to the analysis, only one of the investigated generalisations is true. This generalisation focusses on gender. The analysis shows that the level of income has no influence on the use of the SSIS, or the selected channel. Although the level of education plays no role in SSISs, it does influence the selection of some channels linked to SSISs. Contrary to expectations, age plays a role in the adoption of SSISs and some channels associated with SSISs.

The final chapter concludes with the potential interrelatedness of demographical factors that requires careful consideration in the design of future studies that measure adoption. It also recommends that future studies should be extended to include urban and rural areas within South Africa.

Since customers are not charged for any support channel in the cellular industry, this coupled with the fact that participants were not forced to only consider technological tools, may have influenced the outcome of the survey. The reviewed studies only focus on a specific channel or technological tool and do not include all available channels. In the past, respondents had to choose from the available options presented in the surveys, which may not have been a

true reflection of the channels that they prefer. Based on these findings, this thesis makes recommendations for future studies to assist business with support optimization, transaction increase, cost reduction and profit maximisation.

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Opsomming

Hierdie tesis ondersoek die konsep van inligtingstelsels-aanvaarding, en die verbandhoudende demografie van die potensiële inligting-stelsel gebruikers. In die nageslaane literatuur, fokus skrywers hoofsaaklik op inligtingstelsels as tegnologie en beskou dit selde as 'n werkstelsel waar stelsels tegnies, sosio-tegnies of alleenlik sosiaal kan wees.

Hoofstuk een verduidelik die navorsingsprobleem, en waarom dit belangrik is om die verhouding tussen demografiese faktore en selfdiens-aanvaarding van gebruikers in die Wes-Kaap te oorweeg. Dit verduidelik kortliks die selfdiens geskiedenis en waarom dit 'n belangrik oorweeging is. Die hoofstuk verwys ook kortliks na vorige studies om die probleem aan te spreek en gapings in die navorsing te identifiseer.

Hoofstuk twee bevat 'n opsomming van die literatuur oor aanvaarding en waar die klem val. Dit ondersoek belangrike begrippe soos inligtingstelsels, selfdiens-inligtingstelsels en selfdiens, aangesien die literatuur aandui dat baie studies nie die bepalings wat met aanvaarding verbandhou, duidelik definieer nie. Dit beklemtoon dat baie studies in sake-omgewings of universiteite uitgevoer is, maar dat nie veel daarvan werklike kliënte as deelnemers in die gebruik van inligtingstelsels wat ontwerp is vir transaksionele- en ondersteuningsdoeleindes, ingesluit het nie. Dit poog ook om die voordele van die werk-sisteembenadering vir die akademiese en sake-gemeenskap aan te dui.

Hoofstuk drie bespreek die opname metodologie en etiese oorwegings. Dit verwys ook na die inskakeling van die gekose metode met die navorsingsvraag en die doel van die studie, die wyse waarop steekproefneming gedoen is en die vrae ontwerp is, en algemene foute wat oorweeg moet word.

Hoofstuk vier bevat die bevindings van die opname. Die steekproef bestaan uit 305 selfoongebruikers in stedelike gebiede in die Wes-Kaap. Die ontleding dui aan dat slegs een van die veralgemenings wat ondersoek is, korrek is. Hierdie veralgemening fokus geslag. Die ontleding maak ook interessante bevindings wat betref vlak van opvoeding, inkomste en ouderdom . Dit dui aan dat inkomstevlak nie selfdiens-inligtingstelsel gebruik of 'n gekose kanaal beïnvloed nie. Onderwysvlak speel geen rol in selfdiens-inligtingstelselsaanvaarding nie, maar beïnvloed wel die keuse van die kanale gekoppel aan selfdiens-inligtingstelsels. In teenstelling met verwagtinge, speel ouderdom wel 'n rol by selfdiens-inligtingstelselsaanvaarding en by die kanale verbonde aan selfdiens-inligtingstelsels.

Die laaste hoofstuk kom tot die gevolgtrekking dat demografiese faktore interafhanklik kan wees, en dat dit versigtig oorweeg moet word by die ontwerp van toekomstige studies vir die meting van aanvaarding. Dit beveel ook aan dat toekomstige studies stedelike en landelike

gebiede in Suid-Afrika moet insluit om navorsers in staat te stel om veralgemenings in die Suid-Afrikaanse konteks te maak.

Die feit dat deelnemers nie verplig word om alleenlik tegnologiese gereedskap te oorweeg nie, en die werklikheid dat kliënte nie vir enige ondersteuningskanaal in die sellulêre bedryf hoef te betaal nie, kon die uitslag van die opname beïnvloed het. Die studies wat deel van die literatuur studie vorm, fokus alleenlik op 'n spesifieke kanaal of tegnologiese hulpmiddel, en nie op al die beskikbare kanale nie. Respondente word dus "gedwing" om uit die aangebode beskikbare opsies te kies, en dit is moontlik nie 'n ware weerspieëling van die kanale wat hulle andersins sou verkies om te gebruik nie. Gebaseer op hierdie bevindings, maak hierdie tesis aanbevelings vir toekomstige studies om die industrie te help met ondersteuning optimalisering, transaksie bevordering, koste vermindering en wins maksimalisering.

Acknowledgement

As stated by so many before me, writing a thesis takes you on an interesting journey of discovery and I have many to thank for this experience.

Johann van den Heever, thank you for believing in me, supporting me, taking care of the family and encouraging me to keep going.

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List of Acronyms

ATM	Automated Teller Machine
CMV	Common method variance
DOI	Diffusion of innovations
NCSS	Number crunching statistical system (Statistical analysis software)
IS	Information systems
IT	Information technology
IVR	Interactive voice response
SMS	Short message service
SS	Self-service
SSIS	Self-service information systems
TAM	Technology acceptance model
TPB	Theory of planned behaviour
USSD	Unstructured supplementary service data
UTAUT	Unified theory of acceptance and use of technology

Chapter 1

Introduction

1.1. Introduction

This study attempts to determine whether there is a relationship between demographical factors and self-service (SS) adoption by users in the Western Cape. The purpose is to identify those likely to adopt self-service information systems (SSIS) in the Western Cape, and what channels they prefer.

Much pressure has been placed on operators in the cellular industry to make cellular services more affordable and accessible (Full-scale investigation into mobile prices in South Africa, 2015; Mzekandaba, 2015; Van Zyl, 2015)[1]. Apparently customers view basic communication increasingly as a basic right, and demand access to affordable services. From a business perspective, shareholders want optimal growth for their investments. This creates an obvious conflict for operators in terms of what they can charge for the products and services that they deliver. They must find innovative ways to provide customers with the necessary products and services at a price they are willing to pay. In addition, the charged prices should not create negative growth for, or impact profits of the operators.

This problem is not unique in today's business environment. Heilbronner & Milberg (2008) indicate that business realised at an early stage that managing costs could increase profit.   Financial statements reviewed as part of the literature study point towards an increasing focus on efficiency, growth and improved customer experience to prevent customer churn[2].

For a number of years, SS is being explored as a possible solution for managing operating cost. The argument is that businesses will optimise operating costs if customers adopt cheaper channels to obtain support, or purchase products and services (Kumar & Telang, 2012). Although various technologies have been developed over the years to meet this objective, the adoption thereof is rarely as successful as planned. In addition, investment returns promised for this technology often fall short of expectations (Global Contact Centre Benchmarking Report 2013/14, © Dimension Data 2009–2013, p. 12).

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[1] http://mybroadband.co.za/news/cellular/135212-full-scale-investigation-into-mobile-prices-in-south-africa.html. Accessed 24 August 2015.http://www.itweb.co.za/index.php?option=com_content&view=article&id=145414 Accessed 24 August 2015; http://www.techcentral.co.za/probe-launched-into-contract-price-hikes/58993/ Accessed 24 August 2015, etc.

[2] Churn refers to customers who move to other service providers for the same or similar services. It is also referred to as customer turnover.

Numerous models were developed to assist businesses with the design of systems to be adopted by users. The Technology Acceptance Model (TAM) and the Unified Theory of Acceptance and Use of Technology (UTAUT) were specifically developed to explain technology adoption. Diffusion of Innovations (DOI) and Theory of Planned Behaviour (TPB) were not specifically developed for technology adoption, but were used in studies to investigate and explain technology adoption (Rogers, 1962; Ajzen, 1985; Davis, 1985; Venkatesh & Davis, 2000; Venkatesh & Bala, 2008; Venkatesh et al., 2003; Venkatesh, Thong & Xu, 2012).

In the past, the approach was mainly to focus on hardware and software (Davis, 1985; DeLone and McLean, 1992; Laudon & Laudon, 2007; Rogers, 2003; Ajzen, 1985; Davis, 1985; Venkatesh, Thong & Xu, 2012). Based on the reviewed literature, it appears that researchers with a technical approach presume that perfectly designed technology motivates customers to use it in order to meet business objectives (Rogers, 1962; Ajzen, 1985; Davis, 1985; Venkatesh & Davis, 2000; Venkatesh & Bala, 2008; Venkatesh et al., 2003; Venkatesh, Thong & Xu, 2012).

However, researchers such as Steven Alter are of the opinion that the service domain is not so simple, and the focus should not only be on technology, but on a more holistic approach where SS is considered as a certain type of work system. This work system consists of business processes and activities, participants, customers, information, products and services, as well as technologies influenced by environment, strategies and infrastructure (Alter, 2013).

This study investigates the influence of four demographics where according to Alter (2008) demographics form part of an environment that may impact on a work system where people and/or machines interact with information, technology or other resources to deliver a service, with a particular interest in an SSIS as a work system, and to identify the customers likely to adopt an SSIS in the Western Cape when all available channels are presented to choose from.

Based on the reviewed literature the research question is whether demographical factors play a role in SSISs adoption in the Western Cape where SSISs are considered as a work system.

1.2.   Previous studies that address the problem

Many studies focus on adoption or usage of IS in a business or university context (Davis & Venkatesh, 1996; Venkatesh & Davis, 1996; Venkatesh & Davis, 2000; Venkatesh, 2000; Davis, 1989; Chuttur, 2008; Venkatesh & Bala, 2008). These studies consider IS, developed by technical experts, as a combination of hardware and software designed to perform specific functions in a specific context. These studies also explore factors that could motivate the target audience to use these systems.

Although demographics as influencing factor of IS adoption are not explored often, there are however certain studies that investigate influencing factors such as age, experience, education, literacy and social impact in a business context (Rogers, 1962; Rogers, 1983; Rogers, 2003; Hernandez, Jimenez, & José Martin, 2011; Srite & Karahanna, 2006; Venkatesh et al., 2003; Venkatesh, Thong & Xu, 2012).

No studies were found that explore SSIS adoption in a work systems context. Alter suggests in several of his studies (Alter, 2009; Alter, 2010; Alter, 2013) that the service domain should be studied in this context.

Chapter two discusses various theories associated with systems adoption and the work system approach. Based on various definitions found in the researched sources, key concepts such as information, SS, IS and SSIS are defined in this chapter. This is an important step, particularly since Checkland & Holwell (1998) imply that key concepts in this field of study are not clearly defined and could lead to different interpretations and findings.

Blignaut (2009) & Wu (2006) indicate that education plays a role in SSIS adoption, while Bélanger & Carter (2009), Shrivastava (2010), as well as Santhanamery & Ramayah (2015) claim that income plays a role. Findings on age and gender are inconsistent or unclear (Wu, 2006; Gilham & Van Belle, 2005; Bélanger & Carter, 2009; Shrivastava, 2010; Hernandez et al., 2011; Santhanamery & Ramayah, 2015). This study expects that all four demographical factors play a role with regard to channel adoption. It is important to note that many of the literature study findings are based on business users and not customers.

1.3.   Limitations of previous studies

Many of the reviewed studies focus on the business environment or university context (Rogers, 1962; Rogers, 1983; Rogers, 2003; Hernandez et al., 2011; Srite & Karahanna, 2006; Venkatesh et al., 2003; Venkatesh, Thong & Xu, 2012). Key concepts such as SS, IT, IS and SSIS are used interchangeably (Checkland & Holwell, 1998), and are not always properly defined. The following studies contain but a few examples where IS and IT adoption are discussed, but not clearly defined: Legris, Ingham & Collerette (2003), Bagozzi (2007), Avison et al. (2008), Williams et al. (2009), Yousafzai, Foxall & Pallister (2010), Hoehle, Scornavacca & Huff (2012), Yeh & Teng (2012), De

Guinea (2013), Petter, DeLone & McLean (2013), Wang, Harris & Patterson (2013), Venkatesh, Thong & Xu (2012), Weigel et al. (2014).

Studies of SS adoption are limited to one technology only (Wu, 2006; Gilham & Van Belle, 2005; Bélanger & Carter, 2009; Shrivastava, 2010; Santhanamery & Ramayah, 2015), and do not explore adoption where all service channel options are offered as a choice in a self-reported survey. No studies are found where SSIS as a certain type of work system is explored.

1.4.   Relevance of the study

In terms of a report on customer self-service strategies in South Africa by Goldstuck & Meltzer (2010), it is an error to consider SS as a technology function. The report states that companies should consider SS as a customer service function with a focus on the customer, rather than technology. An understanding of demographics, is a step closer towards customer focus. Demographics forms part of the environment indicated as an influencing factor in the work system context.

Although this study probably raises more questions than answers, it is a step closer towards a better understanding of customers and their preferences, not only for the use of technology, but also where human interaction is involved.   Since human interaction is costly in practice, innovative strategies are required to shift the South African focus away from human interaction for support and transactional purposes towards SS as a more cost efficient solution. The findings of this study identify those areas that require further analysis to determine factors that will motivate customers to use the available SS options. The findings of this study could also indicate whether it is premature to invest money in specific SS channels, or whether more work and education is required to ensure that customers are ready for the change.

This study expands the definition of an IS to a work system, because it may help organisations to identify the role players and how various circumstances may affect the adoption of specific business processes. This study particularly focuses on the customer, and how their demographics may influence the use of SSIS or various channels available for support and transactional purposes.

Merchants (2013)[3] find that customers in the South Africa context prefer face to face or call centre interactions. This study confirms this premise and highlights demographics that require further exploration to fully understand the reasons for their impact on adoption, or not. Only a very limited number of studies could be found that investigate the effect of age, gender, income and education on SSIS adoption. No studies with a work system approach were found, particularly in the service domain where the application was wider than mere technologies.

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[3] Merchants is a subsidiary of Dimension Data that "design, build and operate contact centres. Merchants is a leading BPO solutions provider specialising in customer experience and customer interactions:" Accessed 4 February 2016

1.5.   Purpose statement

This study defines an SSIS as a "special case of a work system" (Alter, 2013) and focuses on specific main theoretical frameworks used to explain IS adoption. A survey is used to determine whether demographical factors have any significant influence on SSIS adoption and/or various channels available for support and transactional purposes. The survey includes all available service channels, and uses Alter's (2008) definition of SSIS.

1.6.   Conclusion

Managing operating cost in the customer service domain is critical and businesses are exploring more cost effective ways of providing customer service. Self-service is seen as a solution to managing cost.

To better understand self-service, the theories that attempt to explain how and why people use technology to perform specific functions needs to be understood. Clear definitions of SS, IS and SSIS is necessary. Chapter 2 captures the main studies that explain technological system adoption and the associated definitions. The work system approach is also discussed as some research indicates that SS should not be seen as a technology function (Goldstuck & Meltzer, 2010; Alter, 2013).

Some of the limitations found in the research on information systems adoption is the lack of focus on the customer service domain. No studies could be found that investigated what type of support channel customers prefer when all available options are presented. Users referred to in the adoption studies often were employees or students. Demographics were seldom explored.

This study explores self-service adoption from a customer perspective. All available service channels were presented in the survey and participants indicated what their channels of choice were.   Their choices were not limited to technology only.

The aim is to determine if demographics influence customer preference in terms of use of technology or human interaction for support and transactional purposes.

In order to lay a foundation for this study and explain why the work system approach could benefit the academic and business societies, the next chapter explores the available literature.

Chapter 2

Literature review

2.1.   Background

Since the early days of the "market society" (Heilbronner & Milberg, 2008, p. 36) business realised that managing costs could lead to increased income. Growth was viewed as a direct result of increased productivity, and productivity was enhanced by capital investment. The onset of competitive markets motivated business to find cost efficiencies to maximise profits (Heilbronner & Milberg, 2008)[4].

In the early days, the main focus was on manufacturing. In the early 1900's, researchers began to acknowledge and investigate the service industry and focused their studies on efficiency, quality, demand and supply, as well as service-profit chain and in later years also customer expectations (Chase & Apte, 2007). This led to innovations such as the SS store, where consumers could pick grocery items from the shelves instead of handing a shopping list to a clerk, thereby reducing the time and cost required of purchasing grocery items (Chase & Apte, 2007). Research on service and cost efficiency also resulted in the button operated lift, touch tone telephone and ATM (Chase & Apte, 2007).

As technological tools and available resources advanced, researchers began to investigate the manner in which these tools and resources could assist with cost saving and productivity in the production and service industry. Heilbronner & Milberg (2008) indicate that the advancement in technological equipment changed the nature of competition and production. The businesses that invested in and adopted these new tools showed phenomenal growth and could create cost advantages that lead to increased profitability (Heilbronner & Milberg, 2008).

The telephone as well as the development of interactive voice response[5] (IVR) created new opportunities to serve consumers regardless of geographical location. Now it was possible to locate service and support personnel in the most cost effective location irrespective of where the clients lived. In the 1980's, the call centre industry was born from the need for economies of scale and more effective resource management (Bain & Taylor, 2002). Consumers could be serviced 24 hours per

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[4] Heilbroner and Milberg refer to Adam Smith's theories and discussions in respect of "labour productivity", "division of labour" and "investment in capital equipment" as a way of increasing profitability. They also refer to his argument regarding the influence of competition on cost management and pricing.

[5] IVR refers to the messages played to customers who contact a call centre. The messages may contain options to choose from, or important information. The system provides routing options to ensure that customers speak to the correct agent regardless of geographical location.

day, 365 days per year. Although this created more opportunity for competitiveness and sales and service optimisation, the call centre service was still expensive and organisations began to investigate alternative channels to render the same or better levels of service at a lower cost (Castro, Atkinson, & Ezell, 2010).

The SS concept was developed further by this search for optimisation and cost saving (Heilbronner & Milberg, 2008). The introduction of the internet, kiosks and cell phones (specifically smart phones) created new possibilities for SS. Keyword analysis, customer relationship management, and business intelligence software enable companies to develop better support because it is easier to identify trends and analyse the exact consumer needs. Consumers are able to provide real time feedback on products and services. The use of software and related hardware are necessitated by changed customer behaviour and expectations (Rust & Lemon, 2001; Wang, Head & Archer, 2002; Hennessy, 2012). Dimension Data's 2013/14 global contact centre benchmarking states that "organisations aim to shift 32.6% of contacts typically handled by agents to SS channels. The reality is that contact centres report just 17.5% of existing contact volumes being deflected. In short, this means that many investment forecasts aren't being realised and many contact centres are in the dark as to why"[6] (Global Contact Centre Benchmarking Report 2013/14, © Dimension Data 2009–2013, p. 12).

Consumers desire access to a product or service providers, because they may wish to a) do a transaction; b) require information about the product or service; c) report a query or problem to be solved; and/or d) amend their accounts (Anton, 2000). Although call centres have been viewed as more cost effective than face to face interaction, the playing field has changed, and businesses need to reduce costs even further to stay competitive (Kumar & Telang, 2012).

SS creates the opportunity to reduce the information and resource costs necessary to perform specific activities in the value chain, as the number of participants and customers who contribute to product or service costs in the business process, reduce (Castro, Atkinson, & Ezell, 2010). Customers who use SS and associated advanced search engines can find the best products at the best prices and arrange delivery with minimal human interaction. The detail of this process forms part of the SSIS discussion later in the chapter. With reference to query resolution or information searches, customers can use search engines, blogs or communities to search for topics related to their query. They can filter the information at their own leisure, and determine what information will suit them best (Laudon & Traver, 2008). If information is unavailable, customers may give feedback to the companies who can source the information, and make it available for future searches. Human interaction is only required when information is unavailable via the SS tool or cannot be crowd sourced online. All of these factors can

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[6]http://www.dimensiondata.com/Global/Downloadable%20Documents/2013_14_benchmarking%20summary%20report.pdf Accessed: 16 August 2014.

contribute to the success of the business model and the overall value proposition that could be offered to the customer[7] (Laudon & Traver, 2008).

It is necessary for companies to remain economically viable. In South Africa, for example, the cellular industry is constantly under pressure to reduce prices (Lith; 2014; Burger, 2014)[8]. Reviewed 2013/2014 financial statements provide ample evidence of an ever increasing focus on efficiency, growth and improved customer experience[9]. Promoting SS adoption is listed as part of these strategies. A 2010 study by World Wide Worx in collaboration with Consology[10], indicates that 88% of the survey respondents believe that SS reduces bill payment time and assists them with customer churn[11] reduction (Goldstuck & Meltzer, 2010). It also indicates that customers who are able to resolve their own queries quickly are less likely to leave and more likely to take up more products and services than customers who have frustrating experiences with face to face interactions or call centres (Goldstuck & Meltzer, 2010).

SS can add value because it a) can automate some business processes; b) can reduce transaction process time; c) is not reliant on geographical location; d) can provide insight into customer needs; e) can process large volumes of data seamlessly; and f) can assist with better resource allocation (Papazoglou & Ribbers, 2008). World Wide Worx states that customer service in South Africa lacks consistency, and that process automation has the ability to contribute more consistency to customer service (Goldstuck & Meltzer, 2010).

State of the art SS tools require significant funding which increases when they are not used (Hilton et al., 2013). Organisations, therefore, need to ensure that these tools are used when and where implemented (Curran & Meuter, 2005). According to Laudon & Taver (2008) SS tools are easily available anywhere in the world, are fairly standardised, can accommodate various media formats, enable interactivity with users, are more cost effective, deliver better quality, allow for designs that suit customers' individual needs and enable users to create and share their own content. It expands the organizational reach and their opportunity to increase revenue and support without incurring prohibitive costs.

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[7] Value proposition refers to the manner in which products and services meet customer needs (Laudon & Traver, 2008).

[8] Mobiles risk becoming networks of last resort. http://www.techcentral.co.za/mobiles-risk-becoming-networks-of-last-resort/47206/ Date accessed 16 July 2014. Mobile operators fighting the wrong war. http://www.techcentral.co.za/mobile-operators-fighting-the-wrong-war/47004/Date accessed 16 July 2015.

[9] Vodacom Integrated report for the year ending 31 March 2014, p. 4. MTN integrated report for year ending 31 December 2013, p. 11. Telkom integrated report for the year ending 31 March 2013, p15-17 and 19-20.

[10] Customer Self-Service Strategies in South Africa 2010

[11] Churn, or customer turnover, refers to customers who migrate to other service providers for the same or similar services.

A 2010 study indicates that cost saving, cross-sell[12], and up sell[13] are the main drivers for SS in South Africa (Goldstuck & Meltzer, 2010). The most important focus areas for telecoms are reduction of churn, cost saving and consistent customer experience, although cross-sell and up sell, customer service and satisfaction, speed of bill payment and customer attraction are also highly regarded (Goldstuck & Meltzer, 2010). The statistics appear in the table below.

Table 2: Main perceived benefits of driving customer SS in South Africa in 2010 (See table 12 and 14 in Goldstuck & Meltzer, 2010)

Business Driver	Regard as important	Importance for telecoms providers on scale of 1-5 where 5 is most important.
Reduction of customer churn (customer retention)	88%	5
Cost savings through automating routine transactions	94%	5
To ensure consistency of brand/customer experience	82%	5
Ability to cross-sell and up sell	94%	4.8
Customer service and satisfaction	82%	4.8
To speed-up bill payment	88%	4.8
To attract customers	65%	4.8
Customer analysis and information	71%	4.6
Call centre deflection	71%	4.4
To contain and reduce cost of customer support	76%	4.4

2.2.   Key concepts

This section aims to develop working definitions for key concepts that are significant to this study. The literature study shows that SS, IS and SSIS, are not always specifically defined. This may be confusing. Peter Checkland and Sue Holwell (1998) confirm this by stating that the IS field is a "confused field" (Checkland & Holwell, 1998, p. 10). ISs involve a specific type of strategic thinking within a social system. The social system itself can be associated with a power struggle that could be influenced by the availability or absence of information (Checkland & Holwell, 1998).

2.2.1   Self-service

Castro, Atkinson & Ezell (2010) define SS as allowing "consumers to take on the traditional role of a service worker in the provision[ing] of a service" (Castro, Atkinson & Ezell, 2010, p. 1). SS is not only limited to technology. However, technology assists business with the creation of opportunities for better resource management and efficiency. If a system is not limited to the use of technology, it implies that SS could include all tasks (including machine-to-machine, human-to-machine and human-to-human communication) necessary to ensure that queries are resolved. This study uses Alter's (2008) definition as a point of departure for this discussion. He states that "in self-service, service

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[12] Cross-sell encourages buyer to spend more by suggesting products from other categories that could be related to the product or service, e.g. a Samsung Note 3 with a 1G data bundle.
[13] Up sell encourages a customer to buy a similar product that is more expensive than the product that they originally requested.

providers provide resources that are used by customers performing self-service activities" (Alter; 2008, p. 5).

2.2.2   Information system: Technology or work system?

A number of definitions exist for an IS (Alter, 2008). The popular approach that unfolds in the reviewed articles, is a considerable focus on ISs as technologies.   Although ISs are not always specifically defined, they are often referred to as a combination of hardware and software (Rogers, 2003; Ajzen, 1985; Davis, 1985; Venkatesh, Thong & Xu, 2012). However, Alter (2008) states that an IS is more than mere technology. It is a combination of human and machine interaction using various resources, including information and technology, to produce informational products and/or services (Alter, 2008; see Table 1 of Alter, 2008, p. 449-450 for a comprehensive list of IS definitions.)

The table below contains some examples of IS definitions.

Table 3: Definitions of an IS

Author	Definition of IS	Main focus
Alter (2008)	"An information system is a system in which human participants and/or machines perform work (processes and activities) using information, technology, and other resources to produce informational products and/or services for internal or external customers."(p. 451)	Views an IS as people and/or technology interacting with information to "produce informational products and/or services" (p. 451).
Davis (1985)	"Systems that are directly used by organizational members at their own discretion to support their work activities. End-user systems represent an increasingly important class of information systems" (p. 9).	Views an IS as hardware and software used by people to support their work activities.
DeLone and McLean (1992)	"The information system creates information which is communicated to the recipient who is then influenced (or not!) by the information. In this sense, information flows through a series of stages from its production through its use or consumption to its influence on individual or organizational performance" (p. 61)	Views an IS as hardware and software that creates and communicates information to people.
Laudon & Laudon (2007)	"Components working together to collect, process, store, and disseminate information to support decision making, coordination, control, analysis, and visualization in an organization". The purpose is to assist in "better management decisions, more efficient business processes, and higher firm profitability" (p. G7)	Views an IS as hardware and software that manages and processes information to assist persons with more efficient decision making.

This study uses Alter's definition of IS as the working definition. Alter (2008) proposes that businesses are work systems and explains his view as follows:

> "A work system is a system in which human participants and/or machines perform work (processes and activities) using information, technology, and other resources to produce specific products and/or services for specific internal or external customers. An IS is a work system whose processes and activities are devoted to processing information, that is, capturing, transmitting, storing, retrieving, manipulating, and displaying information. Thus, an information system is a system in which human participants and/or machines perform work (processes and activities) using information, technology, and other

resources to produce informational products and/or services for internal or external customers."(p. 451)

This approach considers the relationship of customers, products, participants, information and technology with business processes, and views business processes as the centre point of this framework (Alter, 1996). It also draws a distinction between hardware/software and the IS. This is an important distinction, because technical success is not equal to system success. Understanding IS as a socio-technical[14] phenomenon is an important feature of Alter's work systems approach, because it acknowledges both the technical and social dimensions of the system.

2.2.3   Self-service information system (SSIS)

Bearing the working definition of an IS in mind, we can now take a closer look at an SSIS. Authors frequently focus on SSIS as a technology (Davis, 1985; DeLone and McLean, 1992; Laudon & Laudon, 2007), as well as the consequences when this technology is not used. It is stated that state of the art SSIS technology implementations requires significant funding which increases when they are not used (Hilton et al. 2013). Organisations thus need to ensure that the implemented technology is used (Curran & Meuter, 2005). Laudon & Taver (2008) state that technology is easily available anywhere in the world, is fairly standardised, can accommodate various media formats, enables interactivity with the user, is more cost effective, delivers better quality, allows for designs that suit the customer's individual needs and enables users to create and share their own content. It expands the organizational reach and their opportunity to increase revenue and support without incurring prohibitive costs. Traditionally SSIS is considered as technology similar to the definitions of IS in table 2. To fully understand SSISs value, this study proposes that it should be considered in a broader context. It is important to clearly define the following concepts in the context of this study.

2.2.3.1 Conceptualising SSISs as work systems

Taking the work systems approach into consideration, we can consequently define SSISs as work systems where customers and machines perform work (processes and activities) using information, technology, and other resources to purchase products and services or get support (Alter; 2013). The focus is not merely on the use of technology, but also on the relationship of customers, participants, information, technology and products with business processes (Alter, 2013). Figure 1 summarises the work systems framework (WSF) as proposed by Alter.

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[14] Alter (2008) refers to this approach and quotes a few IS definitions that take the socio-technical context into consideration.
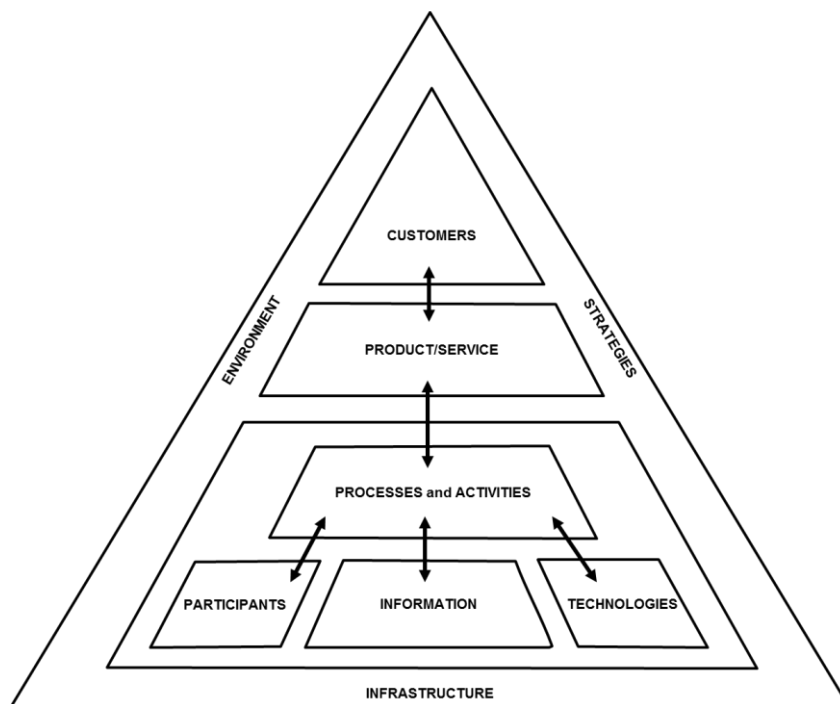
Figure 1: Work System Framework (Alter, 2013)

In the SSIS context, customers may want to gain access to products, offered by companies, without having to visit a store.   This is only possible, if customers or technological resources can perform the same functions as store agents , namely, to ensure that the correct products are acquired and that customers' needs are met. Access to customers' account details are necessary for customers to make informed purchasing decisions, and for companies to determine the customers' affordability. By removing shop assistants from the process, participation is altered and customers now interact directly with the transactional software via an SS interface.

Whether customers decide to use this interface, depends on their understanding of the information, technology (Alter, 2013)[15] and other available resources. Whether or not customers obtain the products or services they require, does not depend only on the use of technology. The business process that guides product purchase is critical in this work activity (Alter, 2009; Alter, 2013). In this process organisations need to understand who the participants are, what the customers need, what information is required to perform the various steps of the process, which steps can or cannot be automated with technology, and what role changes are required when the customers perform certain functions previously performed by store agents.

Whether the business process will go according to plan, depends on the participants (Alter, 2013) and, potentially, their skills, knowledge and training. Incentives offered for making use of the service may further influence the manner in which participants perform the various steps of the process. The

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[15] Alter defines technologies to "include both tools that are used by work system participants and automated agents; that is, hardware/software configurations that perform totally automated activities" (Alter, 2013, p. 80)

example of a "to-be" SS work system snapshot below, summarises the scenario presented in the previous paragraph. A work system snapshot is a one page summary of a work system that considers the following aspects: the customers' and participants' profiles , required information, relevant technologies, and the products/services that result from these business processes or activities (Alter, 2013).

Table 4: Example of a work system snapshot of an SS "to-be" work system[16]

Work system snapshot of a recommended "to-be" work system	
Customers	**Products/Service**
Account holder User	• Request for product • Recommended product • Product purchase approval/denial • Explanation of decision • Customer approval of cost and terms and conditions • Dispatch and delivery/activation of product • Initiate billing of service were relevant

Major activities and processes
• Customer obtains information about product • Customer accesses the SS channel • SS channel requests authentication details • SS channel provides access to account details • Customer requests product • Transactional tools verify account and product related business rules to determine if purchase is allowed • Transaction tools perform account analysis and determine affordability and account limits • Transaction tools approve or deny request and/or recommend available alternatives based on account analysis • Transactional tools obtain feedback from the customer, whether he/she still wants to proceed with the original request, or whether he/she wants to choose an option recommended by the system • SS tool advises of the costs associated with the service • Customer changes, approves or declines costs and/or terms and conditions. • Customer supplies delivery details • Transactional tool dispatches the product • SS tool confirms dispatch of the product • Customer receives and starts using the product. • Transactional system initiates billing

Participants	**Information**	**Technologies**

Account Holder	• Account details
	• Authentication details
	• Account limit
	• Product related business rules
	• Account business rules
	• Product request details
	• Product cost
	• Terms and conditions
	• Explanation of decisions
	• Product details
	• Final approval by customer
		• Transactional tools
		• SS tool
		• SS channel, e.g.:
		   ○ SMS
		   ○ USSD
		   ○ Mobi site
		   ○ Mobile app
		   ○ Website
		• Depending on the SS channel used:
		   ○ Internet
		   ○ GSM
		   ○ Mobile data connection
		   ○ Smart phone/tablet
		   ○ PC/laptop
		• IT infrastructure

Technology only has value if it is adopted and used. A socio-technical approach to SSIS design presumes that the system will have to evolve over time and unplanned changes are to be expected,

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[16] This work system snapshot was developed by using Alter's (2013) guidelines.

although the main structure will stay relevant. The participants' skills, experience and motivation determine whether they follow or deviated from the process (Alter, 2008; Alter, 2013).

Technical view

In contrast with the socio-technical approach, the technical approach views SSIS as a combination of hardware and software focussing on factors that motivate customers to use the technology (Hoehle, Scornavacca, Huff, 2012; Oghazi et al., 2012; Elliott, Meng & Hall, 2012; Mincu & Gruber, 2013; Hilton et al., 2013; Merchants, 2013). Generally, users are not involved in the original scoping and design phase. Designers will consider certain main schools of thought that advocate direct relations between users, technology, and factors that motivate customers to use it. The factors considered as important for adoption, are listed as system requirements. The SS tool is developed according to these requirements. When these requirements change, it is difficult and expensive to change the design during the project, and more often than not, a change request must be logged for consideration and potential roll-out in a later phase. This leads to additional costs for the project, that may cause an over spend. In the event that no auxiliary funds exist, the business has to use the original design even if users' needs may have changed. This, again, could influence the adoption and use of the tool, and thus also the possible success of the technology. Many theories, developed over the past 50 years, explain why the technological approach relies heavily on the adoption and use of the technologies.

The following section reviews some of the theories that have been developed to understand adoption of information systems as technologies.

SSIS adoption

It is important to understand adoption, because only when persons use SSISs they become viable. The real potential of an SSIS is only achieved if and when adopted by a significant number of persons.

The traditional concept of SSIS adoption was limited to technology. Technology has the potential to significantly improve business efficiency, but can also be very costly if not adopted by consumers (Curran & Meuter, 2005).

When SSIS is viewed as a work system, it requires insight into all aspects of the work system. This study adopts Alter's (2008) definition, namely that "self-service systems are work systems in which a service provider provides resources that are used by the customer to create value for themselves and possibly for the provider"(p. 466). Therefore it becomes important to understand the demographic characteristics of adopters (customers and participants), their roles in the business process, the relationships between customers, the participants in the process, information required by various role players during various stages of the process, the technology used to support the process, the resulting products or services, and the motivating factors for participants to adopt and continue to use these systems. The aim is to reduce costs by understanding how SSIS can be made more effective and

efficient.   Based on this information, guidelines can be formulated to determine which SS channels should be made available to cater for the diverse needs in South Africa as a developing country, and which gaps prevent persons from using SS.

A proper understanding of the importance of adoption in the broader context of a work system requires, first of all, a discussion of the various models frequently used to explain adoption of technological tools.

Theories that are mostly used to address adoption

The traditional approach regarding efficiency and effectiveness in the work place, entails a focus on software and hardware. Various theories exist that explain the manner in which persons are encouraged to use technological tools. Thee presumption is that efficiency and effectiveness will improve if these tools are used.

In these theories, the terms adoption, acceptance and/or diffusion are used interchangeably. The TAM and TAM2 refer to adoption and acceptance as a decision (Miller and Burgoon, 1978, pp. 31-35)[17] or motivation (Davis, 1985; Venkatesh & Davis, 2000) to use a new IS[18]. Rogers (1983) states that diffusion refers to the process that leads to the adoption or rejection of an innovation, as well as timing and communication in a social system. Venkatesh et al. (2003) describe the basic concepts of the various[19] user acceptance models as "individual reactions to using information technology", "intentions to use information technology" and "actual use of information technology" (p. 427). In 2012 Venkatesh, Thong & Xu (2012) broadened the definition of adoption and acceptance to include the use of consumer technologies. Saeed & Abdinnour (2013) identify three post adoption stages, and the factors that differentiate users at the various stages.

The following section summarises certain models that were used in the past to explain enterprise and SSIS[20] adoption. This includes a brief discussion of the factors that influence adoption, and indicates what demographic factors were considered.

Diffusion of innovations

In 1962 EM Rogers published the Theory of Diffusion of Innovations. The framework for the theory is based on the concept of innovation, communication channels, time and social systems.

Rogers (1983) states that diffusion is a process whereby new ideas (innovations) are communicated in a social structure, in a specific way, and over a period of time. He assigned relative advantage,

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[17] Quoted in Rogers 1983

[18] In this context, an information system is viewed as information technology, and not as part of a business process.

[19] Venkatesh et al. (2003) reviewed 8 studies and proposed a unified model. The figure summarising the concept appears on page 427.

[20] Here it is defined from a technological perspective.

compatibility, complexity, trialability and observability as characteristics applicable to the innovation concept. According to his theory, persons will adopt innovation if they are of the opinion that it enhances previous ideas (relative advantage); is compatible with their norms, needs and past experiences (compatibility); is relatively easy to use and understand (complexity), and; is possible to undergo controlled testing (trailability) (Rogers, 1983). Observability refers to the visibility of the results following adoption. He states that persons are more likely to adopt when the results are easy to observe (Rogers, 1983). This allows potential adopters the opportunity to evaluate it against their requirements, and observe the influence on those who adopted it. He finds that adopters do not always implement the innovation in exactly the same manner, but sometimes "re-invent" the innovation by using it differently . This could lead to unforeseen consequences for the change agencies and designer of the innovation.

The manner of communication plays a crucial role in how the innovation is adopted. Rogers (1983) finds that diffusion of ideas are successful when persons with similar frames of reference interact. The nature of their relationship determines whether an individual (who has adopted or has knowledge of the new innovation) will communicate the innovation to another individual who has no knowledge of the innovation.
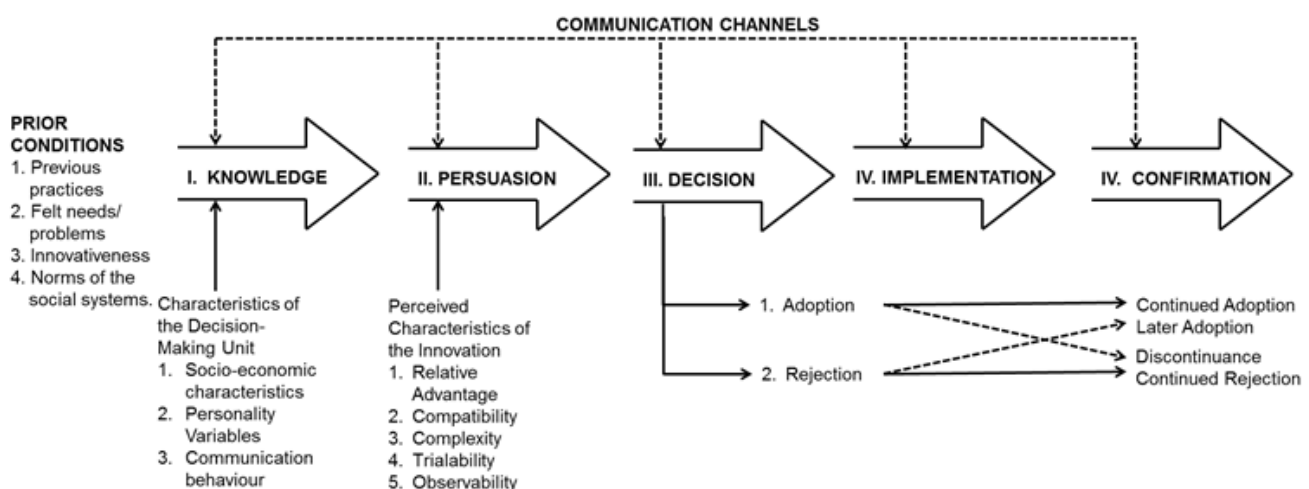
Figure 2: A model of stages in the innovation-decision process (Rogers, 1983)

Five adopter categories are identified based on the *time* measured from the moment of obtaining knowledge about the innovation until the moment of decision to actually adopt the new behaviour. An adopter can be viewed as an innovator, early adopter, early majority, late majority or laggard (Rogers, 2003). The process starts with obtaining knowledge about the innovation. With this knowledge, the potential user develops a positive or negative attitude towards the innovation which influences the decision whether to adopt or reject the innovation. Once the decision to adopt has been made, the

adopters begin to use the innovation and communicate their decision to the social structure. This social structure not only provides feedback that could influence the adopter's decision; it could even reverse it.

Characteristics are assigned to these five adopter categories based on socioeconomic status, personality variables, and communication behaviour. Rogers (1983) indicates that diffusion of technological innovation is directly linked to socioeconomic development.

Rogers (2003, pp. 251-252) lists six generalisations associated with the socioeconomic status variable:

"Earlier adopters are no different from later adopters in age"

"Earlier adopters have more years of formal education than do later adopters"

"Earlier adopters are more likely to be literate than are later adopters"

"Earlier adopters have a higher social status than do later adopters"

"Earlier adopters have a greater degree of upward social mobility than do later adopters"

"Earlier adopters have larger-sized units (farms, schools, companies, and so on) than do later adopters."

These generalisations are consistently revisited. However, no generalised statements about other demographical factors, such as gender and race, were made.

The model shows that all adopters fall within a social system that could influence diffusion. The system consists of an interdependent group of persons who cooperate to address system challenges. Rogers (1995) states that perceived consequence to individuals and/or the social system at the moment of adoption or dismissal of the innovation, may also impact on diffusion. He states that this system contains a set structure that determines those with decision making and delegation powers, as well as control over the order and level of interaction. Norms that determine acceptable behaviour in the system, has a further influence on the collective and individual decision making process (Rogers, 1983). This implies that culture and belief systems in a social system could influence the diffusion of innovations.

Four role players are identified that influence which innovations the social system adopts. Persons with a high level of influence and rank in the communication structure are labelled as opinion leaders. According to the theory, change agents often used them to influence social systems to either adopt or reject innovations. Change agents are defined as professional persons with degrees in technology. Communication gaps between change agents and potential adopters based on levels of education, are conceivable. This creates a need for change agent aids, who are not as highly qualified as the change agents, but who have the same frames of reference (homophily) as the potential adopters.

This leads to better communication with potential adopters and, consequently, the diffusion of the innovation. The purpose of the change agent aid role is also to assist change agencies[21] with cost management, because change agents are more expensive. The purpose of a change agency is to ensure that innovations are either rejected or adopted by social systems (collective innovation-decision) and/or members (optional innovation-decision) within the system. Whether an innovation is adopted or rejected depends on the power, rank or expertise of a few select individuals in a social system (authority innovation-decision). Certain instances require two decisions, with the one leading to the other (contingent innovation-decision)(Rogers, 1983). This may force or enable potential adopters to make the innovation-decision.

Theory of planned behaviour (TPB)

Ajzen (1985) first mentioned the TPB as an enhancement to the theory of reasoned action (TRA)). The theory states that persons will adopt or perform certain behaviour if they believe that the benefits of success exceed the potential negative impact of failure (Ajzen, 1985). This decision is influenced by persons who play an important role (referents) in the adopters' lives. The "referents'" attitude towards the behaviour, guides the adopters' final decision.

The theory consists of three factors that influence the person's intent to perform or adopt the behaviour. The importance of these factors varies from person to person. When a new behaviour presents itself, the attitude towards that behaviour could influence the decision to learn and adopt it. The norms (subjective norm) persons subscribe to, and the perceived pressure to use the innovation within their social environment, as well as their perception of the degree of difficulty to learn, coupled with available opportunities and resources (perceived behavioral control), will further influence the intent and final decision. The figure below summarizes this theory.

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[21] Change agencies are companies who assist with facilitating the diffusion of new innovations.
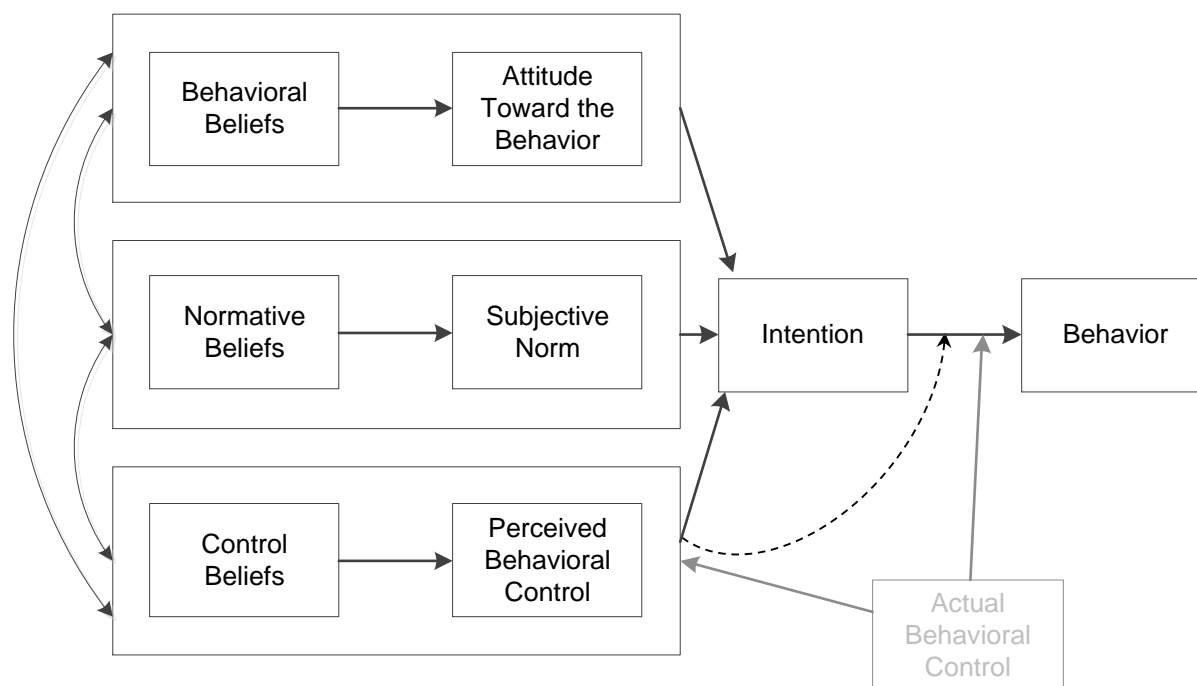
Figure 3: Theory of planned behaviour (Ajzen, 2006)[22]

Behavioural outcome can only be predicted if there is no change from the intention phase to the display of the behaviour Ajzen (1991). It is also vital that the theory is only applied where persons are free to make their own decisions. Although not specifically designed for explaining IS adoption, TBP has been used to describe or predict human behaviour regarding the adoption of technology (Mishra, 2014; Pavlou & Fygenson, 2006). Socioeconomic factors and how they influence adoption, are not included in the original model.

Technology acceptance model (TAM)

The TAM was first described in a doctoral thesis by Fred Davis in 1985. The work of Fishbein (1967), as well as Fishbein and Ajzen (1975), which later became known as the TRA, were used as basis for this theory.

The TAM was developed to explain the adoption of a computer-based IS (Davis, 1985). Initially it was proposed that only perceived usefulness and perceived ease of use will affect a person's attitude towards using the technology. Behavioural intention (Davis, 1989) and subjective norm (Venkatesh & Davis, 2000) were later added to this model. Perceived usefulness is defined as "the degree to which a person believes that using a particular system[23] would enhance his or her job performance" (Davis, 1985, p. 26), and perceived ease of use as "the degree to which a person believes that using a particular system[24] would be free of effort" (Davis, 1985, p. 26). Subjective norm refers to "person's

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[22] http://people.umass.edu/aizen/tpb.diag.html Accessed 23 April 2014
[23] Used to refer to technology.
[24] Used to refer to technology.

perception that most people who are important to him think he should or should not perform the behaviour in question" (Fishbein & Ajzen 1975, p. 302 quoted from Davis, 1985, p.16). Lastly, behavioural intention is defined as "an individual's subjective probability that he or she will perform a specified behaviour" (Fishbein and Ajzen 1975, p. 288 quoted from Davis, 1985, p.16). According to Davis (1985), perceived usefulness has a greater impact on attitude towards use than perceived ease of use. Davis, Bagozzi & Warshaw in 1989, Venkatesh & Davis in 1996 and Venkatesh et al. in 2003, however, indicate that behavioural intention does not significantly influence the intention to use technology, because it is too unpredictable.

In the reviewed articles, system usage was voluntary. Legris, Ingham & Collerette (2003) found that many studies use the TAM to explore and explain technology adoption, and attempted to identify more variables that explain technology use and adoption better . The authors, however, did suggest that it should be extended to include "variables related to both human and social change processes, and to the adoption of the innovation model" (Legris, Ingham & Collerette, 2003, p.191)

Davis (1993) suggests that future studies in terms of TAM should consider the following variables: intrinsic and extrinsic motivation, mandatory use, experience, management support, user involvement, task characteristics and a more detailed and higher quality picture of design features . Venkatesh & Davis (1996) recommend further exploration of self-efficacy and experience, as well as the influence on use. Venkatesh and Davis (2000) encourage researchers to further explore factors that also influence use, such as choice between technological systems, learning and training, misunderstandings about the usefulness and ease of use of the technology, as well as changes to the work or social environment.

Although this model is widely used, some authors have reservations (Chuttur, 2008; Legris, Ingham & Collerette, 2003; Silva, 2007; Benbasat & Barki, 2007; Hess, McNab & Basoglo, 2014; Straub & Burton-Jones, 2007). In the reviewed literature, many researchers used students or organisations in their samples which cannot be considered as a representative sample of the social environment (Davis & Venkatesh, 1996; Venkatesh & Davis, 1996; Venkatesh & Davis, 2000; Venkatesh, 2000; Davis, 1989; Chuttur, 2009; Venkatesh & Bala, 2008).   Further criticism on TAM research draws attention to the type of applications used, and the fact that very limited actual system usage measurements are included (Legris, Ingham & Collerette 2003). Hess, McNab & Basoglu (2014) state that the model was designed for specific paradigms and system intentions which vary from the paradigms and systems that it is often applied to. The fact that constructs are dropped or amended to fit the purpose of the study creates problems for consistent measurements (Hess, McNab & Basoglu,2014)

Below are brief summaries of the changes that Davis made to the original TAM model over the years.

User Motivation

X1

Perceived
Usefulness

X2

Attitude
Toward
Using

Actual
System
Use

Perceived Ease of
Use

X3

Design
Features

Cognitive
Response

Affective
Response

Behavioral
Response
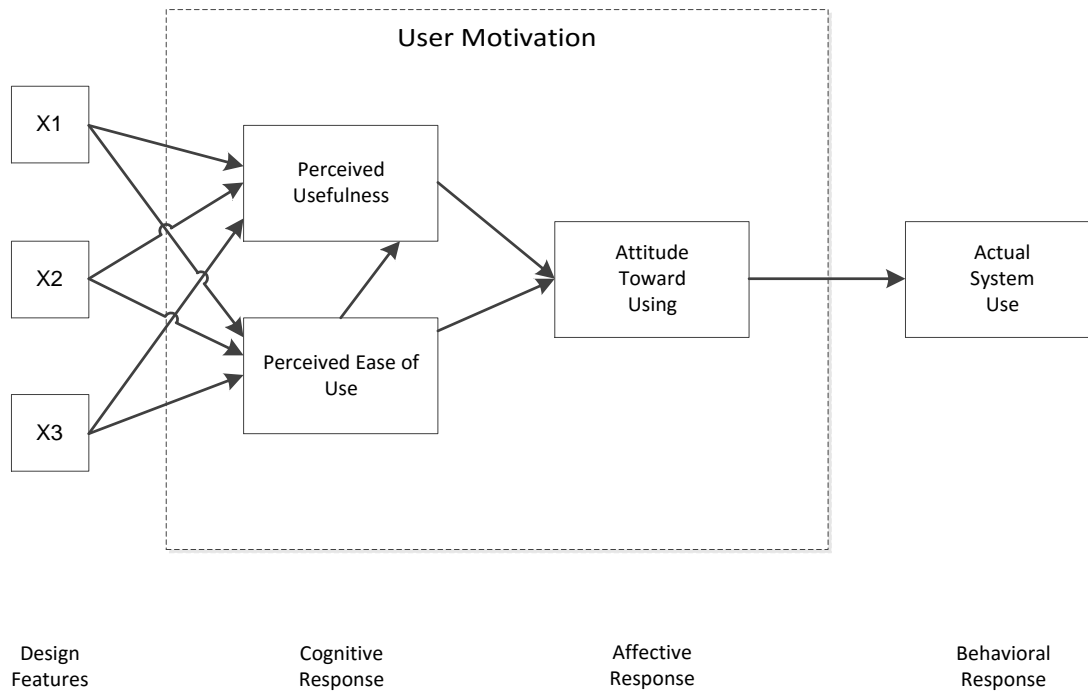
Figure 4: TAM 1985 (Davis, 1985)

Perceived
Usefulness
(U)

External
Variables

Attitude
Toward
Using (A)

Behavioral
Intention to
Use (BI)

Actual
System
Use

Perceived
Ease of Use
(E)
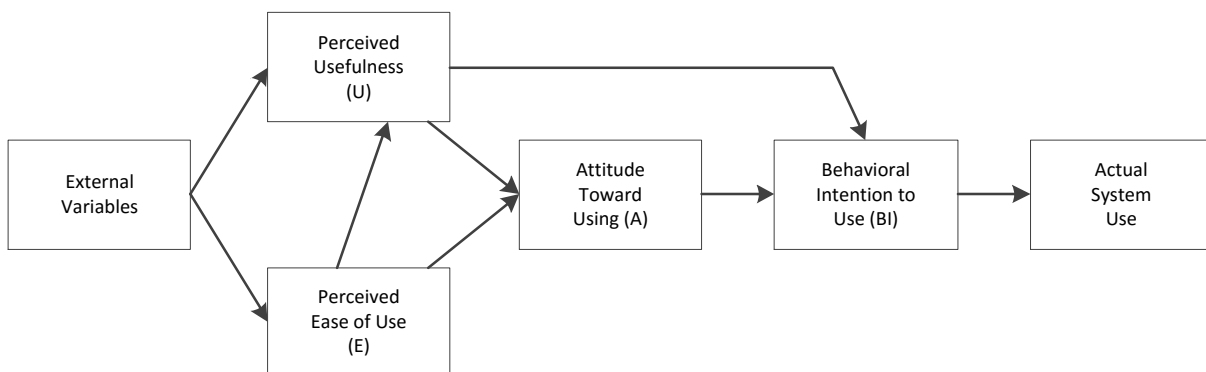
Figure 5: TAM 1989 before comparison study of TPB and TAM (Davis, Bagozzi & Warshaw, 1989)
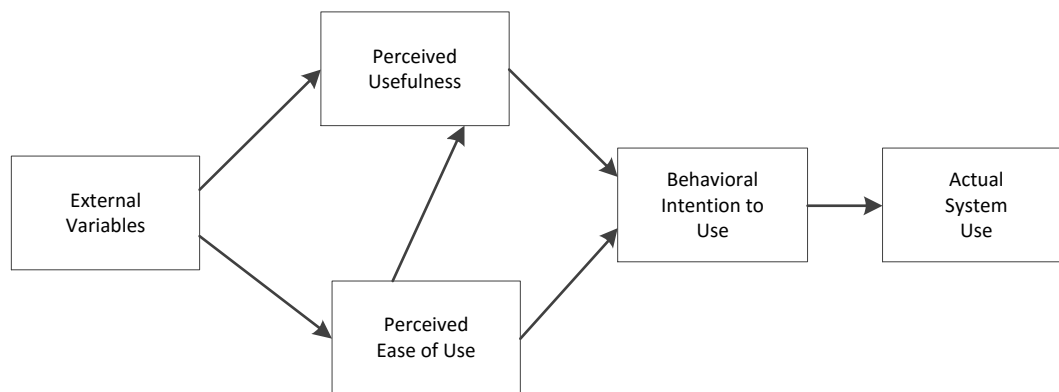
Figure 6: TAM 1989 after comparison of TPB and TAM. (Venkatesh & Davis 1996)
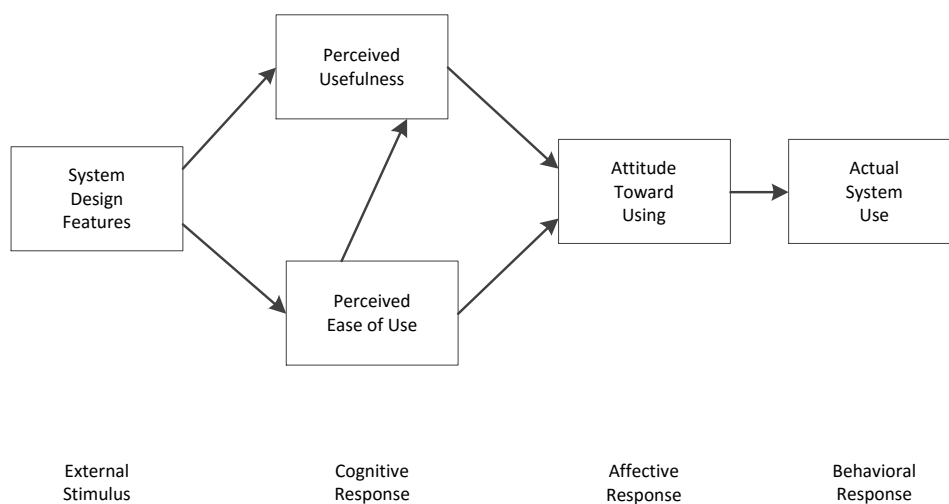
Figure 7: TAM 1993 (Davis, 1993)

Demographical and socioeconomic factors are not indicated as variables in the model and are not specified during implementation. The only variable that can be linked to the aforementioned is subjective norm.

Hernandez, Jimenez & José Martin (2011) query whether age, gender and income influence online shopping behaviour. The study found that these factors do not have an influence on continued use of technology in developed countries when a customer has used the service before. The authors, however, speculate that demographical factors can play a role in developing countries where access to technology is limited.

TAM2

The TAM2 was developed to better explain the adoption of technology in the work environment where the use of technological systems is predominantly mandatory (Venkatesh & Davis, 2000). This extension does not relate to the TAM2 that Davis referred to in his doctoral thesis where he considered perceived quality and enjoyment of using the system (Davis, 1985).

Venkatesh & Davis (2000) propose that other variables such as voluntariness, subjective norm, image (social influence processes), job relevance, output quality, results demonstrability along with perceived ease of use (cognitive instrumental processes), should be considered when examining employees' intention to use technology in their work environment. Their study shows that subjective norm plays a major role initially in terms of perceived usefulness when use is mandatory. As experience in usage increases, influence from the social environment has less of an effect on perceived usefulness and ultimate usage behaviour. Image is identified as a variable that does not change with experience of the user. The study also shows that, as long as the influential role players believe in the usefulness of the technology, the user will continue using it. The reason for this behaviour is that continuing use of the IS (technology) can impact on the user's status, and therefore also on his performance within the group. Below is a summary of the TAM2 model.
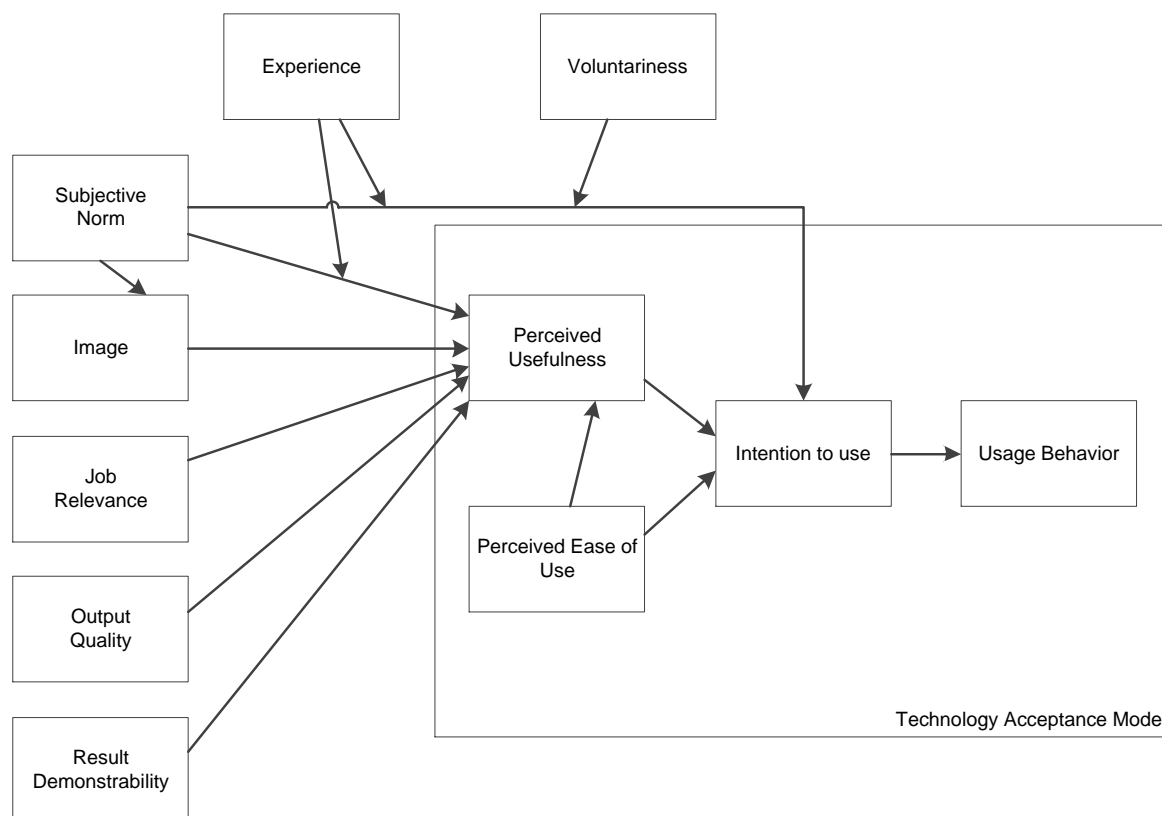
Figure 8: TAM2 2000 (Venkatesh & Davis, 2000)

Job relevance, output quality, result demonstrability and perceived ease of use are grouped together in the construct of cognitive instrumental processes. According to this construct, persons cognitively

examine the ability of the system (technology) and how it aligns with their jobs. Job relevance was defined as "an individual's perception regarding the degree to which the target system[25] is applicable to his or her job" (Venkatesh & Davis, 2000, p. 191). Output quality is described as "how well the system[26] performs those [job related] tasks" (Venkatesh & Davis, 2000, p. 191). The result demonstrability variable was added and refers to the "tangibility of the results of using the innovation[27]" (Venkatesh & Davis, 2000, p. 192), because technology does not always work according to plan.

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[25] Used in the context of technology
[26] Used in the context of technology
[27] Quoted Venkatesh & Davis (2000) from a Moore and Benbasat's study published in 1991.

TAM3

Research in TAM has identified many factors that determine whether or not employees will adapt IT (Davis & Venkatesh, 1996; Venkatesh & Davis, 1996; Venkatesh & Davis, 2000; Venkatesh, 2000; Davis, 1989; Chuttur, 2009; Venkatesh & Bala, 2008). According to the researchers, actual usage was, and still is, problematic, and practical guidelines on adoption improvement are limited (Chuttur, 2009; Legris, Ingham & Collerette, 2003; Silva, 2007; Benbasat & Barki, 2007; Hess, McNab & Basoglo, 2014; Straub & Burton-Jones, 2007). The TAM3 was developed to provide better guidelines on how to improve the individual adoption of IT systems within the various stages of implementation (Venkatesh & Bala, 2008). Factors that influence individual adoption and use are identified, as well as the manner in which these factors interact and are linked, especially in terms of perceived usefulness and perceived ease of use (Venkatesh & Bala, 2008).

Eleven factors identified in previous TAM studies were utilised to explain how they influence perceived ease of use and usefulness.   Subjective norm, job relevance, output quality (Venkatesh & Davis, 2000), result demonstrability and image (Moore & Benbasat, 1991) are, according to this model, the factors that influence perceived usefulness (Venkatesh & Bala, 2008). Perceived ease of use is influenced by computer self-efficacy (Compeau & Higgins, 1995), perception of external control (Venkatesh et al., 2003), computer anxiety, perceived enjoyment, objective usability (Venkatesh, 2000) and computer playfulness (Webster & Martocchio, 1992)[28].

The models discussed in the previous sections are not questioned, but gaps are identified in the practical guidelines that support the organisation with encouraging employees to use these expensive technological systems (Venkatesh & Bala, 2008). The focus is on the provision of a practically implementable model, that takes various TAM studies and findings into consideration. Figure 9 illustrates the resulting model.

Recommendations are made in terms of two distinct intervention phases called the pre-implementation and post-implementation interventions (Venkatesh & Bala, 2008, p. 292). Four main focus areas are identified when attempting to influence adoption in the pre-implementation phase of the project (design characteristics, user participation, management support and incentive alignment [Venkatesh & Bala, 2008]). In the post-implementation stage, three focus areas are identified (training, organizational support and peer support [Venkatesh & Bala, 2008]). Demographical factors are not indicated as influencing factors in this model.

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[28] Venkatesh & Bala (2008) attempted to integrate existing knowledge of the TAM to develop a model that will provide more practical guidelines to organisations. Known definitions provided by the authors referred to in this section of the text are used to provide context to these factors.
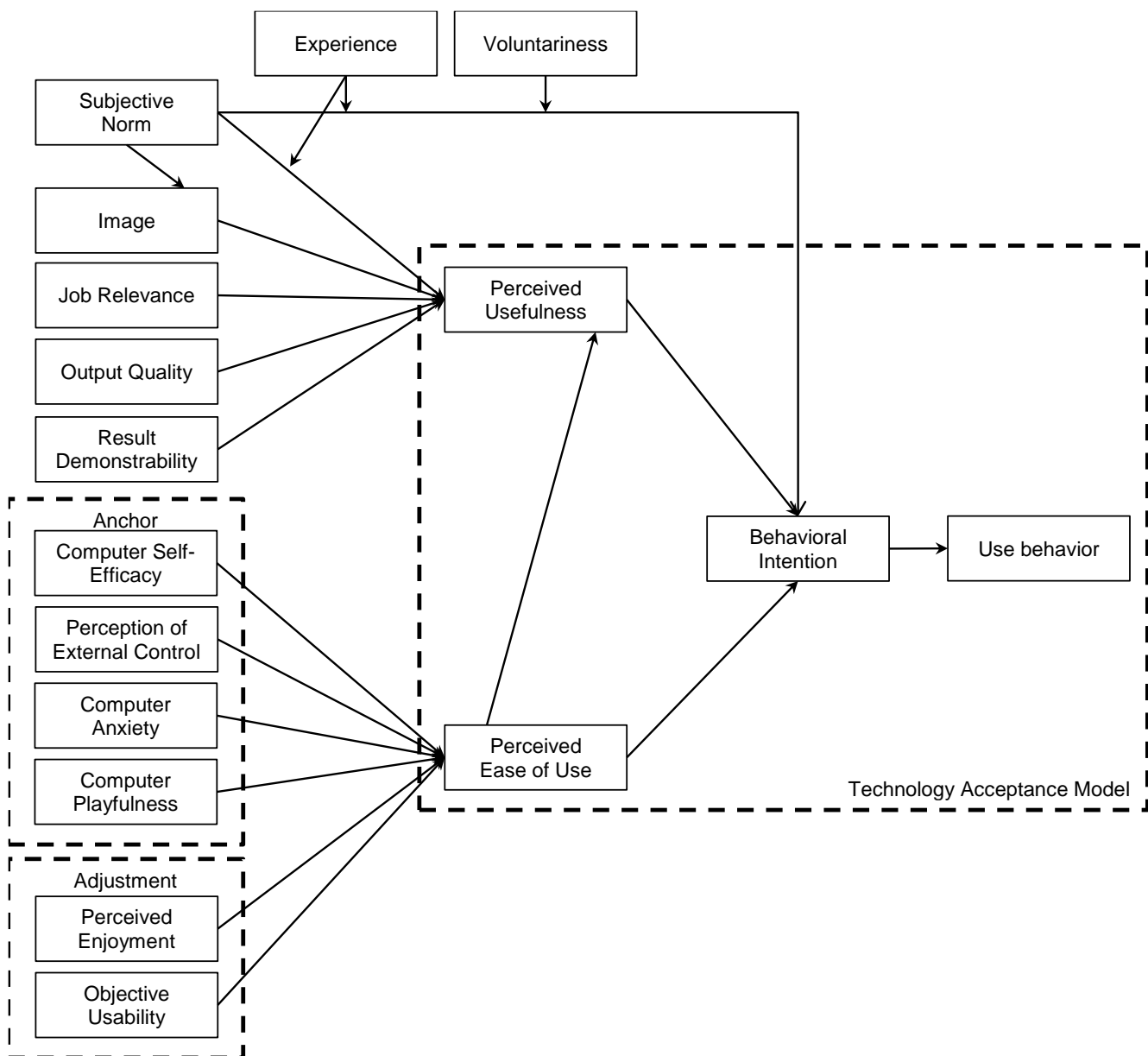
Figure 9: TAM 3 2008 (Venkatesh & Bala, 2008)

Unified theory of acceptance and use of technology (UTAUT)

The UTAUT was developed by Venkatesh et al. 2003. The summary in this chapter shows that, at the time, numerous models explaining technological IS adoption were available. In this context, the term "systems" was also used to focus on technology adoption rather than the broader context of the study. The constructs of theory of reasoned action, the TAM, the motivational model, the TPB, a model combining the TAM and the TPB, the model of PC utilization, the innovation diffusion theory, and the social cognitive theory were reviewed and compared with one another (Venkatesh et al., 2003). This comparison results in four fundamental concepts that influence adoption: performance expectancy, effort expectancy, social influence and facilitating conditions. "The degree to which an individual believes that using the system will help him or her to attain gains in job performance" (Venkatesh et al., 2003, p. 447) is termed performance expectancy. Effort expectancy is defined as "the degree of ease associated with the use of the system" (Venkatesh, et al., 2003, p. 450),   social influence is "the degree to which an individual perceived that important others believe he or she should use the new system" (Venkatesh et al., 2003, p. 451) and facilitating conditions is "the degree to which an individual believes that an organizational and technical infrastructure exists to support use of system" (Venkatesh et al., 2003, p. 453).

The model indicates that gender, age, experience and voluntariness could affect these variables and, therefore, the user's intention to use the technology. Gender and age play a role in performance expectancy, effort expectancy and social influence. Gender does not play a role in facilitating conditions. The users' experience level can be used to predict their perception of required effort, the social pressure, and the available support when using the system. The more experienced the user becomes, the easier it becomes to use the technology and this reduces the dependency on others concerning assistance when using the technology. The user similarly has a better understanding of the supporting structures and infrastructure within their own organisation. A further finding is that facilitating conditions have a direct influence on the behaviour of users. Figure 10 presents the model by Venkatesh et al. (2003).
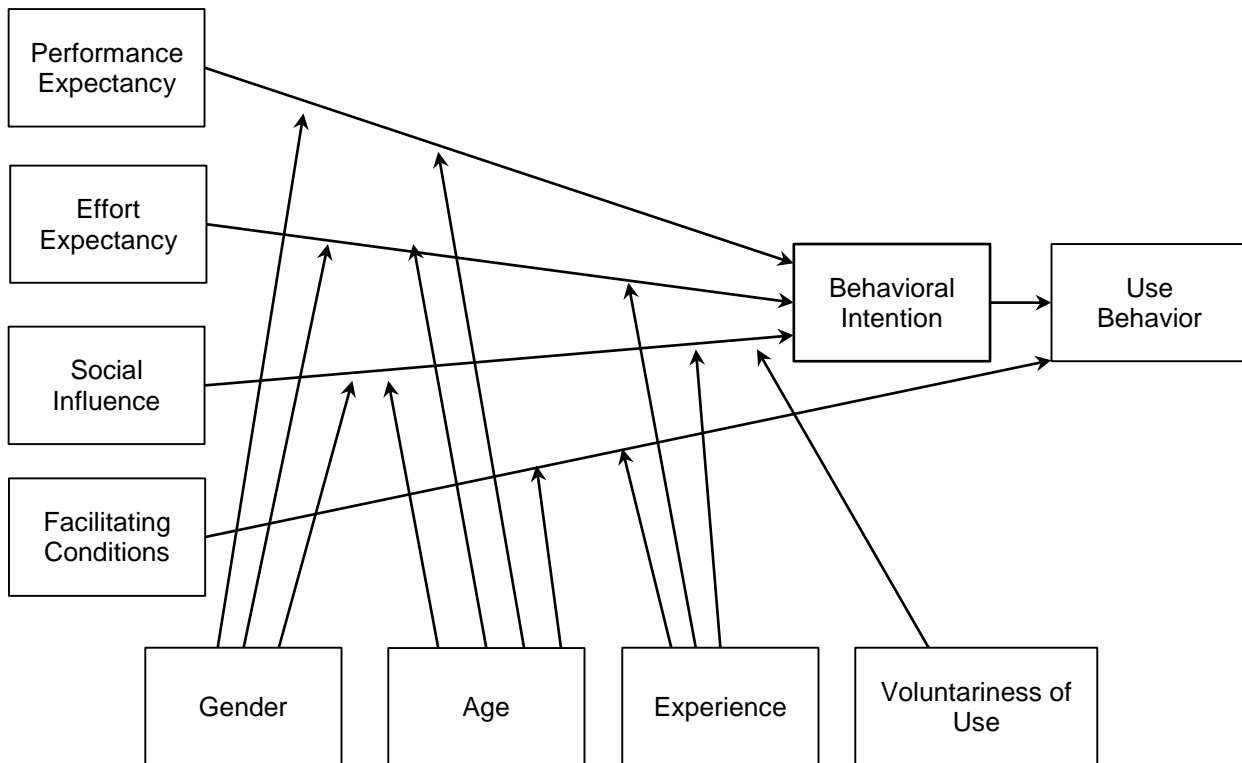
Figure 10: UTAUT (Venkatesh et al, 2003)

This model focuses mainly on organisational technological IS, and Venkatesh et al. (2003) claim that it can explain 70% of usage intention.

The limitations mentioned by Venkatesh et al. (2003), focus on the measures used, as well as the role that age and gender play in behavioural intention. They indicate the need for a deeper understanding of gender and gender role influence on adoption. Venkatesh et al. (2003) speculates that gender differences may disappear as technology becomes more integrated in everyday life.   A need was also identified to review the age at which the influence on these relationships appears and/or disappears. The following socioeconomic factors are recommended for further investigation: computer literacy, social or cultural background, cognitive phenomena, task-technology fit and individual ability (Venkatesh et al., 2003).

Unified theory of acceptance and use of technology 2 (UTAUT2)

Venkatesh, Thong & Xu (2012) identified a gap in explaining consumer use which, in 2012, resulted in an extension of the UTAUT to include technology adoption by consumers. It is important to understand the consumer context, due to its cost implications for business (Venkatesh, Thong & Xu, 2012).

Venkatesh, Thong & Xu (2012) introduce a few changes to the original model. Hedonic motivation, cost and habit are introduced as additional variables to consumer technology adoption where hedonic motivation refers to the enjoyment of making use of the technology (Venkatesh, Thong & Xu, 2012). The cost variable focuses on price value and cost-benefit to the customer when making use of the technology, and habit is defined as behaviour adopted through experience where experience is gained by usage over time (Venkatesh, Thong & Xu, 2012). According to this model, voluntary use is no longer a moderating factor and facilitating conditions play a more prominent role on intention to use technology. Performance expectancy now focuses on the benefits of technology adoption for the consumer, with effort expectancy and social influence also defined within a consumer context. Facilitating conditions focus on the consumers' perception of available support when using the consumer system (Venkatesh, Thong & Xu, 2012). The revised UTAUT is illustrated in figure 11 below.
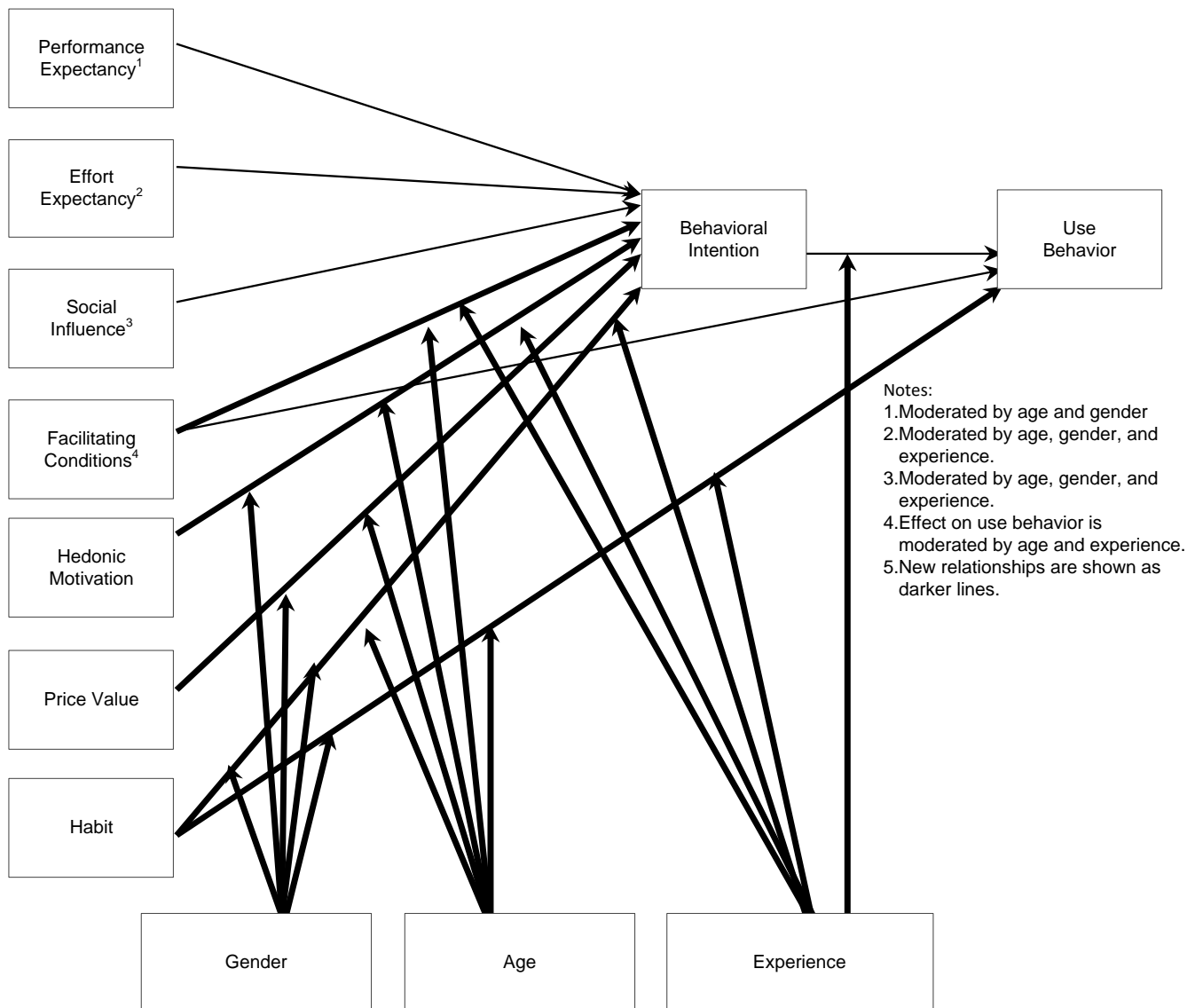
Figure 11: UTAUT2 (Venkatesh, Thong & Xu, 2012)

Venkatesh, Thong & Xu (2012) did not find common method variance (CMV) as problematic, but they did encourage researchers to consider the design of follow up studies to limit the risk of CMV. Relevant to this study, Venkatesh, Thong & Xu (2012) suggest that the industry should take demographic factors and IS usage phases into consideration when designing and marketing their technologies.

Factors that determine or influence adoption.

The previous sections attempt to explain the main models of adoption.   Table 4 below provides a brief summary of these models. Based on the reviewed literature, it appears that most of the models were designed to explain system adoption within an organisational context (UTAUT, TAM, TAM and TAM3). DOI was designed for use within an organisational or societal context, and can be applied to "any new idea, practice, or object" (Weigel et al. 2014, p. 621), but was applied to explaining technology adoption (Weigel et al., 2014). An example of the broad use of the DOI is the 2010 version of the book by Rogers that was sited 57473 times[29]. TPB was designed to explain human behaviour in specific contexts. Due to its broad application, the original work was sited 11362 times. Weigel et al. (2014) lists Ajzen (2011), Chen et al. (2011), Coombs (2009), Ferratt et al. (2010) and Premkumar et al. (2008) as some of the studies which use TPB to explain and predict behaviour. The TAM was first discussed in 1985 (cited 2474 times), with the main purpose of explaining IT adoption in the work environment. In 2000 Venkatesh and Davis revisited the TAM and developed the TAM 2 (cited 6841 times). The latest version of the original TAM is called the TAM3, and was developed by Venkatesh and Bala in 2008 (cited 944). Both the TAM2 and TAM3 predominantly focus on the work environment. The TAM3 is based on the opinion that not enough practical guidelines are available for organisations to influence technological IS adoption. The UTAUT (2003) resulted from of a meta-analysis of various adoption models applied in the work context (cited 9147), and was extended in 2012 to focus on the consumer context (cited 383).

Table 5: Factors influencing behavioural intent and use according to the various models

Model	Factors having a direct influence on behavioural intention	Factors having a direct influence on use
DOI	Relative advantage Compatibility Complexity Trailability	Decision
TPB	Attitude Toward the Behaviour Subjective Norm Perceived Behavioural Control	Intention
TAM	Perceived Usefulness Perceived Ease of Use	Attitude Toward Using
TAM 2		Intention to use
TAM 3		Behavioural intention
UTAUT	Performance Expectancy Effort Expectancy Social Influence	Behavioural Intention Facilitating Conditions
UTAUT 2	Performance Expectancy Effort Expectancy Social Influence Facilitating Conditions Hedonic Motivation Price Value Habit	Behavioural intention Facilitating Conditions Habit

All the reviewed models, except DOI and TPB, have a technological approach to improve efficiency and effectiveness in the business environment.   It appears that adoption leads to business improvement and, therefore, the focus is on the technological system and people's perception thereof.

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[29] Citation stats in this section were retrieved from Google Scholar on 4 August 2014

The purpose of this study is not to consider adoption of systems within the work environment, but to investigate the influence of demographical factors on individual technology adoption in an SSIS as part of work systems. The socio-technical approach to SSIS presumes that the system will evolve over time. The concept of time thus needs to be explored further.

Time

Saeed & Abdinnour (2013) as well as Rogers (2003) confirm the importance of time in the adoption process. Rogers classified users or adopters according to the time of innovation adoption. Venkatesh & Davis (2000), Venkatesh & Bala (2008), Venkatesh et al. (2003) and Venkatesh, Thong & Xu (2012) claim that experience influences the time and probability of users' technology adoption. Cooper & Zmud (1990) identify 6 stages in the adoption process, namely, initiation, adoption, adaptation, acceptance, routinisation and infusion. These stages are further discussed by Saeed & Abdinnour (2013). In South Africa, a direct relationship exists between the time that an individual uses the internet, and the individual's readiness to use online SSs[30].

Although it is important to understand the adoption process, a once off survey will not generate reliable data about the stages associated with the adoption process. It is, however, possible to determine SSIS maturity by assessing the extent to which the participants and customers migrated from face to face and call centre interactions.

Goldstuck & Meltzer (2010)recommends that time should be considered in future studies, because it may influence SSIS usage

Voluntariness

Voluntariness refers to the freedom of choice to adopt an IS (Wu & Lederer, 2009). This is yet another factor that some researchers deem relevant for explaining IS/technology adoption (Venkatesh et al, 2003; Venkatesh & Bala, 2008; Venkatesh & Davis, 2000). It consists of various levels and is not limited to a single choice between mandatory and voluntary (Tsai, Compeau & Meister, 2004; Wu & Lederer, 2009). Not all the models include this as a moderating factor. However, Venkatesh et al. (2003), supported by many studies, state that voluntariness does have a direct or indirect effect on adoption (Venkatesh et al, 2003).

The question arises whether SSIS is always voluntary. When considering the work systems approach, customers can use SSIS technology as a tool to determine whether a company is equipped to perform specific functions. The environment can affect this willingness to use the technology (Alter, 2013). The determining factors of adoption listed in the discussed models such as *social norms* (TPB, TAM2, and TAM3) and *social influence* (UTAT, UTAUT2), may influence perceived voluntariness (Tsai, Compeau & Meister, 2004).

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[30] See figure 11 in "Customer Self-Service strategies" (2010) for further details

If a user has to pay for call centre or face to face interactions, but not for online SS, can online SS use still be considered as voluntary? In South Africa, ATM usage increased significantly when banks began to charge substantially higher transaction fees for withdrawals in a branch than for ATM transactions (Goldstuck & Meltzer, 2010). If an organisation decides not to offer support via a call centre or face to face interaction, but to only provide SS options to their customer base, can free will still be considered as relevant when adopting the SSIS?   If social pressure motivates a person to make use of the SSIS, can the use be considered as voluntary, or is it mandatory? These questions can spark very interesting discussions that will highlight the ambiguity of the concept.

Concerning the use of SSIS, Reinders, Dabholkar & Frambach (2008) find, that freedom of choice. or lack of it, influences the attitude towards the system and the brand. They also found that women, when forced to use SSIS, reacted more negatively and prefer more choices . Reinders, Dabholkar & Frambach (2008) do not have any significant findings concerning age and education.

In the SSIS context, customers could perceive SS as mandatory when they have to pay for call centre interactions. In some instances, call centre interaction is still available to the customer (although at a cost), and that implies that the use of SS is not mandatory. In other instances, some organisations no longer offer a call centre or face to face interaction, but only SS options to the customers. Reinders, Dabholkar & Frambach (2008) indicate that if the organisation has various SS options available to perform specific functions, the customers could believe that they have more freedom of choice even though it is mandatory to use the SS technology. This may, as a result, influence the customers' attitude towards SS, because they still can choose which technological resource they want to use for a specific function. These questions and arguments spark an interest in demographics and how they affect the customer's perception concerning the voluntariness of use. Although important to investigate, voluntariness of use is not directly addressed in this study.

Context

During the last 30 years much work was done to understand IS adoption in the work environment (e.g. Venkatesh et al., 2003; Venkatesh & Bala, 2008; Venkatesh & Davis, 2000; Davis, 1985; Davis et al., 1989; Davis, 1993; Venkatesh & Davis, 1996; Pavlou & Fygenson, 2006). The focus was on IS, IT and technology in the work or study environment, and how employees or students can be encouraged to use these technological systems. The ultimate goal was efficiency and higher productivity, regardless of whether it is service or production based (Heilbronner & Milberg, 2008). When reviewing the various models, that attempt to explain adoption, they create the perception that, in the past, systems were designed by "onlookers", based on organizational staff and their functions with limited consideration for customer's needs.. The 2010 report, by World Wide Worx, on customer self-service strategies in South Africa states that it is erroneous to see SS as a technology function.   The report expresses the opinion that companies need to view SS as a customer service function focusing on the customer rather than technology (Goldstuck & Meltzer, 2010).

Technological advancement place ongoing pressure, especially on organisations in developing countries, to reduce costs in order to stay competitive. SS has become a means to this end. The UTAUT was extended (UTAUT2) to explain individual use of SSIS technologies, but the focus on the process that requires the use of technology to enable profitability, was still limited.   Various types of SSs are available. In the telecommunication industry customers have, for example, the choice of online SS, keyword short message service (SMS), unstructured supplementary service data (USSD), mobile SS applications, SS mobi sites, social media and IVR[31]. The many available options raise the question of voluntariness. The findings of Reinders, Dabholkar & Frambach (2008) with regard to the relationship between freedom of choice and attitude towards the service and brand become significant in the context of the TAM and TPB, since attitude is deemed to influence adoption. If the technological approach is followed, the type of SSIS technology chosen by the customer could depend on various factors, conditional on the model used. In the case of DOI, it could be factors such as relative advantage, compatibility, complexity and trailability. The TPB shows that subjective norm, attitude toward the behaviour and perceived behavioural control influence adoption. TAM focuses on the role of perceived usefulness and perceived ease of use. Performance expectancy, effort expectancy and social influence are the main influencing factors in the UTAUT. The UTAUT2 was extended to explain adoption in conjunction with performance expectancy, effort expectancy, social influence, facilitating conditions, hedonic motivation, price value and habit. Importantly, UTAUT2 is the only one of all the reviewed models,that was specifically designed to explain adoption from the consumer use perspective.

Social pressures could influence whether the service is adopted or not within SSIS. All the models acknowledge that the community in which the customer or worker interacts, could play a significant role in technology adoption. The DOI refers to the opinion leader, the TPB to referents, TAM to subjective norm, and UTAUT to social influence. The work systems framework views the environment as separate from the work system, but indicates that it has a direct impact on the work system (Alter, 2013).

All the reviewed adoption models identify participants in the adoption process, but the focus is only on the end user in terms of adoption. At this point, expansion of the definition of an IS to a work system context presumably can assist the organisation with an understanding of the role players in the process, and how their roles may affect the specified business process adoption.

Current research in South Africa shows that customers predominantly prefer face to face and call centre interactions concerning service and support ("South Africa's customer", 2013). In the telecom industry, the customers also prefer face to face and call centre contact followed by e-mail contact and

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[31] Although SS IVR is possible without human interaction, for the purpose of this study and to reduce complexity, IVR is not included as an SSIS.

call centre SS hot on its heels. According to organisations, the intention to use Facebook and web channels is significantly below target levels ("South Africa's customer", 2013)[32].

Only a limited number of studies were found that explain SSIS technology adoption and whether demographical factors play a role in adoption of SSs (Shrivastava, 2010; Wu, 2006; Gilham & Van Belle, 2005; Santhanamery & Ramayah, 2015; Bélanger & Carter, 2009). No studies were found that considers SSIS as a work system.

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[32] See figure 3 in "South Africa's customer"; 2013 for more details

Table 6: SSIS adoption vs. demographics in South Africa

Author	SSIS	Sample	Model used	Demographics	Finding
Shrivastava, 2010	Mobile financial services	ABSA banking customers in South Africa with a cell phone.	TRA TAM TBP	Income Mzansi account <R2500 <R5000	The higher the income the less positive clients are about mobile financial service as it is perceived to be designed for less important customers.
				Age 16-24 25-34 35-49 50+	In terms of low income groups for age group 16-24, there was a positive attitude towards mobile financial services. For age group 25-34, all income groups were positive towards the functionality.
Wu, 2006	Internet banking	Customers of South African retail banks of all races who reside in the Great Durban area.	DOI	Gender	Men use internet banking more than woman
				Age 21-29 30-39 40-49 Over 50	Age group 30-39 highest users of internet banking. Age do have impact on use of internet banking
				Education level High School Matric Degree/ Diploma Other	Main adopters have a degree/diploma
				Income Less than R2000 R2000-R3999 R4000-R4999 R5000-5999 Over R10000 Other	Income does affect use of internet banking. Income group R5000-R5999 were main adopters.

Author	SSIS	Sample	Model used	Demographics	Finding
				Marital status Married Divorced Single Widow(er)	Marital status influences the use of internet banking. The Main adopters are married.
				Occupation Other Self-employed Pensioners Not working Workers	Occupation has an impact on the usage of internet banking. Workers are main adopters of internet banking.
Gilham & Van Belle, 2005	Mobile Content Services	Samples were taken from 2 Call centres (Retail and mobile communications industry) in the Western Cape and included Individuals under the age of 25 years.	DOI	Gender	There were differences identified in the type of content accessed by the gender groups
				Age Under age of 25	The average age was 23. Main respondents were female, casual workers who owned a Cell phone. They made use of the Vodacom network and were on the prepaid service.
				Working status	
				Owning a cell phone	
				Network operator	
				Type of service Prepaid Contract	Prepaid users were less likely to adopt as they do not update their device as frequently as contract users. This affects their ability to make use of the latest applications.
				Average Monthly Expenditure	R259.19
Santhanamery & Ramayah, 2015	e-filing	Taxpayers in five main urban states in Peninsular Malaysia, namely, Penang, Perak, Selangor, Kuala Lumpur and Johor. Were required to have	Continuance usage intention	Age 20–29 years (Age1), 30–39 (Age2) years, 40–49 years (Age3) and 50 years and above (Age4)	E-filing continuance usage intention will differ by age group.

Author	SSIS	Sample	Model used	Demographics	Finding
		used the e-filing system at least once		Gender	Women, more than men, will continue using the e-filing system.
				Income	E-filing continuance usage intention differs based on income.
				Education	E-filing continuance usage intention differs based on education. Masters and doctoral qualifications have higher intention to continuously use.
				Ethnicity	E-filing continuance usage intentions differ based on ethnicity group.
Bélanger & Carter , 2009	E-Government	Administered survey at a community-wide concert in a rural town in Virginia. Two versions of the survey were randomly handed out. One focused on paying of tax and the other focused on paying of vehicle licences etc. online.	Digital divide	Income Between less than $10,000/year and more than $300,000/ year Age between 14-83 Education Ethnicity Gender Online information search experience Computer experience Prior online purchases.	Predictors of intention to use e-government: Income, Education, Age online information search experience

Not predictors of intention to use e-government: Ethnicity Gender Computer experience Prior online purchases. |

Demographical factors

Certain demographical factors have been considered to explain technological IS usage. Table 6 summarises the findings of the various adoption models.

In a work system, the implemented process depends on the customers and participants in the work system (Alter, 2013; Alter, 2010). It is directly affected by the environment. Alter defines the environment as:

"…the relevant organizational, cultural, competitive, technical, regulatory, and demographic environment within which the work system operates, and that affects the work system's effectiveness and efficiency. Organizational aspects of the environment include stakeholders, policies and procedures, and organizational history and politics, all of which are relevant to the operational efficiency and effectiveness of many work systems. Factors in a work system's environment may have direct or indirect impacts on its performance results, aspiration levels, goals, and requirements for change. Analysis, design, evaluation, and/or research efforts that

ignore important factors in the environment may overlook issues that degrade work system performance or even cause system failure" (Alter, 2013, p. 81).

Table 7: User demographics that have been considered in the various adoption models

Theory	Author	Year	Demographical factors	Country
Diffusion of Innovations	Rogers	1962	Age Social status Financial position Specialization Mental ability	
Diffusion of Innovations	Rogers	1983	Socioeconomic Characteristics Age Education Literacy Social status Social mobility Size of their units Economic orientation Attitude towards credit specialized operations	United States, Europe, South America
Diffusion of Innovations	Rogers	2003	Age Formal education Literacy Social status Social mobility Unit size	United States, Europe, South America
TAM	Hernandez, Jimenez and Martin	2011	Age Gender Income Educational level	Spain
TAM	Srite and Karahanna	2006	Age Gender Experience	United States
UTAUT	Venkatesh, Morris, Davis & Davis	2003	Age Gender Experience Social influence	United States of America
UTAUT 2	Venkatesh, Thong and Xu	2012	Age Gender Experience Social influence	Hong Kong

There is a tendency to believe that the younger age groups are more inclined to adopt technology (Quazi & Talukder, 2010; Shrivastava, 2010; Wu, 2006). Certain studies show that age has no effect on adoption (Rogers, 2003), or do not even include it as a determining factor (Venkatesh & Davis, 2000; Davis, 1993; Venkatesh & Bala, 2008). UTAUT (Venkatesh et al., 2003) shows that age only affects performance expectancy, effort expectancy, facilitating conditions, and social influence, but has no direct effect on behavioural intention and use. The UTAUT2 (Venkatesh, Thong & Xu, 2012) has a slightly different approach, and shows that age affects facilitating conditions, hedonic motivation, price value, and habit, but has no direct effect on behavioural intention and usage behaviour. Limited studies were found that describe the effect of age on SSIS adoption in South Africa as a developing country (see table 5).

Certain studies in South Africa show that the level of education does not influence the use of technology (Blignaut, 2009; Wu, 2006). Wu (2006), however, found that main adopters of internet

banking in the greater Durban area (South Africa) have a degree or diploma. No South African studies were found that refer to other types of SS technologies, and how their usage is linked to level of education. No articles were found that show the link between level of education and SS technologies other than online technologies and SSIS. Income is specified as an indicator of the technology type adopted by users in South Africa (Shrivastava, 2010; Wu 2006)

Certain studies that the effect of gender depends on the cultural context (Vatanparast, & Qadim; 2009). In the South African context, Wu (2006) and Gilham & Van Belle (2005) did find differences of use between men and women.

Certain authors view income as an influencing factor regarding the adoption decision (Bélanger & Carter, 2009; Shrivastava, 2010; Santhanamery & Ramayah, 2015).

In a work system context, humans and machines perform work in an SSIS. The operational environment of humans and machines, the organisational strategies, and the available infrastructure, all affect process and/or activity adherence (Alter, 2008; Alter, 2010; Alter 2013). The manner of process implementation will influence the outcome (Alter, 2008; Alter, 2010; Alter 2013) for the customer using the SSIS, as well as the organisation's profitability. Although these factors are not investigated in this study, they should be considered in future studies.

This study investigates the following generalisations about demographic factors in relation to SSIS adoption within a work system context in South Africa:

The age of the customer will not determine SSIS adoption, but will impact on channels used.

The level of education of the customer determines SSIS adoption and channels used.

The level of income of the customer will influence SSIS adoption and channels used.

The gender of the customer does not determine SSIS adoption and channels used.

Summary and conclusions

This study investigates SSIS adoption within the consumer context. Key concepts related to SS and IS are discussed and defined in an attempt to limit confusion when interpreting the results. These concepts are extended beyond technology (Alter, 2008).   The aim is to determine whether demographics affect the choice of a service channel[33].

According to the reviewed literature, adoption research is usually limited to a particular technology (Shrivastava, 2010; Wu, 2006; Gilham & Van Belle, 2005; Santhanamery & Ramayah, 2015; Bélanger & Carter , 2009). Based on this review, a limited study that investigates the adoption of only one technology when a number of channels[34] are available to the customer, may presumably create bias. Therefore the proposal is that the customer may use different channels based on the service required.

Various theories associated with IS were reviewed to determine their adoption application in the consumer and SSIS context. Although not all were developed to explain adoption[35] of IS, the literature review shows that these models have often been used to explain IS adoption within university, government and organisational contexts where IS is defined as a technology.   Only the UTAT2 was designed to focus on the consumer context.

Adoption models do not often include demographic variables. Only a few studies were found that mentioned the possible effect of demographics on adoption (Rogers, 1962; Rogers, 1983; Rogers, 2003; Hernandez, Jimenez and Martin, 2011; Srite and Karahanna, 2006; Venkatesh et al., 2003; Venkatesh, Thong and Xu, 2012). Limited research within the South African context was found, and the studies that were performed, were limited to a particular technology associated with SS (Shrivastava, 2010; Wu, 2006; Gilham & Van Belle, 2005).

This study aims to analyse the effect of demographics on customers who choose to access information through available channels, thus considering the service domain in a more holistic manner. No study could be found that investigates adoption from this perspective.

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The next chapter discusses the design and methodology of the study.

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[33] This could potentially, according to the extended definition of IS (Alter, 2008), be viewed as an IS, because there is an interaction with information through humans and machines.
[34] This may or may not include technology.
[35] For example DOI and TPB

Chapter 3

Research Design and Methodology

Hypothesis, conceptualisation and key variables

Many studies analyse system adoption, where technological determinants are the main focus, and IS is seen as a "computerized artefact" (Alter, 2013, p. 76). In a work system, the main focus is on the business objectives and how humans and machines cooperate by using information to meet specific business objectives in the most efficient and effective manner. The environment, strategies[36] and infrastructure[37] directly affect the manner in which business objectives are met, as well as the choice of processes and activities used to achieve it.

This study, focuses is on the environment, and particularly on demographic factors. Babbie (2010; p.92) identifies three main purposes of research, namely "exploration, description and explanation". This study aims to explain information system adoption in terms of four demographical factors in order to to assist with a general understanding of the research question within a work system context. A survey was conducted to determine if demographical factors influence SSIS adoption where SSISs are viewed as work systems. Limited focus has been placed on demographic factors in the South African context, and no studies could be found that make use of the work systems approach. Demographical factors that are considered in IS research are age, experience, education, literacy and social influence. Certain researchers also use the Living Standards Measure (LSM)[38] categories.

Demographic factors as part of the work system environment may affect performance, objectives and targets, as well as the need for change. In theory, an understanding of the demographical impact will assist the researcher to understand the reason why customers and participants perform activities and adhere to business processes[39].

Studies in developed countries show that age and income may not impact on the SSs that customers have access to (Rogers, 2003; Venkatesh et al, 2003; Bélanger & Carter, 2009; Hernandez, Jimenez & José Martin, 2011; Venkatesh, Thong & Xu., 2012; Santhanamery & Ramayah,2015). The

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[36] This includes enterprise strategy, department strategy and work system strategy and how they align and interact (Alter, 2013, p. 81)

[37] This includes human infrastructure, informational infrastructure, and technical infrastructure (Alter, 2013, p.81)

[38] Living Standards Measure. A marketing segmentation model that is used in South Africa to group people according to their living standards (SAARF. 2014. *SAARF*. [ONLINE] Available at: http://www.saarf.co.za/LSM/lsms.asp. [Accessed 27 September 2014])

[39] See table 2 in Alter (2013, p.81) for detailed explanation of elements of Work System. His explanation of the environment contributes to the conclusion on the effect demographic factors may have on the work system.

technological infrastructures are vastly different in developing countries.   Access to proper infrastructure is expensive and not all persons have the opportunity to attend school when they were at schooling age.

The research question was developed by reviewing well known adoption theories in the IS field. De Lone and McLean's work which focuses on information system success, and Alter's work which focuses on IS as work system, were also considered.

The literature study shows that SS has become an important aspect in business, although a technological approach is mostly used. Alter (2013) shows that technology is only one aspect of consideration. He states that the environment, pursued strategies and infrastructure all play important roles in the work system (Alter, 2013). The work system mainly focuses on the processes and activities used to achieve a specific business objective.

Participants in the work system use information and technology to perform activities in the business process in order to produce products and services that customers desire. In the service domain, particularly SS, the customer becomes a participant in the business process. When approaching the SS research question from this perspective, it becomes important to understand how companies can design an SS work system that can help them to understand the changes required to become more profitable in a highly competitive market.

This study only considers the following variables: age, level of education, level of income, and gender. Although many of the reviewed studies[40] have a technological focus, these variables are even more relevant in a work systems approach. This study also attends to questions raised about adoption in developing countries in previous studies[41].

Research question and aim of study

This study grapples with a descriptive research question.   The aim is to determine whether demographical factors play a role in SSIS adoption in the Western Cape, where an SSIS is viewed as a work system. This study explores the service domain, since no studies were found that explore SS from this viewpoint. As a subset, the researcher asks which channels participants prefer in order to perform specific SS activities within the SSIS. This study also evaluates whether age, level of education, level of income, and gender need to be considered when developing SSIS. The purpose is to identify the customers likely to adopt SS, and through which channels in the Western Cape.

The generalisations listed in chapter 2 were used to develop the survey.

The age of the customer will not determine SSIS adoption, but will impact on channels used.

The level of education of the customer determines SSIS adoption and channels used.

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[40] Chapter 2: Figure 10; Figure 11; table 5 & 6.
[41] See table 5 and 6 chapter 2.

The level of income of the customer will influence SSIS adoption and channels used.

The gender of the customer does not determine SSIS adoption and channels used.

Type of study

The quantitative approach is typically used to test theories, and to understand influencing factors (Creswell, 2003). Although there are some limitations to the self-assessment approach such as low response rate (Roberts, 2004), lack of control, and low internal validity, this method still produces valuable information (Babbie, 2010). Hard copy, self-administered assessments at various sites are more expensive, but give the survey administrator more control, and could lead to lower abandon rates, because the participant can clarify questions (Mrug, 2010). This study is an empirical cross-sectional qualitative study. It makes use of primary data obtained through pen and paper based self-assessment questionnaires at various locations in the Western Cape.

Focus of the study

The study focuses on four demographic variables to determine whether they influence SSIS adoption in a work system context. It also aims to answer whether these four variables determine the channel used to access SS.

Type of evidence required

This study uses a survey to collect evidence of the links between SSIS adoption and demographical factors. The type of channels used in the work system is also assessed as a component of the work system in order to identify what technology, resources and information is used by participants and customers in this context. Only a static view of the work system was investigated. Although a dynamic view of the work system is important and will add richness to the data gathered (Alter, 2013), it is very time consuming, and therefore falls outside the scope of this study

The presented survey questions were developed to investigate the link between SSIS adoption, age, level of education, level of income, and gender. It addresses the following questions:

Do particular age groups tend to adopt SSIS? Is there a relationship between age and the type of channels[42] that are used to perform SS activities?

Does level of education predict adoption? Is education linked to the type of channels that are used to perform SS activities?

Does level of income predict a tendency to adopt SSIS? Does income predict the type of channels that are used to perform SS activities?

Does gender predict a tendency to adopt the SSIS? Does gender influence the type of channels that

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[42] "Channels" used in this context refers to face to face, call centre or technological (SMS, USSD, online, etc.) interactions that a customer may prefer to resolve a query.

are used to perform SS activities?

Unit of analysis

Keller (2010) states: "One of the most fundamental considerations in conducting research is to determine what the primary unit is or should be that will be the subject of statistical analysis. This is called the unit of analysis." To name a few, the unit of analysis can be on individual, organisational, group, area or technology use level (Keller, 2010). In this study, data were collected on an individual level.

Survey

In this study, the researcher made use of paper based self-assessment questionnaires to gather data about the variables under investigation. Although electronic surveys are easier to administer, they introduce a possible form of bias towards persons who are already able to use technology, and exclude those that do not have access to technology.

Paper based surveys can introduce bias at the point of administration of questionnaires and when assisting customers with completion of the required documentation. The participants may also use socially desirable responding, a term used to indicate that respondents are more inclined to select the answer what they think the researcher will prefer (Booth-Kewley, Larson & Miyoshi, 2007; Fang et al. 2012). The researcher, therefore, has to monitor the research activities closely, and ensure that fieldworkers are trained to know exactly how to properly administer the surveys (Mrug, 2010).

Babbie (2010; p 260) states that a participant's response will depend on how the question was formulated. The words used to formulate the question, may introduce bias, because it may influence the participant's response. The researcher was careful not to introduce emotion or attitude in the wording. According to Babbie (2010; p 261) certain studies show that the wording in itself , as well as the participant's need to be accepted in society, may influence a response. This, in turn, may influence answers to s questions about, for example, personal income. The survey is not interview based and is completed anonymously. It may, therefore, encourage participants to disclose accurate information. This, however, is not guaranteed. Booth-Kewley, Larson & Miyoshi (2007) found that participants who complete an online survey would be more willing to disclose personal information than in a paper based survey, due to the perception of better anonymity security in online surveys.

Research methodology

Sampling technique

The target population is literate cell phone users in the Western Cape. Probability sampling is not feasible in this type of study, due to the number of cellular subscribers in the Western Cape (see table below), as well as the confidentiality of subscriber details. Non-probability sampling is considered as a more viable option. Convenience sampling was done at various locations.

The sample population consists of literate cell phone users aged 18 years and older that were approached by field workers.

305 survey participants completed a paper based self-assessment questionnaire, and signed a consent form that explains the purpose of the survey , as well as the use of the collected data. An copy of the survey document is attached as Appendix A.

The questionnaire asked the participants to indicate where they reside in order to validate their place of residence. Table 7 below shows the results of a study done by Roots (2013). The intervals used in the study served as a guideline to determine the intervals used in the survey questions, because these surveys were particularly designed for the South African context. The 2011 census report was also reviewed to ensure that those intervals can be used for surveys in the South African context, and to enable the researcher to compare findings with similar studies.

Table 8: Individuals from the sample who indicated that they owned cell phones in the Western Cape in 2013 (Roots, 2013)

ROOTS 2013 (Individuals)			Communications / Cell phone			TOTALS
			Own a personal cell phone			
			Yes Individuals	Rank[43]	No	
					Individuals	Individuals
Demographics / Individual	Age Group Detailed	16 - 19	237 886	8	24 345	262 231
		20 - 24	592 729	3	16 899	609 628
		25 - 34	1 254 901	1	73 765	1 328 666
		35 - 44	1 210 910	2	106 015	1 316 925
		45 - 49	530 491	5	63 279	593 770
		50 - 54	456 017	6	74 109	530 126
		55 - 64	581 239	4	164 705	745 944
		65+	369 653	7	208 829	578 482
		Don't know/Refused	33 892	9	6 498	40 390
	Education Level	No formal education	8 704	10	6 404	15 107
		Some primary school	39 339	9	42 455	81 794
		Primary school completed	115 337	8	70 455	185 793
		Some high school	1 122 100	2	306 603	1 428 703
		Matriculated	1 865 232	1	181 562	2 046 793
		Some college or technikon education	569 916	3	42 679	612 595
		Some university education	295 919	6	17 829	313 748
		College or technikon education completed	454 881	5	30 482	485 362
		University education completed	566 533	4	23 170	589 704
		Any other post-matric qualification	229 451	7	16 804	246 255
	Gender	Male	2 233 637	2	294 310	2 527 946
		Female	3 033 348	1	444 132	3 477 480
	Monthly Personal Income	Less than R3 999 per month	2 134 894	1	498 997	2 633 891
		R4 000 - R7 999 per month	931 633	2	95 736	1 027 368
		R8 000 – R11 999 per month	566 015	4	37 247	603 262
		R12 000 – R24 999 per month	685 889	3	36 534	722 423

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[43] This column is not part of the original table.

ROOTS 2013 (Individuals)			Communications / Cell phone			TOTALS
			Own a personal cell phone			
			Yes Individuals	Rank[43]	No	
					Individuals	Individuals
		R25 000 – R50 999 per month	278 562	5	14 623	293 185
		Over R51 000 per month	76 729	7	3 860	80 589
		missing label for '7'	81 695	6	3 320	85 015
		missing label for '9'	25 352	9	756	26 108
		missing label for '8'	46 586	8	1 518	48 104
		TOTALS	5 267 719		738 442	6 006 161
Numbers in RED represent fewer than 40 observations						

According to the Roots (2013) study, there is a total of 6 006 162 cell phone users in the Western Cape.

Sampling error

To ensure that the study is manageable and implementable, the population sample was limited to randomly selected cellular users within the urban population of the Western Cape who were willing to participate in the survey. The findings can be considered as a snapshot of the urban population within the Western Cape, and cannot be generalised to the population of South Africa.

Measurement error

Although the researcher asked for honest and truthful answers in the survey, there is a possibility that participants give answers that they think the researcher expects. The field agents were alerted to this possible error, and were requested to explain this to the participants, and to inform them of the use of the data.

Non-participation error

Non-response error was considered in the design of the survey by arranging the survey questions in a specific order. Babbie (2010) suggests that demographic data should be requested later in the survey. The questions that could potentially spark interests with the participant should always be posed at the beginning of the questionnaire (Babbie, 2010, p.266) in an attempt to reduce non-response error.

Survey design

Questionnaire design

The 2014 Manual for Measuring ICT Access and Use by Households and Individuals lists a number of core concepts that participants may struggle to understand, e.g. "computer, internet access service, mobile cellular telephones and computer-related activities" (Cervera, Muñoz & Roberts, 2014). The following is stated about these terms: "It is important when designing questions for ICT household surveys that these concepts are explained clearly and placed in a country and cultural context." (Cervera, Muñoz & Roberts, 2014, p 95) The construction of the questionnaire is based on Babbie's guidelines (2010). The questionnaire used questions, instead of statements, because questions are more applicable when attempting to explain adoption in this context. Closed ended questions were asked, but in some instances an option for "other" was added to give participants an opportunity to specify such other options in their own words if the options presented in the questionnaire were not relevant to them. Carefully chosen terminology ensured that participants are familiar with and can clearly understand the questions. The questions were formulated as simply and understandably as possible, even for participants without tech savvy. The only requirements for participants are literacy and cell phone usage.

The questionnaire begins with a confirmation of the participant's residency within the Western Cape, because sampling is done randomly at public places. Next, it focuses on SS to potentially create some interest and possibly motivate the participant to complete the questionnaire. Babbie (2010) states "Requests for duller, demographic data (age, gender, and the like) should generally be placed at the end of a self-administered questionnaire" (p. 266). He also states that placing these items at the beginning, may discourage participants to complete the questionnaire. The questions on IS adoption are grouped together at the beginning of the survey to render the questionnaire easier and potentially more interesting to answer. IS adoption is relevant, because most cell phone users, at some stage, need to purchase additional services, get a new phone or contract, or may require assistance when the device or service is not working as intended.

The questionnaire is limited to ten questions in order to limit non response bias. A survey guide (see Appendix A) was developed to help the field workers to understand the purpose of the study and reasons for the specific questions. It also provides context on the interpretation of the questions and terminology in order to help them to provide better and consistent support to the participants. Appendix A is a copy of the survey guide. Questions on which SS options the participants prefer, are structured to indicate frequency of use for each channel. Frequency of use is included in the questionnaire, because it could potentially provide rich data preference analyses.

The questionnaire consists of a combination of multiple choice and frequency rating scale questions. The frequency rating scales were designed as Likert type scales, and present 5 response categories.

Central tendency and social desirability bias were considered in the design (Barnette, 2010), but these measurement options were considered to be the most appropriate for the purpose.

Table 8 below provides a brief description of how the questions are structured, what was assessed, and the answer formats offered in the questionnaire.

Table 9: Layout and explanation of questionnaire (see Appendix A for more detail)

Do you live in the Western Cape?	Answer format: Yes/No The variable indicates whether the participant resides in the Western Cape.
What type of cell phone package do you make use of?	Answer format: Three options available in SA were offered. Most cellular providers segment their customers in these 3 account types Cell phone package was not part of the research question, but may provide some useful insights for further research. The variable indicates what type of price plan the customer was using at the time of the survey.
How do you make contact with you cell phone provider when you have issues with your cell phone or cell phone services and products?	Answer format: Ten channel options were presented where respondent had to indicate frequency of use of each option. Indicates what channels the participant prefers when wanting to resolve package or cell phone issues. "Channels" used in this context refers to whether a customer prefers to talk face to face to agents, call a call centre or make use of SMS, USSD or websites to resolve issues or make purchases.
How do you purchase products and services (e.g. upgrades, airtime, data bundles, music, apps, etc.) from your cellular service provider?	Answer format: Ten channel options were presented where respondents had to indicate frequency of use of each option. Indicates what channels the participant prefers when purchasing products and services from cellular provider. "Channels" used in this context refers to whether a customer prefers to talk face to face to agents, call a call centre or make use of SMS, USSD or websites to resolve issues or make purchases.
How old are you?	Answer format: Presented ten age categories to choose from. Age category the participant fell into at the time of the survey. This is a reported age in years. Participants report on category that they fall into.
Your home language is:	Answer format: Limited language options to the 3 official languages for the Western Cape with an option for "other" Variable indicates what language is predominantly used in the participant's home. The literature study showed that home language and mother tongue may differ. Although this was not part of the research questions listed, it was felt that this option may create opportunities for future research.
What is the very first language that you ever learned as child that you can still understand?	Answer format: Limited language options to the 3 official languages for the Western Cape with an option for "other" Variable indicates what the participants mother tongue is as it could be different to their current home language. Although this was not part of the research questions listed, it was felt that this option may create opportunities for future research.
Your highest level of education that you have completed is:	Answer format: Five options were presented based on information obtained from previous studies.

Diploma and certificate should have been at least six months study duration full-time or equivalent	Variable indicates what the highest level of education of the participant is. The options were limited to keep the question as easy as possible to answer. The level of detail presented was sufficient for the purpose of the study.
Please indicate what best describes your PERSONAL MONTHLY income before tax and deductions. This includes grants and pension	Answer format: Eleven options were presented based on the literature study conducted. Variable indicates personal monthly income before tax and deductions. Respondents had to choose from these eleven options. "Other" was part of the eleven options to provide opportunity for respondent to indicate if there are other options that researcher did not list. To prevent non response bias, an option to indicate that they do not wish to disclose their income was also added.
You are:	Answer format: Male/Female Variable indicates the gender of the participant.

Pilot

The purpose of a pilot study is to determine possible measurement errors that could occur and influence the quality of research. The pilot addresses these measurement errors before the main study is conducted. It should include a close reflection of the target population (Persaud, 2010).

This study uses a convenience sampling method to identify participants who represent the target population. The aim is to determine whether the survey questions are clearly written and easy to understand so that minimal assistance is required from the survey administrators to complete the questionnaire. Time taken to complete the questionnaire was assessed, as well as the simplicity of the instructions. Participants had to complete a feedback form to highlight any problems and suggestions regarding the questionnaire design. The theory on cognitive interviewing (Willis, 2005) assisted with the feedback form design. The aim was to obtain feedback on how various participants interpret the survey questions, in order to help the researcher with questionnaire design improvement.

The survey questions were tested in the pilot phase for clarity, relevancy, length and bias. The questionnaire was sent to participants to review the questions and provide feedback on whether they would have phrased the question differently. In order to prevent contamination, care was taken to not include the pilot participants in the main study..

Main study

Field workers were selected from an Honours student class, and trained on the purpose of this study. They were also told what was expected of them, and which guidelines to follow when conducting the fieldwork. They were also required to complete a minimum of 60 questionnaires each, and to capture the data on an excel template for further data processing.

Data collection procedure of main study

A paper based self-assessment questionnaire was used as primary data source. The questionnaires were made available through 5 field workers who collected data at various locations in the Western Cape. In an attempt to limit sampling bias, field workers were requested to conduct the surveys in time slots that would not exclude working individuals.

An equal number of men and women were required for sampling, because the Census 2011 Municipal report Western Cape (Lehohla 2012, p29) show that an almost equal number of males and females residing in the Western Cape at the time.

Field workers were trained to ensure consistent application of the survey. Although the participants had to complete the survey on their own, the field workers were allowed to help them with clarification of questions.

Training of fieldworkers

Bradburn (2004) is of the opinion that "while interviewers need to be trained about the purpose of questions and their meaning, interviewers may become a source of uncontrolled variance if they have to interpret questions for many respondents. Interviewers need to be alert to cues that respondents are misunderstanding questions and to act to correct them. The need for many interventions by interviewers indicates a bad questionnaire" (Bradburn 2004, p.6). The same potentially applies to field workers in a paper based questionnaire environment.

A survey guide (see Appendix A) was developed to explain the context of the study, as well as the interpretation of the questions. This was discussed with the fieldworkers before they conducted the field work.

Data capturing and data editing

Field workers had to capture the survey data on an excel spreadsheet designed for this purpose. Random checks were done to ensure accuracy and completeness.

Variables used in the survey were renamed for coding purposes. The excel template contains data codes for analysis purposes, and the survey guide reflects the codes per variable and answer selected.   Data were imported to number crunching statistical system NCSS for analysis.

Data analysis

Since all variables are quantitative in nature, Chi-square and Likelihood tests were identified as the most appropriate analysis type. The researcher needs to understand the simultaneous effect of several variables (age, gender, income, education) on SSIS (Babbie; 2010, p 441).

Gaps and limitations

This study only focuses on subjects in an urban environment within the Western Cape. The data, therefore, provides a snapshot of preferences in an urban environment within the Western Cape and cannot be generalised for South Africa. Care should be taken in using the data to make generalised statements about customers within the Western Cape or South Africa. To enable the researcher to make generalised statements, similar studies need to be conducted in rural areas, as well as other parts of South Africa. The generated data can only provide a snapshot of the trends within the sample group, and can be used to design further studies in other parts of the country. Further investigation is also required to obtain a dynamic view of SSIS preferences.

The cost of administering a paper-based questionnaire influenced the sample size and areas covered in the study. A paper based survey would include a wider demographical group than an online survey where participants have access to technology and know how to use it. An online survey can exclude participants who do not have internet access.

The self-assessment approach is limited (Roberts, 2004). In order to fill these gaps, the measurement of actual versus perceived usage is recommended to cater for challenges such as socially desirable responding that may impact on the reliability of the data. In future studies, the use of mixed method surveys should also be explored to potentially broaden the sample size, increase the response rate (Greenlaw & Brown-Welty, 2009), and ensure greater inclusivity of adopters and non-adopters. Proper design techniques should be used to ensure a direct comparison between online and paper based surveys.

Data access and protection

Ethical clearance

This study aims to identify the channels customers use or prefer within an SSIS in order to assist service providers to provide services that customers will adopt and use. This, in turn, could help the service providers to manage service costs more effectively.

According to Herrera (2010) the following can be used as ethical guideline applications for research purposes: (a) guidelines and oversight, (b) autonomy and informed consent, (c) standards and relativism, (d) conflicts of interest, and (e) the art of ethical judgment.

The ethical clearance application process was followed in compliance with the relevant university policies. Informed consent was obtained by providing the participants with an explanatory letter (see Survey Guide, Appendix A). The anonymity of the research participants was protected. The survey documentation did not request names. Informed consent documentation was stored separately from the completed surveys in order to ensure that responses could not be traced back to the participant.

Data storage

Hard copies were used to administer the surveys. The completed documentation was stored according to departmental and university standards to ensure confidentiality, as well as availability for validation and reanalysis purposes for a reasonable period of time.

Informed consent

All participants completed a consent form that explains the purpose of the study, the data that will be collected, and the purpose for which the data and results will be used.

Summary and conclusions

This chapter discusses the aim, planning and execution of the research. The emphasis is on designing a research project that can investigate SSIS in a work system context. The reason for this is, that, in the past, much focus was placed on the manner in which users can be encouraged to use technology.   This becomes evident, for example, when reviewing the financial statements[44] of the telecommunication sector. Despite previously mentioned statistics, it appears that adoption rarely goes according to plan, and therefore the question arises whether it is beneficial to consider a wider perspective . Although this study does not answer this question directly, it identifies demographics as a point of departure.

The first step in answering this question is to investigate whether demographics play a role in humans' performance within an SSIS, and which channels they prefer. The investigated variables are age, income, gender, and level of education. Although race is often included in the South African context, it is not included in this study, due to cost and administration factors. Therefore, a separate study, incorporating all the relevant variables, as well as race, is recommended to limit bias and encourage relevant and complete conclusions.

This is a qualitative study in the format of an empirical cross-sectional study, and data were generated through a paper based self-assessment questionnaire conducted on an individual level.

Five field workers trained for the purpose and armed with survey guides performed convenience sampling in various locations. .

Ethical considerations are discussed, and the last section of the chapter addresses gaps and limitations within the research methodology.

The next chapter focuses on the data results and analysis.

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[44] Vodacom integrated report for the year ending 31 March 2014, p. 4. MTN integrated report for year ending 31 December 2013, p. 11.Telkom integrated report for the year ending 31 March 2013, p. 15-17 and p. 19-20.

Chapter 4

Results

Introduction

This chapter focuses on the survey results. Three hundred and five cell phone users participated in this study and five fieldworkers distributed the surveys in the Western Cape.

NCSS was used for the statistical analysis discussed in this chapter Which also includes tables and graphs to assist with explaining the results.

The purpose of this study, as well as an analysis of the results, explain information system adoption in terms of four demographical factors. The answer to the research question aims to determine how demographical factors of participants in a work system influence channel and technology usage with a view to obtain support for specific cellular products or services, or to purchase products and services. The data analysis focuses on the generalisations presented in table 9.

Based on the literature study, the following generalisations are constructed and investigated for validity within the context of SSIS as a work system.

Table 10: Generalisations and associated dependent and independent variables.

	Generalisation	Dependent Variable	Independent variable
H1	The age of the customer will not determine SSIS adoption, but will impact on channels used.	SSIS adoption Channel	Age
H2	The level of education of the customer determines SSIS adoption and channels used.	SSIS adoption Channel	Level of education
H3	The level of income of the customer will influence SSIS adoption and channels used.	SSIS adoption Channel	Level of income
H4	The gender of the customer does not determine whether SSIS are adopted and channels used.	SSIS adoption Channel	Gender

The first section of this chapter describes the demographical factors of the respondents followed by a discussion of interesting observations based on raw data and its effect on the findings of the study.

The available data was subjected to various tests to determine the acceptance or rejection of the generalised statements.   Low values are merged with nearby values or frequencies to obtain meaningful analysis results. Pearson's Chi-Square, Yates' Continuity Correction, Likelihood Ratio and Fisher's exact tests were run, based on sample size and presented values. The presented results stem from the Likelihood Ratio, because, based on available numbers, it is the most appropriate test.

The section below provides a brief overview of the raw data and the findings based on the conducted statistical analysis.

Analysis

Responses of interest noted in the raw data

The sampling population consists of 305 respondents. Out of these 305 respondents, 183 (60%) are female and 122 (40%) are male. Six respondents did not disclose their age. Eight of the respondents did not reside in the Western Cape.

The questionnaire distinguishes between support and transactional purposes, because it anticipates the use of different channels and SSIS for support and transactional purposes.

A first analysis of the raw data shows the following:

Three respondents answered that they never contact their service providers through any channels regarding problems with their cell phones, or to purchase products or services. These respondents (all three were contract subscribers) did not explain how they acquired their packages and associated services. Although they could provide an "other" option to indicate which channel they used to obtain support and transactional services, they chose not to disclose this information. Two of the three respondents were older than 50 years, while the other one fell in the 20 to 24 age category. The three aforesaid respondents are all male with different educational levels. One of these three respondents answered that he had no income. Of the remaining two, the one respondent chose not to disclose his income, while the other one indicated earnings between R25 000 and R50 999 per month.

Six respondents indicated that they never make contact with their service providers to resolve problems regarding their cell phones, or cell phone products and services. Of the six aforesaid respondents, four were prepaid subscribers, one was a TopUp subscriber, and one was a contract subscriber. Age varied, with three of these six respondents older than 50. Five of the six respondents are female. Only three of the six respondents disclosed their income. Two were at the lower to no income end of the scale, and one earned between R8 000 and R11 999 per month. Two of the six respondents completed primary school, two completed high school, one completed a diploma/certificate after school, and one had a degree. They provided no information on how they deal with cell phone related problems.

Fifteen respondents answered that they never contact their service providers to purchase products or services. Three of these fifteen respondents were TopUp subscribers, ten were contract subscribers, and only two were prepaid subscribers. They gave no explanations on how they acquired their packages. They were all from different age, income, and educational groups.

Thirteen respondents omitted at least one survey question not linked to question 3(j) or 4(j). These two questions catered for options (i.e. "other") not included in the options presented in the questionnaire.

Twenty two respondents did not complete question 3(j) or 4(j). Although there may be various reasons for the non-completion, it remains for the reader to ponder on. The number of multiple choices presented in questions 3(j) or 4(j) could be one possible reason for the respondents' non completion of the entire section. The majority of these respondents did, however, complete all the other sections presented in questions three and four.

The rest of this chapter focuses on the investigated demographics and the relationships relevant to the research question. Although language and package type are not part of the research question, they are included for richness and potential future research opportunities.

Age

The age distribution of the respondents is captured in the figure below.   The dominant age group in the survey is the 20 to 24 age group, with the 25 to 34 age group a close second. Only two percent (2%) of the respondents did not disclose their age. Roots' (2013) study indicated in 2013 that the age group 20 to 24 was ranked third in cell phone ownership in the Western Cape, while the age group 25 to 34 was ranked first. This could mean that this sample is similar to the one in Roots' study.

Figure 12: Age distribution of respondents.
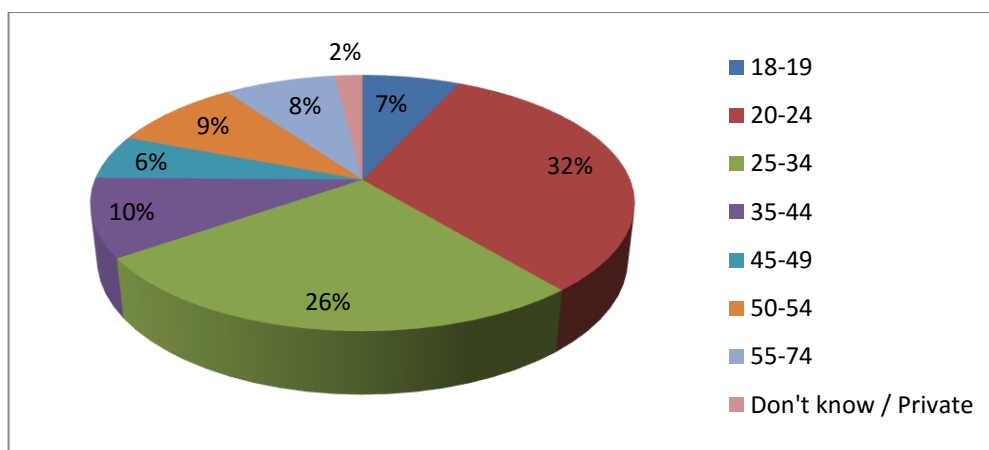
Table 11: Frequency of usage of channels according to respondent's age

Variables		Never	A few times a year	Once a month	Few times a week	Once a week	Total
Support: USSD	18-19	23.81%	14.29%	23.81%	33.33%	4.76%	100.00%
	20-24	13.40%	14.43%	37.11%	26.80%	8.25%	100.00%
	25-34	26.58%	16.46%	24.05%	17.72%	15.19%	100.00%
	35-44	23.33%	23.33%	20.00%	23.33%	10.00%	100.00%
	45-49	47.06%	17.65%	11.76%	17.65%	5.88%	100.00%
	50-54	39.29%	28.57%	14.29%	10.71%	7.14%	100.00%
	55-74	66.67%	4.17%	29.17%	0.00%	0.00%	100.00%
	Don't know / Private	16.67%	33.33%	33.33%	16.67%	0.00%	100.00%
	Total	**27.15%**	**16.89%**	**26.82%**	**20.20%**	**8.94%**	**100.00%**
Transact: USSD	18-19	23.81%	14.29%	19.05%	33.33%	9.52%	100.00%
	20-24	25.77%	5.15%	37.11%	22.68%	9.28%	100.00%
	25-34	36.25%	13.75%	27.50%	13.75%	8.75%	100.00%
	35-44	46.67%	13.33%	20.00%	13.33%	6.67%	100.00%
	45-49	70.59%	5.88%	5.88%	11.76%	5.88%	100.00%
	50-54	42.86%	21.43%	10.71%	17.86%	7.14%	100.00%
	55-74	79.17%	8.33%	12.50%	0.00%	0.00%	100.00%
	Don't know / Private	16.67%	33.33%	33.33%	16.67%	0.00%	100.00%
	Total	**38.61%**	**11.22%**	**25.41%**	**17.16%**	**7.59%**	**100.00%**
Support: SMS	18-19	47.62%	19.05%	4.76%	14.29%	14.29%	100.00%
	20-24	48.45%	18.56%	13.40%	17.53%	2.06%	100.00%
	25-34	61.25%	5.00%	12.50%	11.25%	10.00%	100.00%
	35-44	51.72%	13.79%	6.90%	6.90%	20.69%	100.00%
	45-49	64.71%	17.65%	0.00%	11.76%	5.88%	100.00%
	50-54	64.29%	17.86%	3.57%	7.14%	7.14%	100.00%
	55-74	87.50%	4.17%	8.33%	0.00%	0.00%	100.00%
	Don't know / Private	50.00%	16.67%	16.67%	16.67%	0.00%	100.00%
	Total	**57.62%**	**13.25%**	**9.93%**	**11.92%**	**7.28%**	**100.00%**
Transact: SMS	18-19	71.43%	9.52%	0.00%	9.52%	9.52%	100.00%
	20-24	67.01%	13.40%	12.37%	6.19%	1.03%	100.00%
	25-34	71.25%	8.75%	7.50%	7.50%	5.00%	100.00%
	35-44	43.33%	16.67%	13.33%	16.67%	10.00%	100.00%
	45-49	82.35%	0.00%	5.88%	5.88%	5.88%	100.00%
	50-54	60.71%	17.86%	14.29%	7.14%	0.00%	100.00%
	55-74	87.50%	0.00%	12.50%	0.00%	0.00%	100.00%
	Don't know / Private	66.67%	16.67%	16.67%	0.00%	0.00%	100.00%
	Total	**67.99%**	**10.89%**	**10.23%**	**7.26%**	**3.63%**	**100.00%**
Support: Call centre	18-19	42.86%	42.86%	14.29%			100.00%
	20-24	43.75%	35.42%	20.83%			100.00%
	25-34	37.50%	42.50%	20.00%			100.00%
	35-44	43.33%	40.00%	16.67%			100.00%
	45-49	47.06%	35.29%	17.65%			100.00%
	50-54	64.29%	35.71%	0.00%			100.00%
	55-74	66.67%	29.17%	4.17%			100.00%
	Don't know / Private	66.67%	33.33%	0.00%			100.00%
	Total	**46.36%**	**37.75%**	**15.89%**			**100.00%**
Transact: Call centre	18-19	76.19%	19.05%	4.76%			100.00%
	20-24	75.26%	10.31%	14.43%			100.00%
	25-34	68.75%	16.25%	15.00%			100.00%
	35-44	46.67%	33.33%	20.00%			100.00%
	45-49	94.12%	5.88%	0.00%			100.00%
	50-54	71.43%	21.43%	7.14%			100.00%
	55-74	79.17%	12.50%	8.33%			100.00%
	Don't know / Private	50.00%	33.33%	16.67%			100.00%
	Total	**71.29%**	**16.17%**	**12.54%**			**100.00%**

Variables		Never	A few times a year	Once a month	Few times a week	Once a week	Total
Support: Mobi site	18-19	76.19%	9.52%	14.29%	0.00%		100.00%
	20-24	61.86%	16.49%	15.46%	6.19%		100.00%
	25-34	71.25%	7.50%	8.75%	12.50%		100.00%
	35-44	73.33%	20.00%	3.33%	3.33%		100.00%
	45-49	82.35%	11.76%	0.00%	5.88%		100.00%
	50-54	85.71%	3.57%	0.00%	10.71%		100.00%
	55-74	95.83%	0.00%	4.17%	0.00%		100.00%
	Don't know / Private	83.33%	0.00%	0.00%	16.67%		100.00%
	Total	**72.94%**	**10.89%**	**8.91%**	**7.26%**		**100.00%**
Transact: Mobi site	18-19	85.71%	9.52%	4.76%			100.00%
	20-24	75.26%	13.40%	11.34%			100.00%
	25-34	78.75%	7.50%	13.75%			100.00%
	35-44	80.00%	13.33%	6.67%			100.00%
	45-49	100.00%	0.00%	0.00%			100.00%
	50-54	92.86%	3.57%	3.57%			100.00%
	55-74	100.00%	0.00%	0.00%			100.00%
	Don't know / Private	83.33%	16.67%	0.00%			100.00%
	Total	**82.51%**	**8.91%**	**8.58%**			**100.00%**
Support: Mobile app	18-19	85.00%	10.00%	0.00%	5.00%		100.00%
	20-24	69.07%	11.34%	5.15%	14.43%		100.00%
	25-34	62.50%	11.25%	6.25%	20.00%		100.00%
	35-44	70.00%	6.67%	13.33%	10.00%		100.00%
	45-49	88.24%	5.88%	0.00%	5.88%		100.00%
	50-54	82.14%	14.29%	0.00%	3.57%		100.00%
	55-74	100.00%	0.00%	0.00%	0.00%		100.00%
	Don't know / Private	100.00%	0.00%	0.00%	0.00%		100.00%
	Total	**73.84%**	**9.60%**	**4.64%**	**11.92%**		**100.00%**
Transact: Mobile app	18-19	76.19%	14.29%	4.76%	4.76%		100.00%
	20-24	76.29%	9.28%	6.19%	8.25%		100.00%
	25-34	68.75%	10.00%	13.75%	7.50%		100.00%
	35-44	73.33%	10.00%	10.00%	6.67%		100.00%
	45-49	82.35%	5.88%	11.76%	0.00%		100.00%
	50-54	78.57%	17.86%	0.00%	3.57%		100.00%
	55-74	91.67%	0.00%	8.33%	0.00%		100.00%
	Don't know / Private	100.00%	0.00%	0.00%	0.00%		100.00%
	Total	**76.24%**	**9.57%**	**8.25%**	**5.94%**		**100.00%**
Support: Store	18-19	33.33%	61.90%	4.76%	0.00%		100.00%
	20-24	31.25%	45.83%	16.67%	6.25%		100.00%
	25-34	26.25%	52.50%	15.00%	6.25%		100.00%
	35-44	36.67%	33.33%	30.00%	0.00%		100.00%
	45-49	23.53%	64.71%	11.76%	0.00%		100.00%
	50-54	46.43%	46.43%	3.57%	3.57%		100.00%
	55-74	34.78%	52.17%	13.04%	0.00%		100.00%
	Don't know / Private	33.33%	16.67%	33.33%	16.67%		100.00%
	Total	**31.89%**	**48.50%**	**15.28%**	**4.32%**		**100.00%**
Transact: Store	18-19	47.62%	42.86%	9.52%	0.00%		100.00%
	20-24	40.21%	25.77%	27.84%	6.19%		100.00%
	25-34	39.24%	34.18%	18.99%	7.59%		100.00%
	35-44	33.33%	40.00%	23.33%	3.33%		100.00%
	45-49	52.94%	35.29%	11.76%	0.00%		100.00%
	50-54	46.43%	35.71%	10.71%	7.14%		100.00%
	55-74	37.50%	41.67%	20.83%	0.00%		100.00%
	Don't know / Private	33.33%	33.33%	16.67%	16.67%		100.00%
	Total	**40.73%**	**33.44%**	**20.53%**	**5.30%**		**100.00%**

Variables		Never	A few times a year	Once a month	Few times a week	Once a week	Total
Support: Website	18-19	80.95%	4.76%	14.29%	0.00%		100.00%
	20-24	49.48%	35.05%	10.31%	5.15%		100.00%
	25-34	51.25%	26.25%	16.25%	6.25%		100.00%
	35-44	40.00%	36.67%	16.67%	6.67%		100.00%
	45-49	70.59%	17.65%	11.76%	0.00%		100.00%
	50-54	78.57%	14.29%	0.00%	7.14%		100.00%
	55-74	100.00%	0.00%	0.00%	0.00%		100.00%
	Don't know / Private	100.00%	0.00%	0.00%	0.00%		100.00%
	Total	**60.07%**	**24.42%**	**10.89%**	**4.62%**		**100.00%**
Transact: Website	18-19	95.24%	0.00%	4.76%			100.00%
	20-24	70.10%	14.43%	15.46%			100.00%
	25-34	71.25%	21.25%	7.50%			100.00%
	35-44	60.00%	26.67%	13.33%			100.00%
	45-49	88.24%	5.88%	5.88%			100.00%
	50-54	78.57%	14.29%	7.14%			100.00%
	55-74	95.83%	0.00%	4.17%			100.00%
	Don't know / Private	66.67%	33.33%	0.00%			100.00%
	Total	**74.92%**	**15.18%**	**9.90%**			**100.00%**
Support: e-mail	18-19	80.95%	9.52%	0.00%	9.52%		100.00%
	20-24	75.26%	10.31%	5.15%	9.28%		100.00%
	25-34	75.00%	10.00%	3.75%	11.25%		100.00%
	35-44	66.67%	6.67%	6.67%	20.00%		100.00%
	45-49	88.24%	11.76%	0.00%	0.00%		100.00%
	50-54	82.14%	10.71%	0.00%	7.14%		100.00%
	55-74	91.67%	4.17%	0.00%	4.17%		100.00%
	Don't know / Private	100.00%	0.00%	0.00%	0.00%		100.00%
	Total	**77.89%**	**9.24%**	**3.30%**	**9.57%**		**100.00%**
Transact: e-mail	18-19	90.48%	9.52%	0.00%			100.00%
	20-24	90.72%	2.06%	7.22%			100.00%
	25-34	90.00%	2.50%	7.50%			100.00%
	35-44	66.67%	16.67%	16.67%			100.00%
	45-49	94.12%	5.88%	0.00%			100.00%
	50-54	89.29%	3.57%	7.14%			100.00%
	55-74	100.00%	0.00%	0.00%			100.00%
	Don't know / Private	100.00%	0.00%	0.00%			100.00%
	Total	**89.11%**	**4.29%**	**6.60%**			**100.00%**
Support: Web chat	18-19	90.48%	0.00%	9.52%			100.00%
	20-24	90.72%	2.06%	7.22%			100.00%
	25-34	87.50%	3.75%	8.75%			100.00%
	35-44	83.33%	6.67%	10.00%			100.00%
	45-49	94.12%	5.88%	0.00%			100.00%
	50-54	89.29%	7.14%	3.57%			100.00%
	55-74	100.00%	0.00%	0.00%			100.00%
	Don't know / Private	83.33%	16.67%	0.00%			100.00%
	Total	**89.77%**	**3.63%**	**6.60%**			**100.00%**
Transact: Web chat	18-19	100.00%	0.00%				100.00%
	20-24	93.81%	6.19%				100.00%
	25-34	89.87%	10.13%				100.00%
	35-44	82.76%	17.24%				100.00%
	45-49	100.00%	0.00%				100.00%
	50-54	92.86%	7.14%				100.00%
	55-74	100.00%	0.00%				100.00%
	Don't know / Private	100.00%	0.00%				100.00%
	Total	**93.02%**	**6.98%**				**100.0%**

USSD

The data analysis shows that 20% of the respondents indicated that they use USSD a few times a week, 26.82% that they use it once a month, and 27.15% that they never use it for support purposes. 39% of the respondents indicated that they never use USSD for transactional purposes, 25% that they use it at least once a month, 17% that they use it a few times a week, 11% a few times a year, and 8% that they use it once a week. Pearson's Chi-Square and Likelihood Ratio both indicate a strong association between age and using USSD for support purposes.

The 20 to 25 age group is the most frequent user of USSD for support purposes. Only 13% of this age group indicated that they never use USSD for support purposes. The age group that indicated least likely use of USSD for support in relation to the other age groups, is the 55 to 74 age group (66% of age group).

The trend is similar for USSD usage for transactional purposes.   Both Pearson's Chi-Square and the Likelihood Ratio indicated a strong relationship between age and using USSD for transactional purposes.

The 18 to 19 age group is the most frequent user of USSD for transactional purposes. Also in this instance, the 55 to 74 age group is the least likely group to use USSD for this purpose. The majority of the sample groups indicated that they never use USSD for transactional purposes.

SMS

In relation to the other age groups, age group 18 to 19 is the most frequent user of SMS for support purposes. Eighty-eight percent of age group 55 to 74 indicated that they never use SMS for support purposes. In general, 57.62% of all respondents indicated that they do not use SMS for support purposes.

Age and SMS usage for support purposes are associated, but not as strongly as age and USSD usage.

With reference to transacting via SMS, proportionately the most frequent users are age group 35 to 44, while 88% of age group 55 to 74 indicated that they never use SMS for transactional purposes. Overall, 68% of the respondents indicated that they do not use SMS for transactional purposes. Due to the low numbers, the Likelihood Ratio was used as the indicator. Pearson's Chi-Square performs better with larger numbers, but is not as reliable when only a few responses are available (Field, 2013, p.723). The Likelihood Ratio indicates   a fairly strong relationship between age and SMS usage for transactional purposes.

Mobi site

The 20 to 24 age group stands out as the proportionally highest user of the mobi site, although only 38% of the age group indicated that they use the mobi site from once a week up to a few times a year. Ninety-six percent of the 55 to 74 age group indicated that they never use the mobi site. In general,

73% of all respondents indicated that they do not use the mobi site. Both Pearson's Chi-Square and Likelihood Ratio indicate a significant relationship between age and mobi site usage for support purposes.

Top users of mobi site for transactional purposes are the 20 to 24 age group, although overall usage is only at 24%. For analysis purposes, some frequency variants were combined to enable the researcher to conduct a statistical analysis of the data. All of the respondents in the age group 45 to 49 and 55 to 74 indicated that they do not use the mobi site for this purpose. 83% of the total respondent population indicated that they never use the mobi site for transactions. The Likelihood Ratio indicates a significant relationship between age and mobi site usage for transactional purposes.

Mobile app

The mobile app is the latest SS technology that is increasingly utilised by companies who pursue lower support and transaction costs. At the time when the study was conducted, three of the five cellular providers in South Africa had a mobile app with various support and/or transactional functions. 74% of the respondents indicated that they never use a mobile app for support purposes. The 25 to 35 age group is the highest user, although the majority in this age group indicated that they never use a mobile app for this purpose in the cellular context. None of the respondents in age group 55 to 74 indicated any use of a mobile app for this purpose.

The data analysis (Likelihood Ratio) shows a strong relationship between age and mobile app usage. Due to the low response numbers, Pearson's Chi-Square does not support the statement.

The research data shows that this technology adoption is a slow process, because 76% of the respondents indicated that they do not use a mobile app for transactional purposes. The 25 to 34 age group uses it slightly more than other age groups , with the 35 to 44 age group a close second. Age group 55 to 74 indicated, again, that the majority of them do not use the mobile app for transactions. Although the data does not show a meaningful relationship between age and mobile app usage for transactional purposes, it is noteworthy that very few respondents indicated that they use this technology.

Websites

Businesses use websites to make information available to their customers. In the cellular industry, service providers make web based SS options available to their customers for various purposes ranging from customer account information to activation and deactivation services, or product and service acquisition. Usage of these services appears to be more frequent, but is still low. Sixty percent of the respondents indicated that they never use the cellular provider's website. Only 24% of the respondents indicated that they use support services a few times a year.   In relation to the other age groups, the 35 to 44 age group use web based services most frequently. The group that indicated the least likely website usage, was yet again the 55 to 74 age group. The data showed a very strong relationship between age and web services usage for support purposes.

From the available data, it appears that respondents are more likely to use the website for support purposes than for transactional purposes. Seventy-five percent indicated that they never use the website for transactional purposes. The 35 to 44 age group is more likely to use it than any other age group, but usage is still limited to only 40% of the total age group sample. Age groups 55 to 74, and 18 to 19 indicated the lowest use. The analysed data shows that web usage for transactional purposes also strongly correlates with age.

Call centre

Call centre usage appears to be more popular amongst all respondents. Forty-six percent indicated that they do not contact the call centre for support purposes.   The 25 to 34 age group is, proportionately, highest users of the call centre. The 55 to 74 age group is still the lowest users, but, at 33%, usage numbers for this group are higher than usual.

Surprisingly, the data does not show a strong relationship between age and call centre usage for support purposes. It still appears to be a popular channel for support among all age groups. Call centre usage for transactional purposes is lower. In this instance, age group 35 to 44 are the highest users at 53% of the age group. The least likely call centre users are those in the 45 to 49 age group at 6% usage.   Seventy-one percent of all respondents indicated that they do not phone call centres to perform transactions.

As with call centre usage for support purposes, call centre usage for transactional purposes also shows no strong link with age.

E-mail

Seventy-eight percent of the respondents indicated that they never use e-mail for support purposes. The age group that shows the highest usage, was the 35 to 44 age group at 33%. The 55 to 74 age group has the lowest usage with eight percent (8%). No link could be found between age and e-mail usage for support purposes.

E-mail usage for transactional purposes is exceptionally low, because 89% of the respondents indicated that they do not use this channel.   The age group that showed the highest usage compare to the rest of the sample group, was the 35 to 44 age group at 33%. The 55 to 74 age group had no respondents (0%) who indicated that they use e-mail for transactional purposes. Although the usage was low, the data indicates a strong relationship between age and e-mail usage for transactional purposes.

Web chat

Web chat is also a fairly recent technology that enables customers to talk directly with a contact centre agent. Web chat usage amongst the respondents are also indicated as low. because 90% of the sample indicated that they never use this service for support purposes.   The age group that

proportionately uses the service more often was the 35 to 44 age group with only 17% usage. The 55 to 74 age group has no respondents who use the service for support purposes. No relationship with age could be found. The low usage may contribute to this finding.

Due to the low numbers produced by the surveys for the various frequencies, the "Transact: Web chat" analysis was limited to the option "Sometimes" and "Never". The majority (93%) of the respondents indicated that they never use web chat for transactional purposes.   The highest proportional users were those in the age group 35 to 44. Age group 18 to 19, 45 to 49 and 55 to 74 shared the bottom usage spot with zero percent (0%). Contrary to web chat usage for support purposes, there is a significant relationship between age and web chat usage for transactional purposes.

Store

The last service option that included in the survey, is the option of visiting a store for support. The age group that proportionally visited the store more frequently for support services is the 45 to 49 age group at 76%. Overall, all age groups' appeared to prefer visiting a store above any of other channels. Forty-nine percent of the response group indicated that they visit stores a few times a year.   Forty-six percent of the 50 to 54 age group indicated that they never visit stores. This is much higher than the other age groups. No relationship was found between age and visiting a store for support purposes.

Visiting stores for transactional purposes is higher for all age groups. Fifty-nine percent of the respondents indicated that they visit a store for transactional purposes. Thirty-three percent indicated that they visit a store only a few times a year. The 35 to 44 age group is the highest user of a store with 67% indicating that they visit a store to perform transactions. Fifty-three percent of the 45 to 49 age group indicated that they never visit a store for transactional purposes.

The results show that usage of stores for transactional purposes was still high for all age groups. The Likelihood Ratio therefore did not indicate any relationship between specific age groups and using the store for transactions.

Table 11 summarises the associations that were found between the various channels and age.   The data showed that the channels that facilitate SS without the assistance of a call centre or store agent were likely to be influenced by age in general. Where technology facilitated contact with humans or where contact was face to face, age was not a deciding factor.

Age plays a role in SSIS adoption. With some channels it plays a more significant role in adoption than in others.

Table 12: Associations between age, SSIS and channel adoption[45]

Information system	Channel	Chi-Square Value	DF	P value (Likelihood Ratio)
Customers make use of hardware and	Support: USSD are associated	61.486	28	**0.00026**

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[45] Two sided tests were run. P-values highlighted in bold indicates significant associations.

Information system	Channel	Chi-Square Value	DF	P value (Likelihood Ratio)
software to obtain information or products and services. (Self-Service)	Transact: USSD	61.3447	28	**0.00027**
	Support: SMS	49.6415	28	**0.00709**
	Transact: SMS	42.0524	28	**0.04287**
	Support: Mobi site	44.4591	21	**0.00204**
	Transact: Mobi site	26.621	14	**0.02156**
	Support: Mobile app	40.5682	21	**0.00634**
	Transact: Mobile app	26.2631	21	0.19659
	Support: Website	64.8962	21	**0**
	Transact: Website	30.924	14	**0.00568**
Customers interact with hardware and software to get to agent who can assist with information or provisioning of products and services.	Support: Call Centre	23.1315	14	0.05816
	Transact: Call Centre	23.1946	14	0.05718
	Support: e-mail	20.8002	21	0.4712
	Transact: e-mail	26.6223	14	**0.02155**
	Support: Web chat	15.5423	14	0.34212
	Transact: Web chat	14.4387	7	**0.04391**
Customer interacts with agent face to face to obtain information or for provisioning of products and services.	Support: Store	29.2986	21	0.10702
	Transact: Store	20.049	21	0.51816

Education

Figure 2 indicates the level of education of the respondents.   The majority of the respondents have at least completed high school. The distribution below corresponds strongly with the distribution in Root's (2013) study referred to in Chapter three.

Figure 13: Level of education of respondents
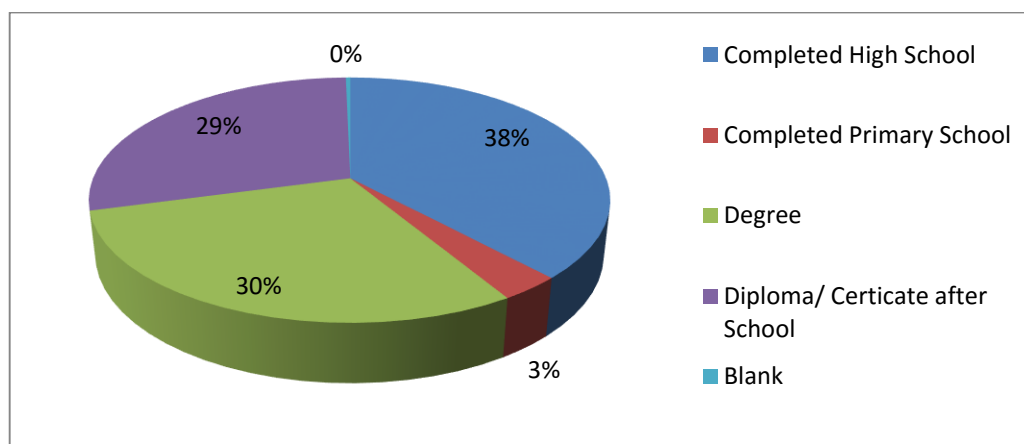
The table below summarises the findings in terms of frequency of use of the various channels for support and transactional purposes in relation to the respondents' level of education. Overall, USSD is the most popular channel of all respondents for support and transactional purposes. Going to a store for support with purchasing products and services is the second most popular channel for all levels of education. Web chat is the least favourable channel.

Table 13: The frequency of usage of different support and transactional channels in relation to level of education

Variables		Never	A few times a year	Once a month	A few times a week	Once a week	Total
Support: USSD	Completed Primary School	40.00%	30.00%	10.00%	10.00%	10.00%	100.00%
	Completed High School	25.00%	19.83%	25.86%	23.28%	6.03%	100.00%
	Diploma/ Certificate after School	29.55%	19.32%	21.59%	27.27%	2.27%	100.00%
	Degree	25.84%	11.24%	34.83%	8.99%	19.10%	100.00%
	Total	**27.06%**	**17.49%**	**26.73%**	**19.80%**	**8.91%**	**100.00%**
Transact: USSD	Completed Primary School	40.00%	10.00%	0.00%	50.00%	0.00%	100.00%
	Completed High School	30.17%	12.07%	25.86%	20.69%	11.21%	100.00%
	Diploma/ Certificate after School	40.91%	12.50%	23.86%	17.05%	5.68%	100.00%
	Degree	46.67%	10.00%	28.89%	8.89%	5.56%	100.00%
	Total	**38.49%**	**11.51%**	**25.33%**	**17.11%**	**7.57%**	**100.00%**
Support: SMS	Completed Primary School	50.00%	20.00%	0.00%	0.00%	30.00%	100.00%
	Completed High School	50.43%	15.65%	13.04%	16.52%	4.35%	100.00%
	Diploma/ Certificate after School	62.50%	12.50%	9.09%	10.23%	5.68%	100.00%
	Degree	63.33%	10.00%	7.78%	8.89%	10.00%	100.00%
	Total	**57.76%**	**13.20%**	**9.90%**	**11.88%**	**7.26%**	**100.00%**
Transact: SMS	Completed Primary School	30.00%	0.00%	30.00%	10.00%	30.00%	100.00%
	Completed High School	64.66%	14.66%	9.48%	9.48%	1.72%	100.00%
	Diploma/ Certificate after School	70.45%	7.95%	10.23%	9.09%	2.27%	100.00%
	Degree	74.44%	10.00%	8.89%	2.22%	4.44%	100.00%
	Total	**68.09%**	**10.86%**	**10.20%**	**7.24%**	**3.62%**	**100.00%**
Support: Call centre	Completed Primary School	70.00%	10.00%	20.00%			100.00%
	Completed High School	48.28%	37.93%	13.79%			100.00%
	Diploma/ Certificate after School	42.53%	40.23%	17.24%			100.00%
	Degree	45.56%	37.78%	16.67%			100.00%
	Total	**46.53%**	**37.62%**	**15.84%**			**100.00%**
Transact: Call centre	Completed Primary School	70.00%	10.00%	20.00%			100.00%
	Completed High School	70.69%	17.24%	12.07%			100.00%
	Diploma/ Certificate after School	72.73%	17.05%	10.23%			100.00%
	Degree	71.11%	14.44%	14.44%			100.00%
	Total	**71.38%**	**16.12%**	**12.50%**			**100.00%**
Support: Mobi site	Completed Primary School	80.00%	10.00%	0.00%	10.00%		100.00%
	Completed High School	66.38%	13.79%	11.21%	8.62%		100.00%
	Diploma/ Certificate after School	78.41%	7.95%	6.82%	6.82%		100.00%
	Degree	75.56%	11.11%	8.89%	4.44%		100.00%
	Total	**73.03%**	**11.18%**	**8.88%**	**6.91%**		**100.00%**

Variables		Never	A few times a year	Once a month	A few times a week	Once a week	Total
Transact: Mobi site	Completed Primary School	80.00%	10.00%	10.00%			100.00%
	Completed High School	76.72%	12.07%	11.21%			100.00%
	Diploma/ Certificate after School	87.50%	7.95%	4.55%			100.00%
	Degree	84.44%	6.67%	8.89%			100.00%
	Total	**82.24%**	**9.21%**	**8.55%**			**100.00%**
Support: Mobile app	Completed Primary School	80.00%	0.00%	20.00%	0.00%		100.00%
	Completed High School	75.65%	9.57%	2.61%	12.17%		100.00%
	Diploma/ Certificate after School	71.59%	11.36%	5.68%	11.36%		100.00%
	Degree	73.33%	10.00%	4.44%	12.22%		100.00%
	Total	**73.93%**	**9.90%**	**4.62%**	**11.55%**		**100.00%**
Transact: Mobile app	Completed Primary School	80.00%	0.00%	10.00%	10.00%		100.00%
	Completed High School	76.72%	11.21%	6.03%	6.03%		100.00%
	Diploma/ Certificate after School	72.73%	11.36%	12.50%	3.41%		100.00%
	Degree	78.89%	7.78%	6.67%	6.67%		100.00%
	Total	**76.32%**	**9.87%**	**8.22%**	**5.59%**		**100.00%**
Support: Store	Completed Primary School	70.00%	30.00%	0.00%	0.00%		100.00%
	Completed High School	32.46%	50.88%	12.28%	4.39%		100.00%
	Diploma/ Certificate after School	27.27%	45.45%	21.59%	5.68%		100.00%
	Degree	31.11%	51.11%	14.44%	3.33%		100.00%
	Total	**31.79%**	**48.68%**	**15.23%**	**4.30%**		**100.00%**
Transact: Store	Completed Primary School	80.00%	0.00%	10.00%	10.00%		100.00%
	Completed High School	41.74%	31.30%	21.74%	5.22%		100.00%
	Diploma/ Certificate after School	35.23%	36.36%	19.32%	9.09%		100.00%
	Degree	40.00%	37.78%	21.11%	1.11%		100.00%
	Total	**40.59%**	**33.66%**	**20.46%**	**5.28%**		**100.00%**
Support: Website	Completed Primary School	90.00%	0.00%	0.00%	10.00%		100.00%
	Completed High School	65.52%	18.97%	8.62%	6.90%		100.00%
	Diploma/ Certificate after School	57.95%	26.14%	15.91%	0.00%		100.00%
	Degree	52.22%	32.22%	10.00%	5.56%		100.00%
	Total	**60.20%**	**24.34%**	**10.86%**	**4.61%**		**100.00%**
Transact: Website	Completed Primary School	80.00%	10.00%	10.00%			100.00%
	Completed High School	77.59%	11.21%	11.21%			100.00%
	Diploma/ Certificate after School	73.86%	19.32%	6.82%			100.00%
	Degree	73.33%	15.56%	11.11%			100.00%
	Total	**75.33%**	**14.80%**	**9.87%**			**100.00%**

Variables		Never	A few times a year	Once a month	A few times a week	Once a week	Total
Support: e-mail	Completed Primary School	100.00%	0.00%	0.00%	0.00%		100.00%
	Completed High School	77.59%	8.62%	2.59%	11.21%		100.00%
	Diploma/ Certificate after School	76.14%	7.95%	4.55%	11.36%		100.00%
	Degree	76.67%	13.33%	3.33%	6.67%		100.00%
	Total	**77.63%**	**9.54%**	**3.29%**	**9.54%**		**100.00%**
Transact: e-mail	Completed Primary School	90.00%	0.00%	10.00%			100.00%
	Completed High School	86.21%	4.31%	9.48%			100.00%
	Diploma/ Certificate after School	89.77%	4.55%	5.68%			100.00%
	Degree	92.22%	4.44%	3.33%			100.00%
	Total	**89.14%**	**4.28%**	**6.58%**			**100.00%**
Support: Web chat	Completed Primary School	90.00%	0.00%	10.00%			100.00%
	Completed High School	86.21%	6.03%	7.76%			100.00%
	Diploma/ Certificate after School	90.91%	3.41%	5.68%			100.00%
	Degree	94.44%	1.11%	4.44%			100.00%
	Total	**90.13%**	**3.62%**	**6.25%**			**100.00%**
Transact: Web chat	Completed Primary School	80.00%	20.00%				100.00%
	Completed High School	92.11%	7.89%				100.00%
	Diploma/ Certificate after School	95.45%	4.55%				100.00%
	Degree	94.44%	5.56%				100.00%
	Total	**93.38%**	**6.62%**				**100.00%**

USSD

Use of USSD for support purposes is most popular among respondents who completed high school with the majority indicating that they use it at least once a month. Forty percent of those who indicated that they completed primary school indicated that they never use USSD for support purposes. This is the largest group of non-users of this channel.

In terms of using USSD for transactional purposes, the matriculants are yet again the highest users of the service (70%), but this time, the graduates are the largest group of non-users for this channel and service (47%).

The data analysis shows a strong association between education and USSD use for support purposes and a moderate association between education and USSD use for transactional purposes.

SMS

Fifty-eight percent of the respondent population indicated that they never use SMS for support purposes. The group with the highest number of adopters are those that completed primary school

(50%). Thirty percent of this group indicated that they use the service at least once a week. The lowest adopters are the graduates with 63% of the group indicating that they never use SMS for support purposes.

The results are similar in terms of SMS usage for transactional purposes. Those who completed primary school are more eager to use SMS (70%) and the graduates are the least likely to use SMS (74%).

The Likelihood Ratio does not indicate an association between education and SMS usage for support purposes, but indicates a moderate association between education and SMS usage for transactional purposes.

Call centre

The call centre is most popular amongst those who completed a diploma or certificate after school with a 57% usage rate for support purposes. Seventy percent of the group who completed primary school indicated that they never use the call centre for support purposes.

The trend is slightly different for use of a call centre for transactional purposes. Those who completed primary school were the highest users although it is only 30% of the particular educational group. Those who completed a diploma or certificate after school are the least likely to use the call centre (73%).

The analysed data shows that level of education does not influence call centre use for support or transactional purposes.

Mobi site

This is not a popular channel amongst the respondents (73%). In terms of using mobi site for support purposes, 34% is the highest usage rate with those who completed high school. Those who completed primary school indicated that they are least likely to use mobi site.

Using mobi site for transactional purposes is even less likely. 82% of the respondents indicated that they never use this channel. Due to the low numbers, some frequency categories had to be combined to provide meaningful statistics. The group that completed high school is still the highest users of this channel, although only 23% indicated that they sometimes use the service for transactional purposes. The primary school completers are still the group least likely to use this channel.

The Likelihood Ratio does not indicate any association between education and mobi site usage for support or transactional purposes.

Mobile app

The mobile app is not very popular for support or transactional purposes. In both cases, those who completed a diploma or certificate are more likely to use the service (28% for support and 27% for transacting), it still is a very small portion of the group. Overall, 76% of the sample population indicated

that they never use the mobile app for transactional purposes and 74% of the sample never uses this channel for support purposes.

As was the case with the mobi site, no link could be statistically established between education and mobile app usage.

Store

Visiting the store is still a popular choice amongst respondents. This channel is the most popular with those who completed a diploma or certificate (73% for support purposes, and 65% for transactional purposes). In both cases, the group who only completed primary school indicated that they do not prefer visiting the store (70% for support and 80% for transactional purposes).

A moderate association is found between education and visiting the store for transactional purposes, but no link is indicated for visiting the store for support purposes.

Website

The website functionality is more popular for support (40%) than for transactional purposes (25%). The graduates indicated that they are more likely to use this channel (support: 48%, and transact: 27%). Those who completed their certificates or diplomas after school, are a close second when it comes to adoption of this channel. As with mobi site usage, the group who completed primary school is very unlikely to use this channel (support: 90%, and transact: 80%).

Level of education can only be linked to website use for support, but not for transactional purposes.

E-mail

Usage of this channel is fairly low, especially for transactional purposes. In terms of adoption for support purposes, the group with diplomas or certificates indicated that they are more likely to use this channel, although only 24% of the group indicated use from time to time. Ninety percent of the primary school group indicated that they never use this channel.

The graduates indicated that they are the least likely to use e-mail (92%), and the high school group is most likely (14%) to use e-mail, although the numbers are very low.

Overall, 89% of the sample population indicated that they do not use this channel for transactional purposes, and 78% of the sample population indicated that they do not use this channel for support purposes.

Due to the fact that e-mail is not a popular channel for transactional or support purposes, the Likelihood Ratio does not indicate any association between education and this channel.

Web chat

Web chat is the least favourable of all the channels. With a very low rate of 14%, the matriculants are the highest users of web chat for support purposes. Surprisingly, those who completed primary school are most likely to use this channel for transactional purposes (20%). The graduates are the least likely

to use this channel (94%) for support purposes, and the group with a certificate or diploma are the least likely to use this channel for transactional purposes (95%). More than 90% of the sample population indicated that they do not use this channel for support or transactional purposes. Various factors can contribute to this finding, but the survey does not explore the reasons for the respondents' choices. This channel is a fairly recent addition in the South African context, and may not be as familiar to the respondents as the other channels.

As is the case with e-mail usage, as a result of the low usage of this channel, no association is found between level of education and web chat usage.

Table 13 summarises the associations that are found between the various channels and levels of education. It also highlights potential associations with SSISs.   A very limited association could be found between level of education and the respondents' preferred channels. Most of the associations are with channels that facilitate SS without the assistance of a call centre or store agent.

Where technology facilitates contact with humans, or where contact is face to face, the level of education plays almost no role.

According to the findings, the level of education does not play a role in SSIS adoption, but only plays a role in the adoption of some channels. Those channels are mainly associated with SSIS.

Table 14: Associations between level of education, SSIS and channel adoption[46]

Information system	Channel	Chi-Square Value	DF	P value (Likelihood Ratio)
Customers make use of hardware and software to obtain information or products and services. (SS)	Support: USSD	34.1565	12	**0.00064**
	Transact: USSD	23.2935	12	**0.02534**
	Support: SMS	19.028	12	0.08786
	Transact: SMS	25.6308	12	**0.0121**
	Support: Mobi site	7.163	9	0.62016
	Transact: Mobi site	5.4897	6	0.48271
	Support: Mobile app	8.9136	9	0.44528
	Transact: Mobile app	7.1623	9	0.62023
	Support: Website	25.9387	9	**0.00209**
	Transact: Website	3.8697	6	0.69431
Customers interact with hardware and software to get to agent who can assist with information or provisioning of products and services.	Support: Call Centre	5.0218	6	0.54101
	Transact: Call Centre	1.644	6	0.94936
	Support: e-mail	8.7049	9	0.46495
	Transact: e-mail	4.424	6	0.61949
	Support: Web chat	5.9829	6	0.42511
	Transact: Web chat	3.0891	3	0.37809
Customer interacts with Agent face to face to obtain information or for provisioning of products and services.	Support: Store	12.5508	9	0.18401
	Transact: Store	18.7535	9	**0.02737**

Gender

The survey population consists of 60% females (see figure 14 below), which corresponds with the Roots (2013) study referred to in chapter three.

Figure 14: Gender of respondents

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[46] Two sided tests were run. P-values highlighted in bold indicates significant associations.

Gender distribution of respondents

40%

60%
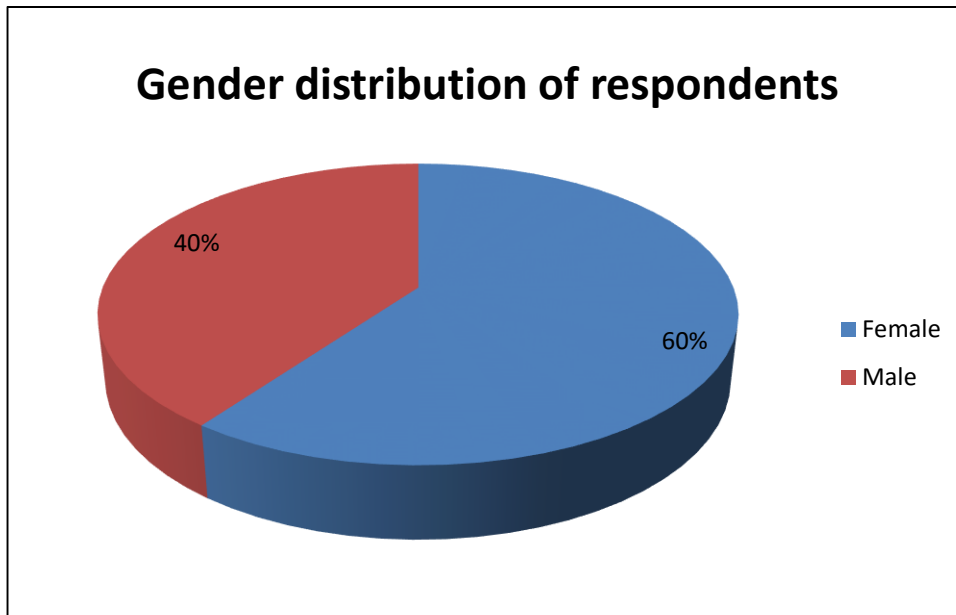
■ Female
■ Male

The table below summarises the findings on usage frequency of the various channels for support and transactional purposes in relation to the respondents' gender. No major differences in preferences are noted between males and females.

Table 15: The frequency of usage of different support and transactional channels in relation to gender

Variables		Never	A few times a year	Once a month	Few times a week	Once a week	Total
Support: USSD	Female	28.42%	21.31%	22.40%	20.22%	7.65%	100.00%
	Male	24.79%	11.57%	33.06%	19.83%	10.74%	100.00%
	Total	**26.97%**	**17.43%**	**26.64%**	**20.07%**	**8.88%**	**100.00%**
Transact: USSD	Female	39.89%	12.57%	22.40%	16.94%	8.20%	100.00%
	Male	36.89%	9.84%	29.51%	17.21%	6.56%	100.00%
	Total	**38.69%**	**11.48%**	**25.25%**	**17.05%**	**7.54%**	**100.00%**
Support: SMS	Female	57.69%	14.29%	9.34%	11.54%	7.14%	100.00%
	Male	57.38%	11.48%	10.66%	13.11%	7.38%	100.00%
	Total	**57.57%**	**13.16%**	**9.87%**	**12.17%**	**7.24%**	**100.00%**
Transact: SMS	Female	67.21%	10.38%	9.29%	8.20%	4.92%	100.00%
	Male	68.85%	11.48%	11.48%	6.56%	1.64%	100.00%
	Total	**67.87%**	**10.82%**	**10.16%**	**7.54%**	**3.61%**	**100.00%**
Support: Call centre	Female	44.51%	41.21%	14.29%			100.00%
	Male	49.18%	32.79%	18.03%			100.00%
	Total	**46.38%**	**37.83%**	**15.79%**			**100.00%**
Transact: Call centre	Female	73.22%	16.39%	10.38%			100.00%
	Male	68.03%	16.39%	15.57%			100.00%
	Total	**71.15%**	**16.39%**	**12.46%**			**100.00%**
Support: Mobi site	Female	73.22%	12.57%	7.65%	6.56%		100.00%
	Male	72.13%	9.02%	10.66%	8.20%		100.00%
	Total	**72.79%**	**11.15%**	**8.85%**	**7.21%**		**100.00%**
Transact: Mobi site	Female	83.06%	9.29%	7.65%			100.00%
	Male	80.33%	9.84%	9.84%			100.00%
	Total	**81.97%**	**9.51%**	**8.52%**			**100.00%**
Support: Mobile app	Female	74.73%	10.44%	4.40%	10.44%		100.00%
	Male	72.13%	9.02%	4.92%	13.93%		100.00%
	Total	**73.68%**	**9.87%**	**4.61%**	**11.84%**		**100.00%**
Transact: Mobile app	Female	75.41%	10.38%	9.29%	4.92%		100.00%
	Male	77.05%	9.02%	6.56%	7.38%		100.00%
	Total	**76.07%**	**9.84%**	**8.20%**	**5.90%**		**100.00%**
Support: Store	Female	31.87%	50.55%	13.74%	3.85%		100.00%
	Male	31.40%	46.28%	17.36%	4.96%		100.00%
	Total	**31.68%**	**48.84%**	**15.18%**	**4.29%**		**100.00%**
Transact: Store	Female	40.66%	34.62%	18.68%	6.04%		100.00%
	Male	40.16%	32.79%	22.95%	4.10%		100.00%
	Total	**40.46%**	**33.88%**	**20.39%**	**5.26%**		**100.00%**
Support: Website	Female	59.02%	26.78%	10.38%	3.83%		100.00%
	Male	61.48%	21.31%	11.48%	5.74%		100.00%
	Total	**60.00%**	**24.59%**	**10.82%**	**4.59%**		**100.00%**
Transact: Website	Female	73.22%	18.03%	8.74%			100.00%
	Male	77.87%	10.66%	11.48%			100.00%
	Total	**75.08%**	**15.08%**	**9.84%**			**100.00%**
Support: e-mail	Female	78.69%	9.29%	3.83%	8.20%		100.00%
	Male	76.23%	9.84%	2.46%	11.48%		100.00%
	Total	**77.70%**	**9.51%**	**3.28%**	**9.51%**		**100.00%**
Transact: e-mail	Female	88.52%	6.01%	5.46%			100.00%
	Male	90.16%	1.64%	8.20%			100.00%
	Total	**89.18%**	**4.26%**	**6.56%**			**100.00%**
Support: Web chat	Female	91.26%	3.28%	5.46%			100.00%
	Male	87.70%	4.10%	8.20%			100.00%
	Total	**89.84%**	**3.61%**	**6.56%**			**100.00%**
Transact: Web chat	Female	93.92%	6.08%				100.00%
	Male	91.80%	8.20%				100.00%
	Total	**93.07%**	**6.93%**				**100.00%**

In this sample, females indicated that they are less likely than males to use USSD for support and transactional purposes, SMS for support, call centre for transacting, mobi site for support and transacting, mobile app for support, store visits for support and transactional purposes, e-mail for support, and web chat for support and transacting. Males indicated that they were less likely than

females to use SMS for transacting, the call centre for support, the mobile app for transacting, and the website for support and transacting. They also indicated that they are less likely to use e-mail for transactional purposes.

Channels of preference for females where indicated as USSD (Support: 72% and Transact: 60%), in-store support (68%), and transacting (59%). The male group indicated that their preferences were also USSD (Support: 75% and Transact: 63%), in-store support (69%), and transacting (60%).

Table 15 summarises the associations between the various channels and gender. It also highlights potential associations with SSISs. Statistically, no relationship between gender and channel preference could be found. Based on the data available, it does not appear as if gender determines SSIS adoption and channel usage.

**Table 16: Associations between gender, SSIS and channel adoption[47]**

Information system	Channel	Chi-Square Value	DF	P value (Likelihood Ratio)
Customers make use of hardware and software to obtain information or products and services. (SS)	Support: USSD	8.3568	4	0.07935
	Transact: USSD	2.3663	4	0.66873
	Support: SMS	0.7273	4	0.94792
	Transact: SMS	3.1433	4	0.53413
	Support: Mobi site	1.8653	3	0.60083
	Transact: Mobi site	0.4942	2	0.78108
	Support: Mobile app	1.0029	3	0.80054
	Transact: Mobile app	1.5862	3	0.66253
	Support: Website	1.6296	3	0.6527
	Transact: Website	3.5179	2	0.17223
Customers interact with hardware and software to get to agent who can assist with information or provisioning of products and services.	Support: Call Centre	2.3759	2	0.30485
	Transact: Call Centre	1.8299	2	0.40053
	Support: e-mail	1.3249	3	0.72324
	Transact: e-mail	4.5794	2	0.1013
	Support: Web chat	1.0541	2	0.59034
	Transact: Web chat	0.5001	1	0.47945
Customer interacts with Agent face to face to obtain information or for provisioning of products and services.	Support: Store	1.103	3	0.77636
	Transact: Store	1.2636	3	0.73778

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[47] Two sided tests were run. P-values highlighted in bold indicates significant associations

Income

The section below focuses on the question whether a link exists between income and SSIS adoption or channel preference. The original hypothesis is that level of income will influence SSIS adoption and channels used.   The various income groups are fairly well represented, and no group dominated.

Figure 15: Income distribution of respondents
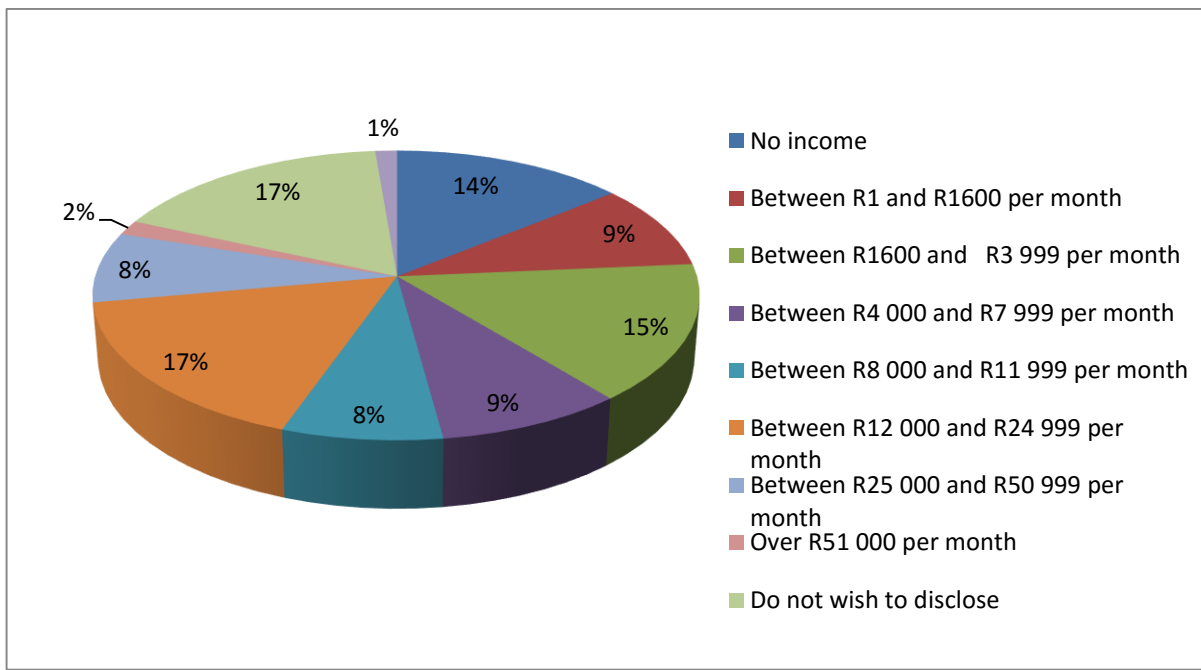
The table below summarises the findings on usage frequency of the various channels for support and transactional purposes in relation to the respondents' level of income. The various income groups show slight differences in preferences, but, statistically, no meaningful relationship could be found between level of income and channels used. The same applied for SSIS adoption. No statistically meaningful relationship could be found.

Table 17: The frequency of usage of different support and transactional channels in relation to level of income

Variables		Never	A few times a year	Once a month	Few times a week	Once a week	Total
Support: USSD	No income	20.93%	20.93%	25.58%	23.26%	9.30%	100.00%
	R 1 to R1600	13.79%	13.79%	37.93%	24.14%	10.34%	100.00%
	R 1600 to R 3 999	14.89%	19.15%	40.43%	21.28%	4.26%	100.00%
	R 4 000 to R7 999	23.08%	11.54%	30.77%	26.92%	7.69%	100.00%
	R 8 000 to R11 999	17.39%	8.70%	21.74%	43.48%	8.70%	100.00%
	R12 000 to R24 999	39.22%	23.53%	13.73%	11.76%	11.76%	100.00%
	R25 000 and more	37.93%	10.34%	17.24%	20.69%	13.79%	100.00%
	*Unwilling to disclose	36.54%	19.23%	28.85%	7.69%	7.69%	100.00%
	*Other	50.00%	25.00%	0.00%	25.00%	0.00%	100.00%
	Total	**26.97%**	**17.43%**	**26.64%**	**20.07%**	**8.88%**	**100.00%**
Transact: USSD	No income	34.88%	11.63%	23.26%	16.28%	13.95%	100.00%
	R 1 to R1600	27.59%	13.79%	34.48%	17.24%	6.90%	100.00%
	R 1600 to R 3 999	25.53%	8.51%	36.17%	25.53%	4.26%	100.00%
	R 4 000 to R7 999	22.22%	11.11%	37.04%	18.52%	11.11%	100.00%
	R 8 000 to R11 999	34.78%	0.00%	26.09%	30.43%	8.70%	100.00%
	R12 000 to R24 999	39.22%	21.57%	25.49%	5.88%	7.84%	100.00%
	R25 000 and more	58.62%	10.34%	17.24%	6.90%	6.90%	100.00%
	*Unwilling to disclose	57.69%	9.62%	9.62%	19.23%	3.85%	100.00%
	*Other	50.00%	0.00%	25.00%	25.00%	0.00%	100.00%
	Total	**38.69%**	**11.48%**	**25.25%**	**17.05%**	**7.54%**	**100.00%**
Support: SMS	No income	55.81%	13.95%	13.95%	13.95%	2.33%	100.00%
	R 1 to R1600	55.17%	17.24%	6.90%	10.34%	10.34%	100.00%
	R 1600 to R 3 999	48.94%	17.02%	14.89%	17.02%	2.13%	100.00%
	R 4 000 to R7 999	57.69%	19.23%	7.69%	11.54%	3.85%	100.00%
	R 8 000 to R11 999	43.48%	13.04%	8.70%	26.09%	8.70%	100.00%
	R12 000 to R24 999	60.78%	13.73%	9.80%	9.80%	5.88%	100.00%
	R25 000 and more	62.07%	10.34%	0.00%	10.34%	17.24%	100.00%
	*Unwilling to disclose	69.23%	3.85%	9.62%	5.77%	11.54%	100.00%
	*Other	50.00%	25.00%	25.00%	0.00%	0.00%	100.00%
	Total	**57.57%**	**13.16%**	**9.87%**	**12.17%**	**7.24%**	**100.00%**
Transact: SMS	No income	69.77%	9.30%	11.63%	6.98%	2.33%	100.00%
	R 1 to R1600	72.41%	10.34%	6.90%	6.90%	3.45%	100.00%
	R 1600 to R 3 999	68.09%	12.77%	10.64%	4.26%	4.26%	100.00%
	R 4 000 to R7 999	55.56%	11.11%	11.11%	18.52%	3.70%	100.00%
	R 8 000 to R11 999	56.52%	13.04%	21.74%	8.70%	0.00%	100.00%
	R12 000 to R24 999	66.67%	11.76%	7.84%	7.84%	5.88%	100.00%
	R25 000 and more	72.41%	10.34%	6.90%	6.90%	3.45%	100.00%

Variables		Never	A few times a year	Once a month	Few times a week	Once a week	Total
	*Unwilling to disclose	73.08%	7.69%	9.62%	5.77%	3.85%	100.00%
	*Other	75.00%	25.00%	0.00%	0.00%	0.00%	100.00%
	Total	**67.87%**	**10.82%**	**10.16%**	**7.54%**	**3.61%**	**100.00%**
Support: Call centre	No income	41.86%	48.84%	9.30%			100.00%
	R 1 to R1600	55.17%	31.03%	13.79%			100.00%
	R 1600 to R 3 999	57.45%	21.28%	21.28%			100.00%
	R 4 000 to R7 999	33.33%	33.33%	33.33%			100.00%
	R 8 000 to R11 999	47.83%	34.78%	17.39%			100.00%
	R12 000 to R24 999	23.53%	58.82%	17.65%			100.00%
	R25 000 and more	27.59%	58.62%	13.79%			100.00%
	*Unwilling to disclose	73.08%	19.23%	7.69%			100.00%
	*Other	66.67%	33.33%	0.00%			100.00%
	Total	**46.38%**	**37.83%**	**15.79%**			**100.00%**
Transact: Call centre	No income	69.77%	20.93%	9.30%			100.00%
	R 1 to R1600	68.97%	13.79%	17.24%			100.00%
	R 1600 to R 3 999	80.85%	8.51%	10.64%			100.00%
	R 4 000 to R7 999	66.67%	11.11%	22.22%			100.00%
	R 8 000 to R11 999	60.87%	26.09%	13.04%			100.00%
	R12 000 to R24 999	64.71%	27.45%	7.84%			100.00%
	R25 000 and more	55.17%	24.14%	20.69%			100.00%
	*Unwilling to disclose	84.62%	5.77%	9.62%			100.00%
	*Other	100.00%	0.00%	0.00%			100.00%
	Total	**71.15%**	**16.39%**	**12.46%**			**100.00%**
Support: Mobi site	No income	69.77%	9.30%	16.28%	4.65%		100.00%
	R 1 to R1600	68.97%	20.69%	3.45%	6.90%		100.00%
	R 1600 to R 3 999	68.09%	8.51%	14.89%	8.51%		100.00%
	R 4 000 to R7 999	59.26%	11.11%	18.52%	11.11%		100.00%
	R 8 000 to R11 999	73.91%	8.70%	4.35%	13.04%		100.00%
	R12 000 to R24 999	74.51%	11.76%	3.92%	9.80%		100.00%
	R25 000 and more	65.52%	20.69%	10.34%	3.45%		100.00%
	*Unwilling to disclose	90.38%	3.85%	1.92%	3.85%		100.00%
	*Other	75.00%	25.00%	0.00%	0.00%		100.00%
	Total	**72.79%**	**11.15%**	**8.85%**	**7.21%**		**100.00%**
Transact: Mobi site	No income	81.40%	11.63%	6.98%			100.00%
	R 1 to R1600	79.31%	10.34%	10.34%			100.00%
	R 1600 to R 3 999	72.34%	12.77%	14.89%			100.00%
	R 4 000 to R7 999	74.07%	7.41%	18.52%			100.00%
	R 8 000 to R11 999	82.61%	8.70%	8.70%			100.00%
	R12 000 to R24 999	84.31%	5.88%	9.80%			100.00%

Variables		Never	A few times a year	Once a month	Few times a week	Once a week	Total
	R25 000 and more	79.31%	17.24%	3.45%			100.00%
	*Unwilling to disclose	96.15%	3.85%	0.00%			100.00%
	*Other	75.00%	25.00%	0.00%			100.00%
	Total	**81.97%**	**9.51%**	**8.52%**			**100.00%**
Support: Mobile app	No income	76.19%	9.52%	4.76%	9.52%		100.00%
	R 1 to R1600	75.86%	10.34%	0.00%	13.79%		100.00%
	R 1600 to R 3 999	72.34%	4.26%	8.51%	14.89%		100.00%
	R 4 000 to R7 999	77.78%	3.70%	0.00%	18.52%		100.00%
	R 8 000 to R11 999	82.61%	4.35%	4.35%	8.70%		100.00%
	R12 000 to R24 999	64.71%	17.65%	3.92%	13.73%		100.00%
	R25 000 and more	65.52%	6.90%	13.79%	13.79%		100.00%
	*Unwilling to disclose	82.69%	9.62%	1.92%	5.77%		100.00%
	*Other	25.00%	75.00%	0.00%	0.00%		100.00%
	Total	**73.68%**	**9.87%**	**4.61%**	**11.84%**		**100.00%**
Transact: Mobile app	No income	76.74%	9.30%	6.98%	6.98%		100.00%
	R 1 to R1600	75.86%	13.79%	6.90%	3.45%		100.00%
	R 1600 to R 3 999	74.47%	6.38%	8.51%	10.64%		100.00%
	R 4 000 to R7 999	77.78%	11.11%	7.41%	3.70%		100.00%
	R 8 000 to R11 999	82.61%	0.00%	13.04%	4.35%		100.00%
	R12 000 to R24 999	64.71%	17.65%	9.80%	7.84%		100.00%
	R25 000 and more	75.86%	17.24%	3.45%	3.45%		100.00%
	*Unwilling to disclose	84.62%	1.92%	9.62%	3.85%		100.00%
	*Other	75.00%	25.00%	0.00%	0.00%		100.00%
	Total	**76.07%**	**9.84%**	**8.20%**	**5.90%**		**100.00%**
Support: Store	No income	30.23%	60.47%	9.30%	0.00%		100.00%
	R 1 to R1600	28.57%	46.43%	21.43%	3.57%		100.00%
	R 1600 to R 3 999	31.91%	42.55%	19.15%	6.38%		100.00%
	R 4 000 to R7 999	40.74%	40.74%	14.81%	3.70%		100.00%
	R 8 000 to R11 999	43.48%	30.43%	17.39%	8.70%		100.00%
	R12 000 to R24 999	16.00%	64.00%	14.00%	6.00%		100.00%
	R25 000 and more	27.59%	51.72%	13.79%	6.90%		100.00%
	*Unwilling to disclose	42.31%	40.38%	15.38%	1.92%		100.00%
	*Other	25.00%	75.00%	0.00%	0.00%		100.00%
	Total	**31.68%**	**48.84%**	**15.18%**	**4.29%**		**100.00%**
Transact: Store	No income	42.86%	40.48%	14.29%	2.38%		100.00%
	R 1 to R1600	31.03%	27.59%	27.59%	13.79%		100.00%
	R 1600 to R 3 999	42.55%	19.15%	34.04%	4.26%		100.00%
	R 4 000 to R7 999	33.33%	33.33%	25.93%	7.41%		100.00%
	R 8 000 to R11 999	52.17%	34.78%	8.70%	4.35%		100.00%

Variables			Never	A few times a year	Once a month	Few times a week	Once a week	Total
	R12 000 to R24 999		31.37%	45.10%	17.65%	5.88%		100.00%
	R25 000 and more		34.48%	41.38%	24.14%	0.00%		100.00%
	*Unwilling to disclose		53.85%	28.85%	13.46%	3.85%		100.00%
	*Other		25.00%	50.00%	0.00%	25.00%		100.00%
	Total		**40.46%**	**33.88%**	**20.39%**	**5.26%**		**100.00%**
Support: Website	No income		65.12%	23.26%	9.30%	2.33%		100.00%
	R 1 to R1600		55.17%	20.69%	17.24%	6.90%		100.00%
	R 1600 to R 3 999		68.09%	17.02%	8.51%	6.38%		100.00%
	R 4 000 to R7 999		44.44%	44.44%	11.11%	0.00%		100.00%
	R 8 000 to R11 999		47.83%	26.09%	26.09%	0.00%		100.00%
	R12 000 to R24 999		52.94%	31.37%	7.84%	7.84%		100.00%
	R25 000 and more		55.17%	24.14%	13.79%	6.90%		100.00%
	*Unwilling to disclose		73.08%	17.31%	5.77%	3.85%		100.00%
	*Other		75.00%	25.00%	0.00%	0.00%		100.00%
	Total		**60.00%**	**24.59%**	**10.82%**	**4.59%**		**100.00%**
Transact: Website	No income		81.40%	11.63%	6.98%			100.00%
	R 1 to R1600		72.41%	13.79%	13.79%			100.00%
	R 1600 to R 3 999		78.72%	10.64%	10.64%			100.00%
	R 4 000 to R7 999		62.96%	14.81%	22.22%			100.00%
	R 8 000 to R11 999		65.22%	26.09%	8.70%			100.00%
	R12 000 to R24 999		76.47%	19.61%	3.92%			100.00%
	R25 000 and more		68.97%	24.14%	6.90%			100.00%
	*Unwilling to disclose		80.77%	7.69%	11.54%			100.00%
	*Other		75.00%	25.00%	0.00%			100.00%
	Total		**75.08%**	**15.08%**	**9.84%**			**100.00%**
Support: e-mail	No income		81.40%	6.98%	2.33%	9.30%		100.00%
	R 1 to R1600		79.31%	10.34%	3.45%	6.90%		100.00%
	R 1600 to R 3 999		78.72%	6.38%	2.13%	12.77%		100.00%
	R 4 000 to R7 999		77.78%	11.11%	3.70%	7.41%		100.00%
	R 8 000 to R11 999		73.91%	4.35%	8.70%	13.04%		100.00%
	R12 000 to R24 999		66.67%	23.53%	1.96%	7.84%		100.00%
	R25 000 and more		65.52%	10.34%	10.34%	13.79%		100.00%
	*Unwilling to disclose		92.31%	0.00%	0.00%	7.69%		100.00%
	*Other		75.00%	25.00%	0.00%	0.00%		100.00%
	Total		**77.70%**	**9.51%**	**3.28%**	**9.51%**		**100.00%**
Transact: e-mail	No income		95.35%	2.33%	2.33%			100.00%
	R 1 to R1600		86.21%	3.45%	10.34%			100.00%
	R 1600 to R 3 999		87.23%	6.38%	6.38%			100.00%
	R 4 000 to R7 999		81.48%	7.41%	11.11%			100.00%

Variables		Never	A few times a year	Once a month	Few times a week	Once a week	Total
	R 8 000 to R11 999	91.30%	0.00%	8.70%			100.00%
	R12 000 to R24 999	86.27%	5.88%	7.84%			100.00%
	R25 000 and more	86.21%	6.90%	6.90%			100.00%
	*Unwilling to disclose	96.15%	0.00%	3.85%			100.00%
	*Other	75.00%	25.00%	0.00%			100.00%
	Total	**89.18%**	**4.26%**	**6.56%**			**100.00%**
Support: Web chat	No income	90.70%	0.00%	9.30%			100.00%
	R 1 to R1600	89.66%	3.45%	6.90%			100.00%
	R 1600 to R 3 999	91.49%	2.13%	6.38%			100.00%
	R 4 000 to R7 999	88.89%	0.00%	11.11%			100.00%
	R 8 000 to R11 999	91.30%	4.35%	4.35%			100.00%
	R12 000 to R24 999	86.27%	7.84%	5.88%			100.00%
	R25 000 and more	89.66%	3.45%	6.90%			100.00%
	*Unwilling to disclose	90.38%	5.77%	3.85%			100.00%
	*Other	100.00%	0.00%	0.00%			100.00%
	Total	**89.84%**	**3.61%**	**6.56%**			**100.00%**
Transact: Web chat	No income	95.24%	4.76%				100.00%
	R 1 to R1600	96.55%	3.45%				100.00%
	R 1600 to R 3 999	91.49%	8.51%				100.00%
	R 4 000 to R7 999	84.62%	15.38%				100.00%
	R 8 000 to R11 999	95.65%	4.35%				100.00%
	R12 000 to R24 999	94.12%	5.88%				100.00%
	R25 000 and more	89.66%	10.34%				100.00%
	*Unwilling to disclose	94.23%	5.77%				100.00%
	*Other	100.00%	0.00%				100.00%
	Total	**93.07%**	**6.93%**				**100.00%**

*These 2 categories will be excluded for reporting purposes, because they contribute no meaningful information to the results.

USSD

This channel is, yet again, a popular choice of the respondents, and indicated fairly high usage compared to other channels. The income group R1 to R1 600 (86%) appears most likely to use USSD for support purposes. Income group other (50%) indicates that they are least likely to use USSD for this purpose. This, however, is a very vague category and does not provide much usable information. Respondents of the income group R12 000 to R24 999 (39.22%) indicate that they are least likely to use this channel for this purpose. Income group R4 000 to R7 999 (78%) indicate that they are more likely to use USSD for transactional purposes, while income group R25 000 and more (59%) are least likely to use USSD for this purpose.

Although no association between level of income and USSD usage for support purposes could be found, a moderate relationship between level of income and USSD usage for transactional purposes was indicated.

SMS

The highest number of SMS users for support purposes is income group R8 000 to R11 999 at 57%. The group unwilling to disclose their income, are the least likely users at 69%. Of the groups that declared their income, the group with an income level of R25 000 and more are less willing to use the channel at 62%.   Sixty-eight percent of all respondents indicate that they never use SMS for transactional purposes. The more willing users are those in income group R4 000 to R7 999 with a proportionately low 44% usage. Income group R1 to R1600 and R25 000 and more are the least likely to use this channel at 72%.

As with USSD, no meaningful relationship between level of income and the SMS usage as channel for SS purposes could be found.

Call centre

Income group R12 000 to R24 999 indicate that they are more likely to use the call centre for support purposes, and income group R16 00 to R3 999 are least likely to call for support. Fifty-four percent of the total respondent population indicate that they were likely to use the call centre for support purposes. They were less willing to use the call centre for transactional purposes. The results for call centre usage for transactional purposes are very different. Forty-five percent of the income group R25 000 and more indicate that they will use the call centre for transactional purposes. The income group R1 600 to R3 999 that indicated they are more likely to use the call centre for support purposes, indicate that they are least likely to use the call centre for transactional purposes at 81%.

Although a strong link between level of income and call centre usage for support purposes is found, no link could be established between level of income and call centre usage for transacting purposes.

Mobi site

The mobi site is more popular for support than for transactional purposes. In this instance, income group R4 000 to R7 999 are the most frequent users at 41%.   Seventy-four comma five one percent of the income group R12 000 to R24 999 indicate that they do not use the mobi site for support purposes. The group with the highest mobi site usage for transactional purposes, is the R1 600 to R3 999 income group. Only 28% of this population sample uses the mobi site for this purpose. Eighty-four comma three one percent of the income group R12 000 to R24 999 do not use the mobi site for this purpose.

No link could statistically be found between level of income and mobi site usage for support or transacting purposes.

Mobile app

Mobile app usage per income group is generally low, with slightly higher usage for support than for transactional purposes. 35% is the highest usage number for transactional purposes (R12 000 to R24 999). The "No income" group indicate that 77% of the group never use the mobile app for transactional purposes. The income group R8 000 to R11 999 indicate that 83% of them never use the app for support purposes. The income group R12 000 to R24 999 indicate the highest support purpose usage at 35%.

Statistically, the Likelihood Ratio indicates no link between income and mobile app adoption for support or transacting purposes.

Store

The store is a more popular channel with the various age groups. 68% of the total population sample indicates that they use the store for support purposes. Transacting was slightly lower at 60% of the population sample. At 69%, income group R1 to R1 600 is more likely to use the store for transacting purposes, while income group R8 000 to R11 999, at 52.17%, is less likely to use this channel for this purpose. Income group R12 000 to R24 999 indicate that 84% of their population sample will visit the store for support purposes. Income group R8 000 to R11 999 is again less likely to use the service at 43% of their population sample.

Store visits for transactions and support could also not be linked to level of income.

Website

The website is more popular with the income group R4 000 to R7 999 for support (56%) and transacting (37%) purposes. Sixty-eight comma zero nine percent of income group R1 600 to R3 999 indicate that they never use the website for support, and 81.40% of the "No income" group indicate that they never use the website for transacting.

Web usage for support or transacting purposes is not statistically linked to level of income.

E-mail

E-mail is an unpopular channel for support and transacting. Income group "R25 000 and more" indicate that 34% of their group use e-mail for support. At 19% of the population sample, income group R4 000 to R7 999 is the highest e-mail users for transactional purposes. The group with no income indicates that 81% of the population sample do not use e-mail for support, and 95% of the population sample do not use it for transactional purposes.

Level of income is no indicator of predicted usage of this channel for support or transactional purposes.

Web chat

At 14% of the population sample, income group R12 000 to R24 999 are the main users of web chat for support purposes. At 91.49%, income group R1 600 to R3 999 is least likely to use the service. Income level R1 to R1 600 is least likely (96.55%) to use web chat for transactions, and, at 15%, the

R4 000 to R7 999 income group is more likely to use Web chat for transactions.

Due to the low adoption of this channel, and possibly also the fact that it is fairly new technology, no link is found between level of income and use of this channel.

The table below summarises the associations between the various channels and level of income, and it also highlights potential associations with SSISs. Statistically, no relationship between level of income and channel preference could be found. Level of income is a strong predictor of call centre usage for support purposes. Based on the available data, level of income does not predict choice of adopted SSISs and channels used.

Table 18: Associations between level of income, SSIS and channel adoption[48]

Information system	Channel	Chi-Square Value	DF	P value (Likelihood Ratio)
Customers make use of hardware and software to obtain information or products and services. (SS)	Support: USSD	45.6039	32	0.05629
	Transact: USSD	51.1379	32	**0.01727**
	Support: SMS	35.4164	32	0.31013
	Transact: SMS	14.8636	32	0.99576
	Support: Mobi site	30.6326	24	0.16466
	Transact: Mobi site	23.3642	16	0.10434
	Support: Mobile app	33.6882	24	0.09037
	Transact: Mobile app	23.127	24	0.51231
	Support: Website	27.0642	24	0.30147
	Transact: Website	16.1992	16	0.43915
Customers interact with hardware and software to get to agent who can assist with information or provisioning of products and services.	Support: Call Centre	49.2166	16	**0.00003**
	Transact: Call Centre	25.104	16	0.06801
	Support: e-mail	33.9966	24	0.08473
	Transact: e-mail	15.5622	16	0.48391
	Support: Web chat	10.9134	16	0.8148
	Transact: Web chat	4.8746	8	0.77089
Customer interacts with Agent face to face to obtain information or for provisioning of products and services.	Support: Store	26.0103	24	0.35264
	Transact: Store	32.5558	24	0.1138

[48] Two sided tests were run. P-values highlighted in bold indicate significant associations

Study architecture

The survey aims to determine customer choice of support and transactional services. The outcome focuses on SSIS and channel adoption. In order to eliminate a level of bias, an electronic survey was not conducted. At the very least, electronic surveys require respondents who are adopters of email or online services, in order to access the survey. Non adopters of these electronic channels would, therefore, have been excluded, with a resulting impact on the results and findings. For this reason, a paper based self-assessment technique was conducted.

The questionnaire does not only focus on technological determinants, because an emphasis on only SS options may have forced the respondents to choose one of the presented options. With a wider choice than mere technological channels (face to face contact, contact via technology, or interaction with only technology and no service agent involvement), the probabilities improve that the results are a better reflection of the respondents' true preference.

The survey consists of ten questions. Questions three and four each consist of ten channels to choose from as a response to the question. In the event that they use a channel, the respondents also have to indicate usage frequency.   The questions are a combination of closed-ended and partially open-ended type questions in order to limit the responses. Questions three, four, six, seven and nine are partially open-ended questions, since they contain the option "other" where respondents are allowed to indicate options that were not presented in the survey.

The response options chosen are based on the premise that it limits the effect of the respondents' frame of reference on the interpretation of the questions, for example, for one respondent "often" could mean once a day, and for another respondent it could mean once a week (Sandelowski; 2009). This may impact on the survey results. For this reason, the following options were chosen to indicate usage: never, a few times a year, once a month, a few times a week, and once week.

The questions and number of questions are kept as short as possible to prevent respondents becoming confused by long questions or losing interest half way through the survey (Survey research design, 2014). The questionnaire contains a cover note that explains the purpose of the study, the expectations, as well as confidentiality. The first 2 questions are screening questions to determine if the respondents are living in the Western Cape, and what type of cell phone package they own. This determines if they qualify to participate in the s. The field workers were instructed to only include cell phone users in the sample. Questions three and four focus on usage, is less threatening, and can potentially spark interest, because they are not limited to the standard demographical questions (Babbie, p266, 2010). The demographical questions appear at the end of the questionnaire, in compliance with Babbie's (2010) recommendation. The questions are spaced to assist with readability, and to ensure questions are not overlooked due to unnecessary clutter. Where frequency applies, the options are listed next to the relevant question for clarity and ease of use.

The questionnaire uses short sentences and terms associated with cellular products and services familiar to the South African population. A survey guideline was also developed to help the field workers with explaining the terminology in the questions. As far as reasonably possible, the options in the questions are illustrated by examples. Respondents may be inclined to use a particular service, e.g. *111#, but may not be familiar with the supporting technology, e.g. USSD. In each instance where USSD is presented as a possible channel, the option available at each cellular provider is presented, for the sake of clarity. The questionnaire also elaborates on monthly income, because the pilot showed that respondents do not necessarily know that they should include grants and pensions. The same was done with qualifications in order to provide clarity on the interpretation of the presented variables.

Institutional practices

A pre-survey discussion with the field workers aimed at managing sources of error. During a discussion of the questions, the field workers had an opportunity to ask questions for clarification. Each field worker received an information pack, as well as a data capture spreadsheet. They also received the contact details for the researcher and supervisor, in the event that questions are in the field or during preparation. Each field worker had to capture the data on the excel spreadsheet. The variables presented in the survey were captured on the template, and the field workers had to indicate on the spreadsheet which variables the respondents selected. Other than entering subject codes, field workers did not have to do any typing work. The data was then verified and merged into one consolidated spreadsheet used for data analysis. Although data cleansing ensured that statistical analysis is not compromised, care was taken not to amend results or introduce bias by means of the cleansing technique.

Criticism

The literature often criticises self-reporting on system usage, because the results usually represent the respondents' perception of their usage, which may differ from their actual usage. It also relies heavily on the respondents' ability to recall the time and frequency of their usage. Although this method was useful to gauge the respondents' preference of channels and SSIS, ideally the actual usage would have been most valuable to measure true adoption, and how it differs from perceived adoption. Measuring actual usage in the cellular industry is challenging, because it can be viewed as business intelligence that gives a competitive advantage to the particular providers, and they may be reluctant to release it to the public. Care should also be taken when interpreting Actual usage statistics must be carefully interpreted, because a myriad of factors exist that may influence the conclusions to be drawn from the data.

A large portion of the sample (57%) is Afrikaans speaking, and 34% is English speaking. Only 6% is Xhosa speaking, and 3% is indicated as "Other". The Xhosa speaking sample of the respondents cannot be viewed as representative of the Xhosa speaking population of the Western Cape, because census 2011 indicates that 25% of the entire Western Cape population is Xhosa speaking. The sample contains responses from only 17 (6%) Xhosa speaking respondents. For reliable inferences in respect of main languages spoken in the Western Cape, the sample of Xhosa speaking respondents should ideally have been closer to 25%. Although the research questions do not focus on language as an independent variable, it is included in the survey. Language, however, has many associated aspects not included in the scope of this study, and therefore not included in many of the discussions. The data show interesting associations noted that should be explored in future studies.

The questionnaire presents certain challenges. Studies of SS generally focus on a particular channel, i.e. Shrivastava (2010), Wu (2006), Gilham & Van Belle (2005), Santhanamery & Ramayah (2015) and Bélanger & Carter (2009). This study includes all common service channels associated with the cellular industry. The rationale for this stems from the chosen work systems approach. The inclusion of so many channels made the questionnaire lengthy which could have impacted on the quality of responses and may have contributed to non-responses. This complicated the data analysis. Twenty nine (9.5% of the sample) respondents left certain questions blank.   A large number of these respondents (25) was assisted by field worker DA, and four by JS. Sixteen of these respondents only left one question blank, 12 left two questions blank (mainly questions 3(j) and 4(j) that refer to other channels not mentioned in the survey), and one left three questions blank (this included question 3(j) and 4(j)).

Based on the analysis and the challenging data processing, the generalisations should be simplified further. The assessment of the channels' association with the four demographics, should be addressed in separate research questions, e.g. H1 should state: The age of the customer will

determine which channels are used by the customer.   SSIS should be addressed in separate research questions. This may have contributed to the manageability of the study. Although SSIS and channels are clearly defined, this separate research question approach may have simplified the analysis process and the volume of data generated.

Ideally, the study should have included a larger sample group representative of the South African population within rural and urban settings. However, with the available resources the decision was made to limit the sample group to the Western Cape in an urban setting. This issue will be considered when making recommendations for future research.

Readability

The Flesch Reading Ease measure was used to determine the questionnaire's readability. The 60.4 rating indicates a fairly standard written English on English first language level. The Flesch-Kincaid Grade Level (8.5) indicates that the questionnaire is understandable to 8th graders (generally 13 years old) in an American context who read English as first language.

The majority of the respondents is indicated as high school graduates. The second largest group is graduates, and the respondents in the third largest group hold diplomas or certificates. Only 34% of the respondents speak English at home, and for 31% of the respondents, English is the first language they ever learned. This implies that readability may be slightly lower than indicated at second language level, but still is sufficient for the average level of education of the group of respondents.

Feedback from the pilot group was used to update and amend the questions in order to render them more understandable.

Bias

The survey was voluntary, and respondents chose to complete the questionnaire. This may introduce "social desirability" (Babbie, p.261, 2010) which could influence the answers.   Neutrally framed questions ensured that the respondents did not find themselves in uncomfortable positions where they may have felt pressurised to choose answers they think are desirable to the researcher.

The sampling only took place within the Western Cape, and excluded rural areas. Generalisations, therefore, are limited to urban areas within the Western Cape. Further sampling will be required for generalisations within the South African context.

Method bias is never completely eliminated, because respondents misinterpret questions. The environment of the surveys, as well as the level of interest the respondents show in the topic, may affect this type of bias. Self-reporting is another form of bias, and certain authors view it as problematic (Burton-Jones, 2009). The respondents can potentially report on perceived usage, and not actual usage. Ideally, in an IS context, reported usage should be followed with actual usage reports to determine the accuracy of the self-reporting usage system. Measuring actual usage may lead to other

challenges, because it affects anonymity. In the cellular or business environment, this information is difficult to obtain, due to the high levels of competition. The selected response options, as well as the number of options, were attempts at reducing method bias.   Questions three and four contain examples aimed at clarifying the service referred to, because some respondents may not know the technology underpinning a particular service.

Conclusion

The study focuses on certain generalisations.   Below is a summary of the findings made in relation to the generalisations.

Table 19: Summary of findings

	Generalisation	Dependent Variable	Independent variable	Finding based on data analysis.
H1	Age of customer will not determine SSIS adoption, but will impact on channels used.	SSIS adoption Channel	Age	Age plays a role in SSIS adoption. It also played a role in the adoption of some channels, but not others. Age plays a role in channels associated with SSIS. Use of most of the channels that assisted the customer in making contact with an agent in a call centre or store, was not influenced by age.
H2	The level of education of the customer determines SSIS adoption and channels used.	SSIS adoption Channel	Level of education	Level of education does not play a role in SSIS adoption. It does play a role in the adoption of some channels. These channels are mainly associated with SSIS.
H3	Level of income will influence SSIS adoption and channels used.	SSIS adoption Channel	Level of income	Level of income does not influence SSIS adoption and channels used. Only two channels were affected by income: Transacting via USSD and making use of a call centre for support purposes.
H4	Gender does not determine SSIS adoption and channels used.	SSIS adoption Channel	Gender	Gender does not influence SSIS adoption or channels used.

The South African cellular business environments usually contain a combination of service domains. Customers may choose from various channels for support and transactional services. They have options to visit a store, call or email someone who can assist, or interact with systems that require no service agent intervention.

Channel options vary from provider to provider, but the business objectives remain the same: optimize support, maximize transactions, and reduce cost of both to maximise profits.

Based on the findings, it appears that age influences adoption and usage, and therefore needs to be explored further to understand its role. In this context, income, education and gender play no role, but further investigation will determine if this is true in the South African context.

When approaching service from a work systems perspective, it is important to understand usage from a user perspective in conjunction with their expectations and needs (Goldschmidt, Joseph & Debowski, 2012). A pure focus on demographics may not provide the answers required to determine how SSIS adoption can be influenced.

Goldschmidt, Joseph & Debowski (2012) also indicate that "Work systems provide a service to their users by supporting the user's tasks, whilst simultaneously supporting the service to the ultimate users of the results of the work systems – the customer's service component" (Goldschmidt, Joseph & Debowski. 2012, p. 157). This could mean that a better understanding is required of the tasks that cell phone users perform, or may wish to perform, in respect of cellular services and transactions. A valuable future analysis will determine whether the industry meets these needs, and how SSIS could potentially contribute to an improvement. More complex demographic factors, e.g. culture and economic status, may also be considered, since this may also affect the service environment. Strong associations are found between the channels that were used and language (home language and mother tongue).   These findings, however, fall outside of the scope of this study.

Chapter 5

Conclusions and Recommendations

Introduction

The previous chapter briefly discusses the findings of this study. This chapter shows its relevance to the study fields of knowledge and information management, and the recommendations that stem from these findings.

The chapter begins by giving an overview of the study, the problem that motivated it, and the methodology used. It will also consider the key concepts discussed in chapter 2, as well as the link between the findings and these concepts, and its meaning according to the literature.

Time will be spent on gaps, anomalies and deviations found in the data, as well as the significance of the results. The chapter will conclude with the advice for action, and recommendations for future research.

Summary of the study

This study focuses on the service domain of the work systems approach discussed by Steven Alter. The scope of the project is limited to the effect of customer demographic factors on SSIS adoption as a work system. This study asked the respondents to indicate the frequency of the following: specific hardware and software usage for support and transactional purposes, hardware and software usage to contact agents for assistance with support and transactions, and face to face interactions for the same reason. The aim is to identify the persons within the Western Cape who is likely to adopt SS.

The literature study focuses on a discussion of the most popular models used in the past to predict information system adoption. Most of these models have a technical approach, and focus on the factors that motivate customers to use the technology.

The work system approach is used to define SSISs. Customers and machines perform work (processes and activities) by using information, technology, and other resources to acquire products and services, or obtain support services. A work system focuses on the relationship of customers, participants, information, technology and products with business processes (Alter, 2013). This focus determines much of the material included in the survey questions, and this is also the reason for the survey questions focussing beyond traditional views of SSIS and whether customers interact with them or not. The respondents had the option to indicate the frequency they contact centre agents or visit the store for support and transactional purposes, as well as their frequency of SS usage.

The literature study explains and defines key concepts relevant to this study. This includes SS, IS, SSIS, SSIS as work systems, SSIS adoption with factors that determine or influence adoption such as time, voluntariness and context, and conclude with a discussion of demographics and previous findings focussing on adoption. See Appendix B for a brief summary of the discussion on various adoption models in the literature study.

Overview of the problem and methodology

In chapter 2, Dimension Data's 2013/14 global contact centre benchmarking is quoted as stating that organisations aim for call volume reduction by shifting the contacts to SS, but that they are not very successful at it.

The financial reports of the South African cellular providers also report on actions to improve and simplify customer service, while reporting on cost savings by means call volume reduction and SS uptake.

With a view to reduce costs, this study focuses on the environment, particularly four demographical factors, within a work system context. The purpose is to identify the persons in the Western Cape who is likely to adopt SSIS. Age, income, education and gender are investigated. The respondents were given various options to choose from that included SSIS, contact centre contacts, and face to face interactions. In all of these options, the respondents had to indicate how often they use each of these channels.

Key concepts are defined within context of this study. This is as a direct response to Checkland & Holwell's statement that IS is a "confused field" (Checkland & Holwell, 1998, p. 10)

South African studies show that our customers predominantly prefer face to face interactions, or using technology (IVR[49] and email) to contact an agent who can assist with support or transactions. All three these channels are costly, and put pressure on cellular providers to reduce operating costs.

In the cellular context, all these channels are freely available to customers and must be considered when reviewing adoption and the influences on adoption. This is only a point of departure towards an understanding of the influences on IS adoption. Much further investigation is still required to enable the cellular industry to implement cost effective and efficient support and transactional systems, or channels that customers would want to use.

Within the work systems approach, demographical factors are viewed as part of the environment in which the work system functions. Alter (2010; 2013) defines the environment as: ""The relevant organizational, cultural, competitive, technical, regulatory, and demographic environment within which

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[49] Interactive Voice Response technology. This is used in the call centre environment to route customers to an agent, or present information about products and services to the customer.

the work system operates, and that affects the work system's effectiveness and efficiency." (Alter, 2013, p. 81)

In assessment studies on the influence of demographical factors, the focus was only on IS. As a result, certain studies indicate that education, income and age play a role in technology adoption (See chapter two).

Findings, trends and what it means in terms of the literature

The findings are different than expected, because the level of education and level of income do not play a role in SSIS adoption.   Age is the only indicator of SSIS and channels associated with SSIS. As expected, gender did not determine SSIS or channel adoption. Level of education play a role in the selection of some channels. These channels are also predominantly associated with SSIS. Level of income only influences transacting via USSD, and call centre usage for support purposes.

Table 19 below summarises the findings on the generalised statements that initiated this study. The focus here is not only on SSIS, but on different types of work systems that enable customers to obtain support, or to transact in order to obtain specific products or services. Although various role players and participants feature in these work systems, the focus is on the customers and their perceptions about SSIS and channel usage.

This study differs from the studies referred to in the literature study, in the sense that it does not only focus on IS as technology. This may have influenced the outcome of the study, because the respondents were not forced to consider technological tools usage only. In services such as internet banking, other channels are more costly to use than SS. In the cellular context, no major charges that could influence the choice of channels, exist when using these services.

Contrary to what was expected, age influences SSIS adoption in this context. It is a strong indicator of SS channel choice, transacting via e-mail, and transacting via web chat. Since Web chat and SS options are fairly recent technologies, customers are possibly less familiar with it. This may influence the preferences of customers from different age groups. In combination with age, channel preference may also be influenced by other factors such as willingness to learn new technologies, culture, time taken to deal with queries and transactions, or knowledge of available technology. Surprisingly, age is not an indicator of call centre usage for support and transactional, or e-mail and web chat for support purposes. It also does not influence interaction at store level. Call centre usage is very common and it is the preferred measure in South Africa. Education on available new technology may play a more significant role than age. The cost and availability of infrastructure may have a further influence on the fact that age is not an indicator in this instance. The reviewed literature on the traditional adoption models, indicate that age has no effect on adoption, or were not even included as a determining factor.

Level of education is an indicator of USSD usage for support and transactional purposes, SMS usage for transactional purposes, web usage for support in-store transactional purposes. USSD and SMS usage are mainly associated with lower educational levels, while website usage is associated with graduates. These channels may be more economical and easy to use than a website. The users' devices do not require specific settings to use the service. Respondents with a post secondary school diploma/certificate are willing to visit stores. This does not confirm Wu's (2006) findings that respondents with diplomas also prefer internet banking, nor does it confirm Blignaut (2009) and Wu's (2006) findings that level of education influences technology usage in general. Wu's study also indicates that level of education influences internet banking adoption that could include support and transacting. His study, however, makes no differentiation between these two functions. Further studies are necessary to determine why education plays a less significant role than expected. An investigation of the South African context of pursued infrastructure, knowledge and SS strategies, will determine whether this plays a role in the product selection available to customers to enable them to use the available services. SSs are not always actively marketed, and this may impact on available service awareness, and how it works.

Level of income is not indicated as a role player in SSIS and channel adoption. This is contrary to expectations. Two channels are affected by income, namely USSD and the call centre for support services. Generally, USSD usage and call centre contact are not associated with any costs in the cellular industry, and this could possibly be a usage motivator. It is also fairly simple to use.

The study shows that gender has no significant influence on SSIS or channel adoption. The literature review hinted at cultural context as a possible influence of gender's effect on adoption. Wu (2006) and Gilham & Van Belle (2005) find certain gender differences. This factor requires further investigation , because, in the Western Cape, culture may impact on these findings . It is therefore not possible to state that these findings apply to the entire South Africa, because the cultural context is vastly different in various parts of the country. The fact that the study is limited to the urban environment, may also have influenced these findings.

Generally, the findings of this study do not confirm Hernandez, Jimenez & José Martin's (2011) suspicion that demographical factors may play a role in developing countries with limited technology. Some, but not all, channels and technologies are influenced. This applies to the South African context. The cultural diversity of the country may play a role in findings of this nature, and calls for further exploration.

The findings of this study create a perception that the demographical factors are all interrelated and cannot necessarily be viewed as separate entities that impact adoption on an individual level. Various factors could potentially work together and influence adoption. It is also unclear whether awareness and knowledge of various available channels will influence customers' willingness to use them. It

would be interesting to test customers' understanding of these services and its uses. The effect of service awareness and knowledge could also be assessed to determine whether a change in behaviour occurs after the intervention, and how demographic relationships change, if at all.

Another factor that may explain customers' preference for contact centres, is the ease of use. The majority of customers carry their phones with them all the time, and each operator has a short code to dial for assistance. Services such as web chat, e-mail, mobi sites and mobile apps require settings or software downloads before the services can be utilised. Customer motivation for using specific channels more often than others may provide valuable insights in customer needs and motivations.

This survey does include questions on language, and a distinction is drawn between mother tongue and home language. The language aspect calls for further investigation to determine its role in service adoption, because surprisingly significant correlations are found that is not discussed here due to the fact that it falls outside the scope of this study.

Table 20:   Summary of findings

	Generalisation	Dependent Variable	Independent variable	Finding based on data analysis.
H1	Age of customer will not determine SSIS adoption, but will impact on channels used.	SSIS adoption Channel	Age	Age plays a role in SSIS adoption. It also played a role in adoption of some channels and not others. Age did play a role in channels that were associated with SSIS. Use of most of the channels that assisted the customer in making contact with an agent in a call centre or store was not influenced by age.
H2	The level of education of the customer determines SSIS adoption and channels used.	SSIS adoption Channel	Level of education	Level of education does not play a role in SSIS adoption. It does play a role in the adoption of some channels. These channels are mainly associated with SSIS.
H3	Level of income will influence SSIS adoption and channels used.	SSIS adoption Channel	Level of income	Level of income does not influence SSIS adoption and what channel is used. Only two channels were affected by income: Transacting via USSD and making use of a call centre for support purposes.
H4	Gender does not determine whether SSIS are adopted and which channels are used.	SSIS adoption Channel	Gender	Gender does not influence SSIS adoption or what channels are used.

Limitations

These findings are limited to respondents within the Western Cape, particularly in urban areas. Factors such as race and culture are not included, and should possibly be explored in future studies.

Work systems consist of customers, products and services, processes and activities, participants, information and technologies that are influenced by the environment, pursued strategies, and infrastructure. This study only focuses on certain aspects of the environment that may influence the work system within the service domain.

Cellular operators are called upon to develop a proper understanding of the processes and activities associated with their support and transactional services, as well as the stakeholders within the work system context, policies and procedures, organizational strategies and requirements, technology and regulatory requirements. (Alter, 2013, p. 81)

Findings on demographics can assist with determining a focal point such as encouraging adoption, but it should not be the only focus area. Alter indicates that, if all aspects of the environment are not considered, the factors that affect work systems performance may be overlooked, and efficiency and effectiveness may be compromised (Alter, 2013, p. 81).

The significance of the results

These findings contribute to an understanding of the environment that influences the service domain within a work systems context, but which requires further exploration within the South African urban and rural context. At this stage it is not possible to make general statements concerning the South African population, based on the findings of this study. Although culture may influence these demographical factors, it was not explored within this context.

Findings of this nature can contribute to segmentation strategies to assist with optimizing support, maximizing transactions, reducing costs, and maximising profits, but needs to be evaluated within the full scope of a work system.

Conclusions

Age related findings must be explored further in the South African context to understand its role. Ideally, actual usage should also be measured against perceived usage.

Level of education plays a role in the adoption of certain channels associated with SSIS, but needs to be compared to actual usage to fully determine the significance of the findings, and how this can be used in future adoption strategies.

Level of income influences USSD transacting and call centre use for support services. This could be explored further to understand why higher income groups prefer to use more expensive call centre channels when they can afford to make use of online channels and apps.

Time and voluntariness of use must be explored further to determine whether this would impact on the findings of this study. In the South African banking industry, SS adoption increased significantly when higher transaction fees for face to face or agent interactions were introduced (Goldstuck & Meltzer, 2010). An understanding of how voluntariness of use can impact adoption, may assist

operators with determining strategies which will encourage use without affecting brand loyalty that may encourage churn[50] and ultimately impact on profitability.

The service domain requires holistic exploration, taking into consideration the strategies, infrastructures, and other environmental factors that may influence the work systems.

The scope of this study was held at manageable levels to enable respondents to provide reliable information and to limit non response bias. Actual SSIS and channel usage are critical for innovative, efficient and effective development strategies.

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[50] Churn refers to customers who move to other service providers for the same or similar services. It is also referred to as customer turnover

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Appendixes

Appendix A

Survey Guide

Self-Service Adoption in the Western Cape:

The influence of demographical factors.

The following is a guide in terms of how to administer the questionnaire. It also describes the procedures that should be followed and explain critical concepts that needs to be understood when administering the questionnaire.

1. PURPOSE OF THE STUDY

Your feedback will assist us to evaluate whether age, level of education, level of income and gender needs to be considered when developing SSIS in the Western Cape.

The purpose is to determine who is likely to adopt self-service and in what channels in the Western Cape. "Channels" used in this context refers to whether a customer prefers to talk face to face to agents, call a call centre or make use of SMS, USSD or websites to resolve issues or make purchases.

2. PROCEDURES

The participant will be asked to do the following things:

- Complete 2 questions about what services they prefer when they need help with their cell phone or package or when they want to purchase products and services.
- They will also be required to answer 7 questions that relates to their age, income, level of education, gender, language and residence.

It should take them between 10 to 15 minutes to complete.

It will not be possible to associate their answers with their details as the questionnaire is anonymous. The information generated by the questionnaire will only be used for the purpose of this study and will be analysed to determine who is likely to adopt self-service and what channels are preferred by the various groups identified.

3. POTENTIAL BENEFITS TO SUBJECTS AND/OR TO SOCIETY

This information may assist businesses to become more efficient in terms of customer service and potentially improve on customer experience. It also may assist academics to determine whether demographical factors do play a role in self-service information system adoption in the Western Cape where a self-service information system is seen as a work system.

4. PAYMENT FOR PARTICIPATION

Consent forms will be used to enter participants into a lucky draw for a Vodafone Smart tab.

5.   CONFIDENTIALITY

Any information that is obtained in connection with this study and that can be identified with the participant needs to remain confidential and will be disclosed only with the participant's permission or as required by law. Confidentiality will be maintained by means of storing the data according to departmental standards. Please safeguard the completed questionnaires and store it in the containers provided for this purpose. Do not leave it unattended at any time. This is to ensure that data is protected according to university standards.

Once the data is collected it will be available for a reasonable time for validation purposes.

The final Thesis will be available through the Stellenbosch library. The data may also be used to draft a journal article.

6.   PARTICIPATION AND WITHDRAWAL

Participation in the study is voluntary. When you approach the participant ensure that this is made clear from the start. Discuss the consent for with the participant and explain what their rights are, how confidentially will be maintained and what the data will be used for. Indicate that they may withdraw at any time without consequences of any kind.

7.   IDENTIFICATION OF INVESTIGATORS

If you have any questions or concerns during the field work, please feel free to contact **Melinda van den Heever 082 997 1868** or Daan Le Roux (021) 808 3803.

8.   FIELDWORK

8.1.   The participants that should be part of this study should be cellular subscribers that is 18 years or older.

8.2.   Random samples should be taken in the Western Cape on days that would not exclude working individuals to limit sampling bias.

8.3.   A minimum of 300 participants that meet the selection criteria should be surveyed.

8.4.   Please ensure that the selection criteria and the purpose of the study are clearly explained.

8.5.   Participants should participate out of their own free will. No one should be intimidated or forced to complete the questionnaire.

8.6.   Each participant will be required to complete a consent form and a questionnaire. The consent form details will be used to enter the participant into a lucky draw.

8.7.   The 2 forms need to be stored separately to maintain confidentiality.

8.8.   Ensure that the consent form is clearly explained to the participant and that they sign the document before the questionnaire is completed.

8.9.   You are allowed to assist participants where they need clarity on a question, but be careful of influencing the answer that the customer may present. See explanations with each question to assist you.

8.10.   Once questionnaires have been completed, capture the data in the excel spread sheet provided.

8.11.   Take care to capture data accurately as this may influence the outcome of the data analysis and findings.

9. CONSENT FORM

No questionnaire may be completed without a valid consent form. This is a formal document that is required from the University of Stellenbosch and is used to ensure that participants are fully aware of the implications of the study and what the data will be used for. Participants have to indicate that they agree that the data captured can be used for research purposes. The Field worker has to clearly explain the purpose of the study, what the data will be used for and the participant rights in the study.

The following form has to be completed and signed by the participant and the field worker. Ensure that all details required are captured.

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CONSENT TO PARTICIPATE IN RESEARCH

Self-Service Adoption in the Western Cape: The influence of demographical factors.

Thank you for offering your time to complete this questionnaire.

You are asked to participate in a research study conducted by Melinda van den Heever (Mphil student) from the Centre for Knowledge Dynamics and Decision-making at Stellenbosch University. The results of the questionnaire will contribute to a thesis that is required for an MPhil in Information and Knowledge Management. You were selected as a possible participant in this study because the study requires participants that are cell phone users in the Western Cape.

1. PURPOSE OF THE STUDY

Your feedback will assist us to evaluate whether age, level of education, level of income and gender needs to be considered when developing SSIS in the Western Cape.

The purpose is to determine who is likely to adopt self-service and in what channels in the Western Cape. "Channels" used in this context refers to whether a customer prefers to talk face to face to agents, call a call centre or make use of sms, USSD or websites to resolve issues or make purchases.

2. PROCEDURES

If you volunteer to participate in this study, we would ask you to do the following things:

- You will be required to complete 2 questions about what services you prefer when you need help with your cell phone or package or when you want to purchase products and services.
- You will also be required to answer 7 questions that relates to your age, income, level of education, gender, language and residence.
- It should take you between 10 to 15 minutes to complete.

It will not be possible to associate your answers with your details as the questionnaire is anonymous. The information generated by the questionnaire will only be used for the purpose of this study and will be analysed to determine who is likely to adopt self-service and what channels are preferred by the various groups identified.

3.   POTENTIAL BENEFITS TO PARTICIPANTS AND/OR TO SOCIETY

This information may assist businesses to become more efficient in terms of customer service and potentially improve on customer experience. It also may assist academics to determine whether demographical factors do play a role in self-service information system adoption in the Western Cape where a self-service information system is seen as a work system.

4.   REWARD FOR PARTICIPATION

On completion of the questionnaire your consent form will be submitted as an entry to win a Vodafone Smart tab.

5.   CONFIDENTIALITY

Any information that is obtained in connection with this study and that can be identified with you will remain confidential and will be disclosed only with your permission or as required by law. Confidentiality will be maintained by means of storing the data according to departmental standards. This is to ensure that data is protected according to university standards and are available for a reasonable time for validation and reanalysis where relevant

The final Thesis will be available through the Stellenbosch library. The data may also be used to draft a journal article.

6.   PARTICIPATION AND WITHDRAWAL

You can choose whether to be in this study or not. If you volunteer to be in this study, you may withdraw at any time without consequences of any kind. You may also refuse to answer any questions you don't want to answer and still remain in the study. The investigator may withdraw you from this research if circumstances arise which warrant doing so.

7.   IDENTIFICATION OF INVESTIGATORS

If you have any questions or concerns about the research, please feel free to contact Melinda van den Heever (021) 940 9352 or Daan Le Roux (021) 808 3803.

8. RIGHTS OF PARTICIPANTS

You may withdraw your consent at any time and discontinue participation without penalty. You are not waiving any legal claims, rights or remedies because of your participation in this research study. If you have questions regarding your rights as a research subject, contact Ms Maléne Fouché [mfouche@sun.ac.za; 021 808 4622] at the Division for Research Development.

SIGNATURE OF RESEARCH SUBJECT

The information above was described to me by _____ in [*Afrikaans/English/Xhosa/other*] and I am in command of this language or it was satisfactorily translated to me. I was given the opportunity to ask questions and these questions were answered to my satisfaction.

I hereby consent voluntarily to participate in this study.

_____

Name of Participant

_____ _____

Signature of Participant   **Date**

SIGNATURE OF INVESTIGATOR

I declare that I explained the information given in this document to _____ [*name of the participant*].   [*He*/she] was encouraged and given ample time to ask me any questions. This conversation was conducted in [*Afrikaans/*English/*Xhosa/*Other*] and [*no translator was used/this conversation was translated into* _____ by _____].

_____   _____

Signature of Investigator   **Date**

9. VARIABLES USED

The table below gives a brief description of the variables that were used in the survey

RESIDE	The variable indicates whether the participant resides in the Western Cape.
TARIFF	The variable indicates what type of price plan the customer was using at the time of the survey.
ADDOPT1	Indicates what channels the participant prefers when wanting to resolve package or cell phone issues.
ADDOPT2	Indicates what channels the participant prefers when purchasing products and services from cellular provider.
AGECAT	Age category the participant fell into at the time of the survey. This is a reported age in years. Participants report on category that they fall into. Ten categories were indicated.
HLANG	Variable indicates what language is predominantly used in the participant's home. 4 categories were indicated based on the official languages of the province. A fourth category was added if the home language was not one of the official languages.
MTONG	Variable indicates what the participants mother tongue is as it could be different to their current home language.
EDUCA	Variable indicates what the highest level of education of the participant is.
INCOM	Variable indicates personal monthly income before tax and deductions.
GENDR	Variable indicates the gender of the participant.

10. QUESTIONNAIRE

This question is asked to determine if the respondent is living in the Western Cape Region or visiting as findings are based on inhabitants of the Western Cape.

RESIDE:

1. Do you live in the Western Cape?	☐ Yes	☐ No
Value of answer selected	*1*	*2*

Question 2 is asked to determine what type of price plan the customer has signed up for. Most cellular providers segment their customers in these 3 account types.

TARIFF:

Prepaid	Customer has to buy airtime and data before they can make use of their cell phone service. Customers cannot overspend on their account
Contract	Customer signs a contract where they agree with their cellular provider on the products and services that they will have access to. The customer is billed at the end of the month for the services they used, e.g. talk time and data consumed.
TopUp	Customer signs a contract with their cellular provider where they agree on a monthly amount that will be available for use. Should the customer require more, they can buy additional airtime. The customer is billed on a monthly basis, but only for the agreed amount. Customers have the convenience of airtime being allocated automatically at the start of the month. If they need more airtime, they can purchase additional airtime on an adhoc

	basis without overspending as is the risk with contract.		

2. What type of cell phone package do you make use of?	☐ Prepaid	☐ Contract	☐ TopUp
Value of answer selected	*1*	*2*	*3*

The following 2 questions are asked to determine whether the customer makes use of technological tools for support or whether they still prefer human interaction via phone or face to face to solve their queries. 2 separate questions were designed to address support (resolve queries, e.g. cell phone issues, service not working, poor reception, SIM swap etc.) and transactions (e.g. signing up for a new contract, purchasing a phone, buying SMS and data bundles, buying airtime, purchasing music and ringtones, buying apps and other services) as the researcher anticipated that respondents may prefer different channels for these 2 functions.

USSD:	Unstructured supplementary service Data. The customer accesses the service by making use of a number that normally starts with a * and ends with a #. Various menu items are presented when the customer dials the number and they can select what information they require. They can view balances, account information, make purchases of services and airtime, view information about promotions, etc.
SMS:	Short messaging service. Customer sends a keyword to a specific number and receives information about their account or services
Call Centre:	Customer calls a call centre number

Mobi site	This is a web site that meets specific requirements to make it easy for the user to view the content on a cell phone or smart phone that has a smaller screen than the normal PC.
Mobile App	"A mobile app is a computer program designed to run on smartphones, tablet computers and other mobile devices." (Wikipedia; Accessed 2 March 2015)
Web chat	The customer asks their question online directly to an agent who responds immediately with an answer. It is normally used to resolve simple queries. No email is required and you can talk to someone about an issue in real time.

ADDOPT1:

3. **How do you make contact with you cell phone provider when you have issues with your cell phone or cell phone services and products?**

By the use of:

Indicate how often you use the each service with an X

	Never	**A few times a year**	**Once a month**	**Once a week**	**Few times a week**
Value of answer selected	*1*	*2*	*3*	*4*	*5*
a. **USSD** E.g. Vodacom:*111# Cell C:*147# MTN:*141# Virgin mobile: *100#/*101# Telkom mobile:*180#	☐ Never	☐ A few times a year	☐ Once a month	☐ Once a week	☐ Few times a week
b. **SMS**	☐ Never	☐ A few times a year	☐ Once a month	☐ Once a week	☐ Few times a week
c. **Call Centre** E.g. Vodacom: 082111 Cell C: 084140 MTN: 083173 Virgin Mobile: 0741000123 Telkom Mobile: 081180	☐ Never	☐ A few times a year	☐ Once a month	☐ Once a week	☐ Few times a week
d. **Mobi site**	☐ Never	☐ A few times a year	☐ Once a month	☐ Once a week	☐ Few times a week
e. **Mobile app**	☐	☐	☐	☐	☐

	Never	A few times a year	Once a month	Once a week	Few times a week
f. **I go to the store**	☐ Never	☐ A few times a year	☐ Once a month	☐ Once a week	☐ Few times a week
g. **Website** E.g. www.vodacom.co.za www.cellc.co.za www.mtn.co.za www.virginmobile.co.za www.telkommobile.co.za	☐ Never	☐ A few times a year	☐ Once a month	☐ Once a week	☐ Few times a week
h. **e-mail**	☐ Never	☐ A few times a year	☐ Once a month	☐ Once a week	☐ Few times a week
i. **Web chat**	☐ Never	☐ A few times a year	☐ Once a month	☐ Once a week	☐ Few times a week
j. **Any other** (Please specify and indicate how often you use it):	☐ Never	☐ A few times a year	☐ Once a month	☐ Once a week	☐ Few times a week

ADDOPT2:

4. **How do you purchase products and services (e.g. upgrades, airtime, data bundles, music, apps, etc.) from your cellular service provider?**

   I make use of:

   Indicate how often you use the each service with an X

	Never	**A few times a year**	**Once a month**	**Once a week**	**Few times a week**
Value of answer selected	*1*	*2*	*3*	*4*	*5*
a. USSD E.g. Vodacom:*111# Cell C:*147# MTN:*141# Virgin mobile: *100#/*101# Telkom mobile:*180#	☐ Never	☐ A few times a year	☐ Once a month	☐ Once a week	☐ Few times a week
b. SMS	☐ Never	☐ A few times a year	☐ Once a month	☐ Once a week	☐ Few times a week
c. Call Centre E.g. Vodacom: 082111 Cell C: 084140 MTN: 083173 Virgin Mobile: 0741000123 Telkom Mobile: 081180	☐ Never	☐ A few times a year	☐ Once a month	☐ Once a week	☐ Few times a week

d. **Mobi site**	☐ Never	☐ A few times a year	☐ Once a month	☐ Once a week	☐ Few times a week
e. **Mobile app**	☐ Never	☐ A few times a year	☐ Once a month	☐ Once a week	☐ Few times a week
f. **I go to the store**	☐ Never	☐ A few times a year	☐ Once a month	☐ Once a week	☐ Few times a week
g. **Website** E.g. www.vodacom.co.za www.cellc.co.za www.mtn.co.za www.virginmobile.co.za www.telkommobile.co.za	☐ Never	☐ A few times a year	☐ Once a month	☐ Once a week	☐ Few times a week
h. **e-mail**	☐ Never	☐ A few times a year	☐ Once a month	☐ Once a week	☐ Few times a week
i. **Web chat**	☐ Never	☐	☐ Once a month	☐ Once a week	☐ Few times a week

		A few times a year			
j. **Any other** (Please specify and indicate how often you use it):	□ Never	□ A few times a year	□ Once a month	□ Once a week	□ Few times a week

The following 6 questions are designed to gather demographical information about the user to determine if there is a relationship between demographics and Self-Service adoption.

AGECAT:

5. How old are you?

	□ 18 to 19 years old	□ 20 to 24 years old	□ 25 to 34 years old	□ 35 to 44 years old	□ 45 to 49 years old
Value of answer selected	*1*	*2*	*3*	*4*	*5*
	□ 50 to 54 years old	□ 55 to 64 years old	□ 65 to 74 years old	□ 75 years or older	□ Don't know/Private
Value of answer selected	*6*	*7*	*8*	*9*	*10*

HLANG:

6. Your home language is:

	□ English	□ Xhosa	□ Afrikaans
Value of answer selected	*1*	*2*	*3*

	☐ Other (Please specify):
Value of answer selected	*4*

MTONG:

7. What is the very first language that you ever learned as child that you can still understand?

This refers to your mother tongue and could be different to your current home language.

	☐ English	☐ Xhosa	☐ Afrikaans
Value of answer selected	*1*	*2*	*3*

	☐ Other (Please specify):		
Value of answer selected	*4*		

EDUCA:

No schooling	This will include schooling completed up to grade 6.
Completed Primary school	Should have completed grade 7. If not, select no schooling.
Completed High school	Should have completed grade 12. If not, select the highest level of what was ***completed***.
Completed Diplomas or Certificates after school	Should have completed diplomas or certificates. Diploma and Certificate should have been at least six months study duration full-time or equivalent. If not, select the highest level of what was ***completed***.
Completed Degree	Should have completed a Degree. This includes Higher degrees. If not, select the highest level of what was ***completed***.

8. Your highest level of education that you have completed is:

Diploma and certificate should have been at least six months study duration full-time or equivalent[51].

	☐ No Schooling	☐ Completed Primary School	☐ Completed High School	☐ Completed Diplomas Or Certificates After School	☐ Completed Degree
Value Of Answer Selected	*1*	*2*	*3*	*4*	*5*

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[51] Guidelines taken from sensus 2011 questionnaire; p. A06

INCOM:

9. Please indicate what best describes your PERSONAL MONTHLY income before tax and deductions. *This include grants and pension*:

	☐ No income	☐ Between R1 and R1600 per month	☐ Between R1600 and R3 999 per month	☐ Between R4 000 and R7 999 per month	☐ Between R8 000 and R11 999 per month
Value of answer selected	*1*	*2*	*3*	*4*	*5*
	☐ Between R12 000 and R24 999 per month	☐ Between R25 000 and R50 999 per month	☐ Between R25 000 and R50 999 per month	☐ Over R51 000 per month	☐ Do not wish to disclose
Value of answer selected	*6*	*7*	*8*	*9*	*10*
	☐ Other (Please specify):				
Value of answer selected	*11*				

GENDR:

10.   You are:

	☐ **Male**	☐ **Female**

Value of answer selected	1	2

Appendix B

Table 21: Summary of adoption models considered

Model	Summary of theory	Factors having a direct influence on behavioural intention	Factors having a direct influence on use	Demographics relevant to the study
DOI	Rogers states that diffusion is a process where new ideas (innovations) are communicated in a social structure in a specific way over time.	Relative advantage Compatibility Complexity Trailability	Decision	• "Earlier adopters are no different from later adopters in age" • "Earlier adopters have more years of formal education than do later adopters"
TPB	The theory states that a person will adopt or perform certain behaviour if they believe that the benefits of success exceed the negative impact failure may have (Ajzen, 1985). This decision is influenced by people who play an important role (referents) in the adopter's life.	Attitude Toward the Behaviour Subjective Norm Perceived Behavioural Control	Intention	• None mentioned
TAM	Perceived usefulness and perceived ease of use will influence use of computer-based information systems	Perceived Usefulness Perceived Ease of Use	Attitude Toward Using	• None included in model, but Hernandez, Jimenez and Martin (2011) did not find link between age, gender and income and continued use in developed countries, but speculated that it may play a role in developing countries.
TAM 2	Developed to explain the adoption of technology in the work environment where use of technological systems is mostly mandatory (Venkatesh & Davis, 2000) People evaluate		Intention to use	• None

	cognitively what system can do and if it aligns with the job that is required. If the system is applicable to the job, performs the tasks well and performs results, it will motivate use.			
TAM 3	TAM 3 was developed to provide better guidelines on how to improve on individual adoption of IT systems within various stages of implementation. The focus was to provide a model that takes various TAM studies and findings into consideration and to make it practically implementable.		Behavioural intention	• None
UTAU T	In this model the constructs of theory of reasoned action, the TAM, the motivational model, the TPB, a model combining the TAM and the TPB, the model of PC utilization, the innovation diffusion theory, and the social cognitive theory were reviewed and compared.	Performance Expectancy Effort Expectancy Social Influence	Behavioural Intention Facilitating Conditions	• Age • Gender
UTAU T 2	UTAUT was extended to consumers as it has implications for business	Performance Expectancy Effort Expectancy Social Influence Facilitating Conditions Hedonic Motivation Price Value Habit	Behavioural intention Facilitating Conditions Habit	• Age • Gender • Venkatesh, Thong & Xu (2012) recommended that demographic factors and IS usage phases be taken into consideration when designing and marketing consumer systems.

| **Work system** | Alter (2008) indicates that "A work system is a system in which human participants and/or machines perform work (processes and activities) using information, technology, and other resources to produce specific products and/or services for specific internal or external customers. An IS is a work system whose processes and activities are devoted to processing information, that is, capturing, transmitting, storing, retrieving, manipulating, and displaying information. Thus, an IS is a system in which human participants and/or machines perform work (processes and activities) using information, technology, and other resources to produce informational products and/or services for internal or external customers."(p. 451) | | In a work system the process implemented is dependent on the customer and the participants in the work system (Alter, 2013; Alter, 2010). It is directly affected by the environment. Alter defines the environment as: "The relevant organizational, cultural, competitive, technical, regulatory, and *demographic* environment within which the work system operates, and that affects the work system's effectiveness and efficiency. |