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Master of Arts in the Field of ICT Policy and Regulation

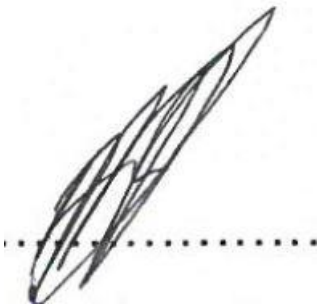
INVESTIGATING MOTIVATIONAL FACTORS INFLUENCING BROADBAND ADOPTION AND USAGE IN SOUTH AFRICAN LOW-INCOME HOUSEHOLDS

KOPANO MONYETSANE
STUDENT NUMBER: 1144055
SUPERVISED BY DR. KIRU PILLAY

A research report submitted to the Faculty of Humanities, University of the Witwatersrand
In partial fulfilment of the requirements for the degree of
Master of Arts in the field of ICT Policy and Regulation

Declaration

I declare that this report is my own, unaided work. It is submitted in partial fulfilment of the requirements for the degree of Master of Arts in the field of ICT Policy and Regulation at the University of the Witwatersrand, Johannesburg. It has not been submitted before for any other degree or examination in any other university.



Kopano Shadrack Monyetsane
04 June 2018

Abstract

Broadband technology has been identified as a vital contributor to socio-economic development in South Africa. Hoverer, the rate of broadband adoption and usage in low-income households is lower as compared to middle and high-income households. Although there are studies that have presented motivational factors for broadband adoption in South Africa, there is little knowledge about how these motivational factors collectively influence the adoption and usage of broadband in low-income households and how they use the technology. To address this gap, this study investigated motivational factors that influence low-income households in South Africa to adopt and use broadband. An extended Model for Broadband Adoption (MBA) was derived from literature and used to provide the basis for the theoretical and conceptual framework for this study. The researcher then followed a phenomenological approach to collect qualitative data that was analysed using a computer-assisted qualitative data analysis software (CAQDAS). The findings of this study show that the participants from low-income households used broadband everyday but only for basic applications and the high cost of data hindered increased usage. The findings further suggest that attitude, normative beliefs and control factors can have both positive and negative influence on the adoption and usage of broadband by low-income households. In addition, low-income households regarded broadband as a key element towards improving their livelihood and confirmed the lack of local content in most broadband platforms. The study recommends that policy makers, regulatory authorities and broadband service providers should consider adopting models such as the MBA to advance their understanding on the interactions between low-income households and broadband, in order to develop policy interventions and products that are relevant to the lived experience of low-income households. The study emphases further the importance of expediting policies and regulations that are meant to address the high cost of data to ensure that broadband adoption and usage is inclusive of all income groups in South Africa.

Keywords: Broadband, South Africa, Broadband Adoption, Broadband Usage

Dedication

I dedicate this achievement to my loving wife Mmakgotso “Pino” Monyetsane. I thank you for the constant support and motivation through this journey. This would have never been possible without you by my side.

Acknowledgements

I would like to acknowledge Dr Kiru Pillay, my supervisor, for the support and continuous encouragement on my journey towards the completion of this research report. A special acknowledgement goes to the communities of Sohanguve Blocks M, H and T, to you I say thank you for dedicating your time and sharing your highly valued opinions with me. To all the colleagues and fellow comrades in the programme, I would like to express my sincere gratitude to you all for the knowledge, experience and wisdom that I have honed from you. I would also like to thank all my friends and family their unwavering support and encouragement.

List of acronyms

Acronym	Definition
ICT	Information Communications Technology
GDP	Gross Domestic Product
USA	United States of America
IoT	Internet of Thing
M2M	Machine to Machine Communication
xDSL	Digital Subscriber Lines
FTTx	Fibre-To-The-installation point
FTTH	Fibre-To-The-Home
Mbps	Megabits per second
Gbps	Gigabits per second
RF	Radio Frequency
SIM	Subscriber Identity Module
CPE	Customer Premises Equipment
IXPs	Internet Exchange Points
ICASA	Independent Communications Authority of South Africa ,
MNOs	Mobile Network Operators
MVNOs	Mobile Virtual Network Operators
ISPs	Internet Services Providers
NLD	National Long Distance
SANRAL	South African National Road Agency Limited
SAARF	African Audience Research Foundation
LSMs	Living Standards Measures
ISDN	Integrated Service Digital Network
ADSL	Asymmetric Digital Subscriber Line
LTE	Long Term Evolution
HSPA+	High Speed Packet Access
ICT4D	ICT for Development
ECA	Electronic Communications Act No. 36 of 2005 as amended
ECTA	Electronic Communications Transactions Act No. 25 of 2002
ECNS	Electronic Communications Network Services
ECS	Electronic Communications Services
SA Connect	South Africa Connect
DoC	Department of Communications
DTPS	Department of Telecommunications and Postal Services
WOAN	Wireless Open Access Network operators
IT	Information Technology
OECD	Organization for Economic Cooperation Development

ISOC	Internet Society
WEF	World Economic Forum
GPT	General Purpose Technology
MIS	Management Information Systems
IS	Information Systems
TRA	Theory of Reasoned Action
TPB	Theory of Planned Behaviour
TAM	Technology Acceptance Models
DOI	Diffusion of Innovation theory
UTAUT	Unified Theory of Acceptance and Use of Technology
UD	User Diffusion
PU	Perceived Usefulness
PEOU	Perceived Ease Of Use
PC	Personal Computer
MATH	Model of Adoption of Technology in Households
MBA	Model of Broadband Adoption
GIS	Geographic Information System
EA	Enumerator Area
CAQDAS	Computer-Assisted Qualitative Data Analysis Software
FGs	Focus groups
SMS	Short Message Service
iNeSI	Ikamva National eSkills Institute
NeSPA	National e-Skills plan of action
NCPF	The National Cybersecurity Policy Framework for South Africa
eWOM	Electronic Word-of-Mouth
SAcsi	South African Customer Satisfaction Index
RIA	Research ICT Africa
NBN	National Broadband Network

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Chapter 1: An overview of broadband and its adoption in South Africa

1.1 Introduction

There is no doubt that ICT, in particular the Internet, has transformed how we do things. The internet has disrupted and broken traditions in many industries such as the entertainment, health, education, manufacturing and transportation industries. It is this fact that provides confidence that broadband, as a much improved way of providing connectivity to the Internet, has the ability to unlock even more potential.

The introduction of broadband technology brought even more opportunities to Internet users. Broadband offers enhanced functionality which includes high data transfer rate and low latency. However, the rate of broadband adoption and usage in South African low-income households is low as compared to middle and high-income households. Furthermore, there are no detailed studies on how low-income households use broadband, what motivates them to adopt and use it as well as how it is relevant to them in terms of their livelihood and the content they consume.

This study sought to investigate motivational factors that influence low-income households to adopt and use broadband and gain a deeper understanding on their interaction with the technology by exploring how they use it and its impact on their daily lives and the availability of relevant content.

This chapter builds a context on the impact of broadband in society, considerations for broadband demand stimulation and an overview of broadband network infrastructure. The chapter then provides a background on the South African broadband market, the country's digital divide, barriers to Internet adoption and the current policy environment to support broadband development. The chapter then presents a profile of the selected population of Soshanguve and a summary of the research problem and purpose statements, the research questions, the research objectives, its limitations and significance and concludes with the chapter outline for this report.

1.2 The impact of broadband in social development

Picot and Wernick (2007) argue that broadband should be regarded as a public good. In economics, a public good is defined as a commodity or service that is provided without profit to all members of society. A public good should be non-rival, meaning its consumption by one individual does not reduce the quantity for consumption by other individuals. It should also be non-excludable i.e. when it is produced, no one can be prevented from using it (Burrel, 2012).

On the other hand, should broadband really have the same priority as other essential services such as water and public safety? Firths and Mellor (2005) contend that although literature presents a multiplicity of economic and social benefits that can be derived from the proliferation of broadband, there are still controversies surrounding the notion of broadband being an all-round enabler of many industries and substantial improvements in public service delivery. These controversies stem from the inability of the same literature to provide explicit understanding and measurement of these benefits. This situation has led to policy makers opting to focus rather on increased uptake without an understanding if this will be at the best interest of the society (Firth & Mellor, 2005; Rampersad & Troshani, 2013).

To address this gap in literature, researchers have taken different approaches when attempting to develop frameworks and measurement instruments that will bring tacit benefits of broadband. There are studies that have taken a macro approach by focusing on the contribution on economic growth or gross domestic product (GDP) (Bojnec & Fertő, 2012; Katz & Avila, 2010; Koutroumpis, 2009), some tend to shift their focus to sectoral impact by concentrating on key sectors like education, health and commerce (Firth & Mellor, 2005; Rampersad & Troshani, 2013), while others take a more granular approach by focusing on the impact on individuals, households and organizations (Anderson, 2008).

Although the focus might be different, all approaches provide findings of realisable benefits. For example, those who study the impact of broadband on economic growth found that there is positive correlation between broadband penetration and GDP growth (Koutroumpis, 2009; Katz & Avila, 2010; Katz, Vaterlaus, Zenhäusern, & Suter,

2010). The common result is that an increase in broadband penetration translates to positive GDP growth. Of course the actual contribution (i.e. percentage increase in broadband penetration on GDP growth) varies between studies depending on the availability of data and the economic state of the countries studied (Katz & Avila, 2010).

Sectorial studies also indicate that although there might be challenges (Firth & Mellor, 2005), there are greater benefits such as inclusive access to high quality education material, overall improvement in academic performance and innovativeness. Broadband can also enable the uptake of tele-medicine and e-health by remote communities (Rampersad & Troshani, 2013). There is evidence from countries like South Korea that electronic commerce activities (e.g. online stock trading, online banking and online shopping) grew rapidly following increased access to broadband (Lee, Oh, & Shim, 2005).

1.3 Broadband demand stimulation

Many countries have developed broadband development strategies to make broadband readily accessible to all. Broadband strategies seek to coordinate the usually fragmented infrastructure rollout efforts from the public and the private sector and reduce the cost of access and stimulate demand (Mugeni, Wanyembi & Wafula, 2012). According to Kelly & Rossotto (2012), a broadband development strategy requires attention from both the supply (i.e. provisioning of network infrastructure) and demand (uptake and usage). Hence it is important for policy makers to further understand what broadband means to different communities, why they adopt it and how they use it. Typically, supply side orientated strategies concentrate on investing in network infrastructure and technologies with an assumption that there is a demand or demand will grow to justify this investment (Kim, Kelly, & Raja, 2010).

Although previously focus was on the supply side for broadband adoption, inroads were made to incorporate demand stimulation as well. As part of the American Recovery and Reinvestment Act, the United States of America (USA) developed the National Broadband Plan which stated that to make advances in segments of the

population that have not adopted broadband, both the demand and supply side must be considered as important aspects of the market (Hauge & Prieger, 2010). Trends also show that the majority of countries that developed broadband plans have included strategies to address the demand side.

Kim, et al., (2010) identifies broadband demand as a subject of three main pillars: awareness, affordability and attractiveness. For potential users to adopt broadband, they first have to be aware and have the basic skills to use it, it must be accessible by all, and it should be translated to some sociological benefit.

The awareness pillar refers to the broader knowledge about broadband (also referred to as digital or ICT literacy) that will enable individuals to participate in a knowledge society. Since the beginning of society, word-of-mouth has been regarded as one the most influential marketing tools for experience goods (Duan, Gu, & Whinston, 2008). Through word-of-mouth, consumers can alter their attitudes and perceived risk levels about certain products by gathering information from those who had already experienced the goods (Elwalda & Lu, 2014). In the context of broadband adoption and usage, this is evident through online products and services consumer ratings and reviews. The concept of electronic word-of-mouth (eWOM) refers to the sharing of consumption experience by consumers using Internet-based communication (Vimaladevi & Dhanabhakaym, 2012; Elwalda & Lu, 2014).

The cost to access broadband is still a major focus for most developing countries. Out-of-reach prices to acquire devices and high subscription charges in particular has been identified as some of the contributors to low broadband adoption in South Africa (Seymour & Naidoo, 2013), hence the affordability pillar is applicable. Although trends are showing steady cost reduction (RIA, 2016), more still needs to be done to bring it to a level where the majority of the population can be able to afford access to broadband without sacrificing other basic needs.

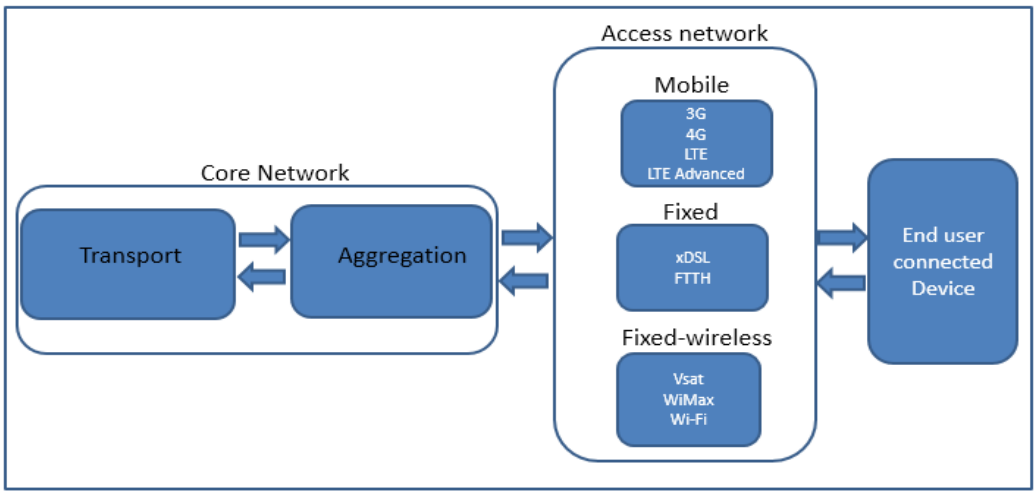
Attractiveness refers to the noticeable benefits that broadband delivers to its users. This includes the relevance of content, applications and services to the livelihood of users. The relevance can be through entertainment, productivity, business, and government services. Hauge and Prieger (2010) assert that programmes that are

targeted at specific market segments with information of particular use are important to mitigate against perceived lack of value as a barrier to adoption.

1.4 Broadband network infrastructure

A typical broadband network consists of four major components as illustrated in Figure 1.

Figure 1: Typical broadband network architecture



Source: Researcher (2018)

1.4.1 End user connected device

The end user connected device is the interface between the user and the network. This is how the user accesses the Internet and other broadband based services. These used to be desktops, laptops or smart mobile devices (smartphones, tablets etc.), but now with advances in the internet of thing (IoT) and machine to machine communication (M2M) technologies, these can be anything from home appliances, industrial equipment and machinery, vehicles, monitoring and control systems, medical equipment, agricultural equipment, as well as interactive class room equipment. IoT and M2M enable connected devices to communicate and coordinate with less or no human intervention. This is achieved by using the information gathered by these connected devices through embedded sensors.

1.4.2 Access network

The access network forms the interface between the end user connected device and the network. There are generally three types of access network technologies. Fixed

access technologies only provide connection to a user defined location (also referred to as an installation point). The connection is usually provided between the installation point and a local exchange, typically via copper digital subscriber lines (xDSL) or optical fibre to the installation point (FTTx). Depending on the type of technology (i.e. copper or optical fibre) and the product package chosen by the user, data transfer speeds can range from 2 Megabits per second (Mbps) to 10 Gigabits per second (Gbps). Fixed access technologies provide advantages of stable connections (i.e. no interruptions due to loss of coverage) and guaranteed data transfer speed because of the dedicated connection to the installation point. But this comes as at cost as the user is expected to pay a monthly line rental charge. Fixed access technologies also take greater effort to setup and to maintain because the installation needs to be commissioned by a qualified technician and the user can be left without connection for hour (or days) in case of cable breaks.

Mobile access technologies use radio frequency (RF) to provide seamless connection and mobility to an end user connected device through handovers between mobile base stations (referred to as cells). They are relatively cost effective and quick to setup. The user only needs to purchase a device and a subscriber identity module (SIM) card, no installation and line rentals are required. Connection can be established anywhere provided there is ubiquitous mobile network coverage. Mobile access technologies are capable of providing data downlink (when downloading content to the device) transfer speeds of up to 150Mbps and 25Mbps uplink (when uploading content from the device). However, the data transfer speed cannot be guaranteed because the mobile connection is subject to best effort and network congestion (i.e. it depends on RF signal strength received by the user connected device and number of users on the network).

Fixed-mobile access technologies use either mobile access technologies or alternative wireless technologies such as satellite, to provide a connection to customer premises equipment (CPE). It provides an alternative to fixed access technologies where connection is required to one location. It therefore inherits some advantages and disadvantages of mobile access technologies.

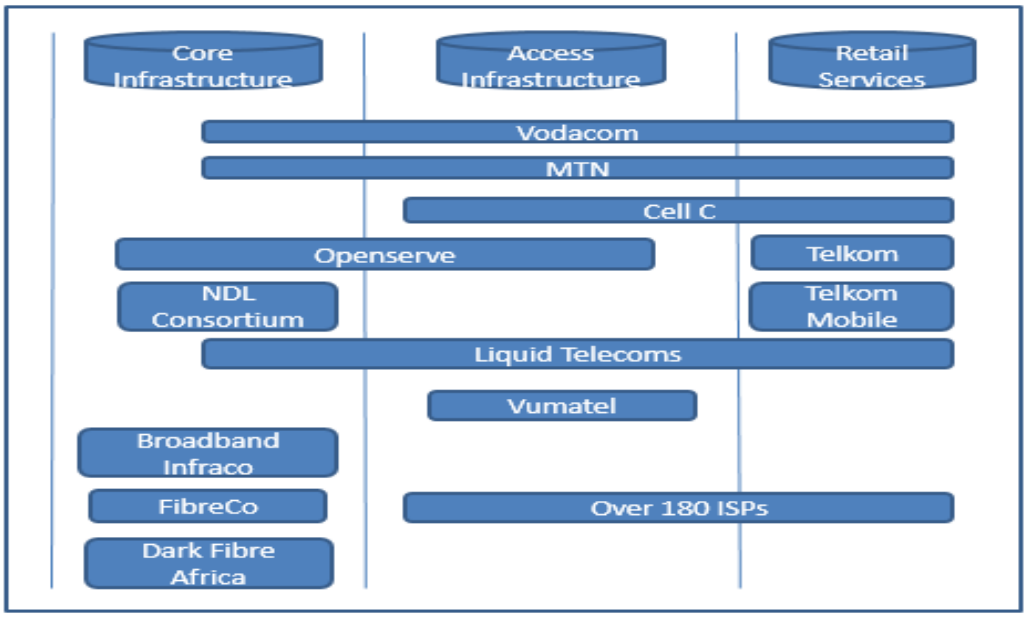
1.4.3 The core network

Aggregation network consist of points where the data from access networks is aggregated and routed to the desired destinations, this includes local and regional Internet exchange points (IXPs). The transport or backbone network forms the key connectivity between aggregation networks. The aggregated data is transmitted to external networks (national and international) through the national backbone network (also fibre optic or microwave) and international undersea cables or satellite. The national data will be terminated on local destinations and the international data will be transferred to international undersea cable landing stations where it will be further aggregated with data from other networks and transmitted to international destinations.

1.5 Background on the South African broadband market

The ICT sector has been identified as one of the key sectors to drive economic growth in South Africa (Statistics South Africa, 2014). Its contribution to the country's GDP was estimated at 3% with telecommunications services (which also include broadband) amounting to 62% of the total contribution (Statistics South Africa, 2014). Figure 2 represents the overview of the broadband market in South Africa. It should be noted that the figure only depicts market players with considerable market share, there is a number of other smaller players providing access infrastructure and services as well. According to the ICT regulator, the Independent Communications Authority of South Africa (ICASA), there were over 370 companies that were licenced to provide network infrastructure and services by September 2017.

Figure 2: Overview of the broadband market in South Africa

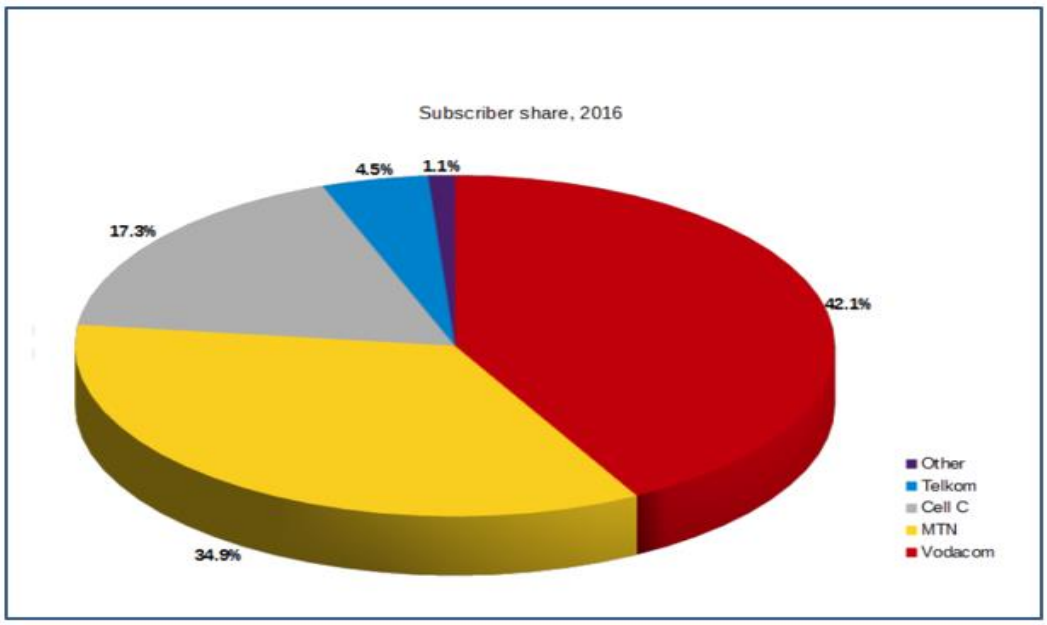


Source: Researcher (2018)

1.5.1 Access and retail services markets

The figure depicts a number of vertically integrated market players operating in all spheres of the market. Vodacom and MTN are South Africa's dominant mobile network operators (MNOs) with over 42% and close to 35% market share respectively as shown in Figure 3 Both Vodacom and MTN own and operate core and access infrastructure and they also provide retail services. The third MNO to enter the market (Cell C), owns just over 17% of the mobile market and the fourth market entrant, Telkom Mobile, has manged to accrue 4.5% or the market since it was launched in 2010. The other 1.1% of the market is shared by mobile virtual network operators (MVNOs) who only operate at retail services level. MVNOs do not own and operate network infrastructure, they usually enter into national roaming contracts with MNOs.

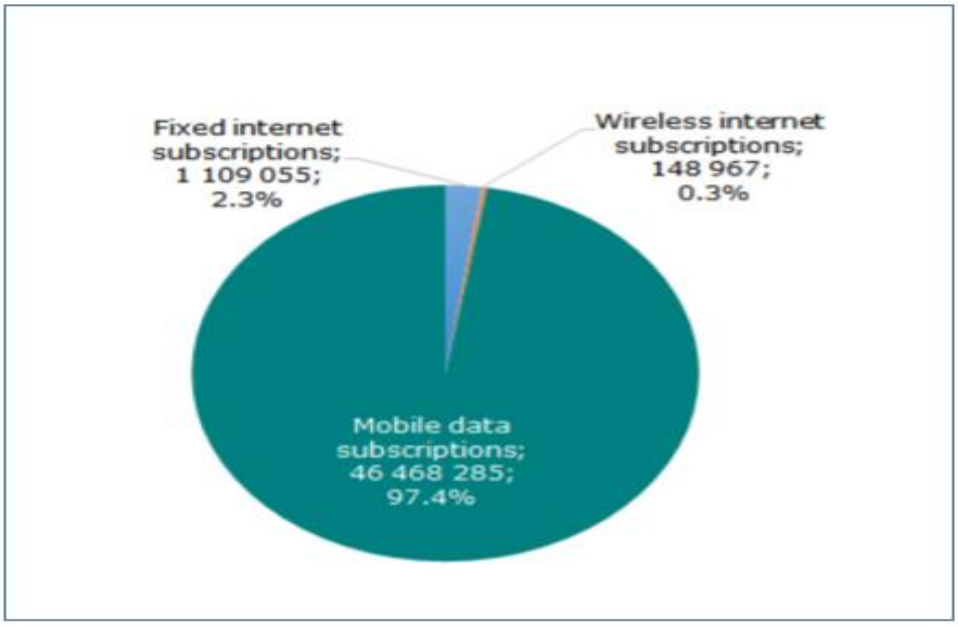
Figure 3: Mobile market share in South Africa



Source: BusinessTech (2017)

Figure 4 shows that 97% of South African Internet subscribers use mobile access technologies. However, the fibre-to-the-home (FTTH) market has seen a lot of developments since 2014.

Figure 4: Subscriptions by access technology



Source: ICASA (2016)

New market entrants such as Vumatel disrupted the long standing Telkom (previous government owned telecommunications incumbent) and Neotel (second fixed line operator) dominance in the fixed access market by introducing community based

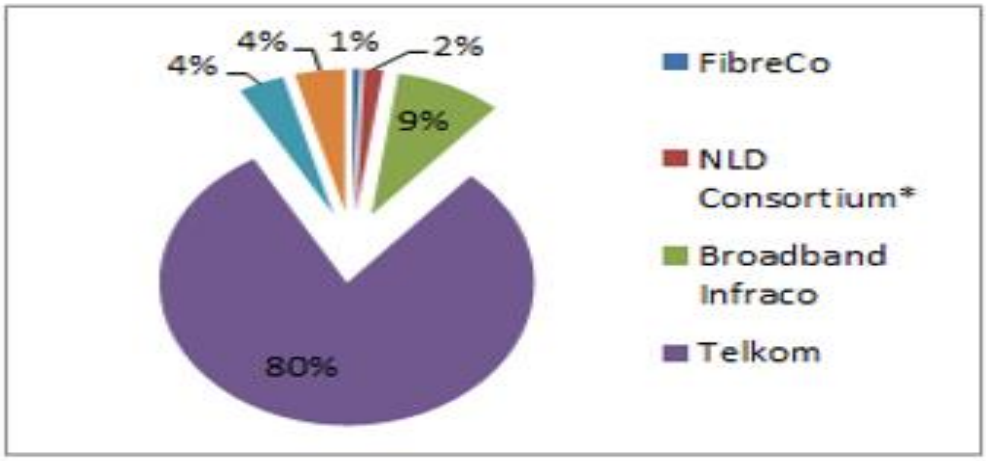
open access FTTH infrastructure. Since then, mobile operators also ventured in to the FTTH market. Then the market witnessed the structural separation of Telkom to form a wholesale open access network infrastructure subsidiary, Openserve. There has also been a number of acquisitions in this market, the most notable being that of Vumatel acquiring Fibrehoods, the acquisition of Neotel by Liquid Telecom and MTN acquiring Smart Village. Although there are claims from Openserve and Vumatel to be market leaders in FTTH, there has not been any comprehensive study to evaluate the state of competition in this market so far.

The retail services market also comprise over 179 internet services providers (ISPs) (The Internet Service Providers' Association, 2017), providing access to broadband Internet through a mixture of technologies such as satellite, point to point microwave links and Wi-Fi hotspots. Local and regional governments have also put initiatives in place to ensure easy access to broadband Internet for citizens. Successful examples of these initiatives includes the City of Tshwane Wi-Fi project in partnership with Project Isizwe where hotspots were installed in public places (schools, libraries, parks, and other public facilities) to allow free access to a limited amount of data usage per device per day, and the City of Cape Town broadband project which has over 800 kilometres of optic fibre network and has connected over 1 million users on its public Wi-Fi hotspots (Philip, 2017).

1.5.2 Core infrastructure market

As depicted in Figure 5, Telkom (now Openserve after the structural separation) still dominates the national backbone network with over 80% of the market share. This is due to its vast network infrastructure that was inherited from its past days as a government owned monopoly. In 2007, government formed another state owned telecommunications infrastructure company through the Broadband Infraco Act of 2007. The Broadband Infraco was primarily established to support the second fixed line operator (which later became Neotel) that was to compete with Telkom. By 2014, Broadband Infraco owned 9% of the national backbone market.

Figure 5: Core market share in South Africa



Data Source: Mott MacDonald (2014)

The National Long Distance (NLD) Consortium was launched 2013 as a partnership between Vodacom, Neotel, MTN and the South African National Road Agency Limited (SANRAL) to use road infrastructure and servitudes to provide long distance fibre network that will connect major cities in South Africa and compete with Broadband Infraco and Telkom. The other 5% of the market was shared by Neotel, FiberCo and Dark Fiber Africa.

1.6 A perspective on the digital divide in South Africa

Although connectivity to the Internet, in particular broadband, presents so much benefits to societal development, most developing countries are still grappling with a considerable degree of digital divide. The adoption and usage of broadband has over the years seen a disproportionate growth between income levels, with the main barriers identified as cost and access to infrastructure. Broadband adoption and usage comes at a considerable cost that is out of reach for some members of society (i.e. device and data cost).

Furthermore, broadband infrastructure rollout in developing countries has been driven by private entities whose main focus is to generate profit (Nedohe, 2014). This resulted in infrastructure gaps in areas that are deemed to have low or no return on investment. The potential socio-economic benefits and exclusive provisioning of access to broadband services and infrastructure has caused common concern and

prompted action from politicians and national governments around world (Picot & Wernick, 2007).

South Africa is no exception to this phenomenon. Its social inequalities are rooted in the past political and economic exclusions which shaped unequal access to resources, infrastructure and other services (education, healthcare, telecommunications etc.). The fact that this level of disparity is still prevalent even over 20 years after South Africa became a democratic country, draws attention to how policies are being developed and implemented to support social development (in certain sectors) by the government. ICT is one sector with high social development potential, but also reliant on sound policy and implementation to realise the benefits.

South Africa is a developing country with a total population of 55.9 million, a GDP of 294.8 billion USA dollars (World Bank, 2017). The country is currently challenged by a high unemployment rate of more than 30% and a high income disparity as evidenced by the country's Gini Coefficient of 0.68 (Statistics SA, 2017). To separate and define household income levels, Statistics South Africa (2015) divided annual household income into four categories as shown in Table 1.

Table 1: Statistics South Africa income level categories

Annual Income	**Income Category**
R1–R19 200	No income
R1–R19 200	Low income
R19 201–R307 200	Middle income
R307 201 and above	Upper income

Source: Data derived from Statistics South Africa (2015)

However, Statistics South Africa (2015) alludes to the challenge of defining income levels accurately as income is an inherently difficult variable to measure because it its definition as the sum of consumption and change in net worth. Furthermore, the Statistics South Africa definition of income levels is based on the data collected from the 2011 census. Therefore, there might have been considerable changes in net worth over the past years. Hence an updated and granular measure was necessary for this study.

The Living Standard Measures (LSMs) were developed by the South African Audience Research Foundation (SAARF) in the late 1980's after realising the need for an index that will use a number of variables (rather than one) to segment the population in to 10 markets or LSM groups (1 being the lowest and 10 the highest) based on the average monthly household income and affordability. The index has since been improved throughout the years to cater for rapid market changes. LSM has become the most popular tool used for market research in South Africa (SAARF, 2015).

In the absence of an accurate measure for income levels, the SAARF LSMs were used to propose three income levels for the purpose of this study. Table 2 illustrates the LSMs data as published by SAARF in 2016 and how it was grouped to define the income levels. Following the proposed income levels, the data SAARF LSMs data showed that 84.1% of the South African population fell within the low-income level.

Table 2: Income levels definition using LSMs

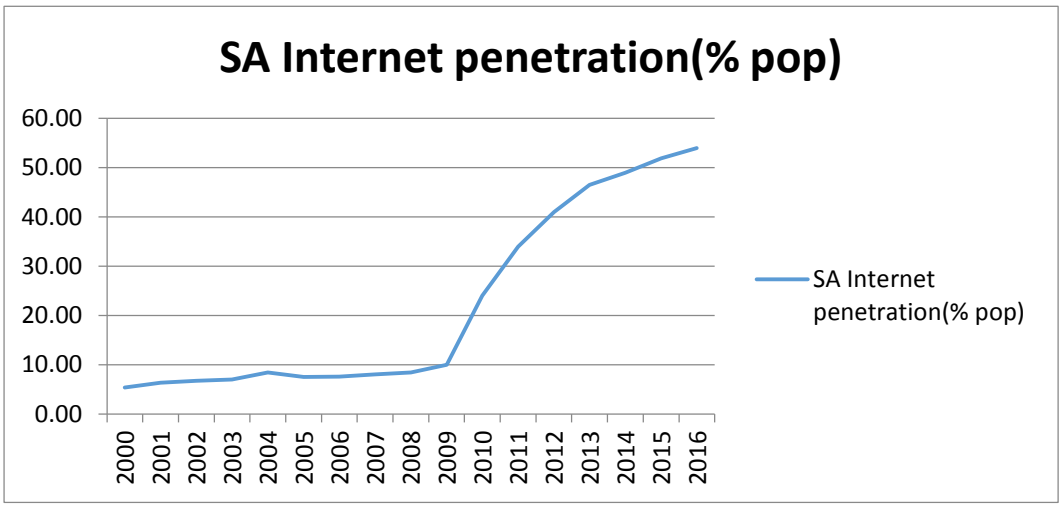
LSM	Average household income/month	%Population per LSM group	Grouped Income	Income level
1	R 2 225	1.1	R0 - R 20 000	Low-income
2	R 3 352	2.7		
3	R 3 357	5.7		
4	R 4 156	12.8		
5	R 5 636	16.8		
6	R 7 876	22.8		
7	R 12 280 - R 14 588	13.6		
8	R 18 210 - R 20 973	8.6		
9	R 24 212 - R 29 679	9.7	R20 000 - R30 000	Mid-income
10	R 31 709 +	6.2	R30 000+	High-income

Source: Data derived from SAARF (2016)

1.7 Barriers to adoption

Internet adoption in South Africa grew exponentially from 2009. This growth is attributed to a number of factors including the introduction of mobile broadband and the proliferation of smartphones. But Figure 6 shows that the growth since declined to a rate of only 5% from 2014 till 2016 to mark 54% of the South African population as Internet users.

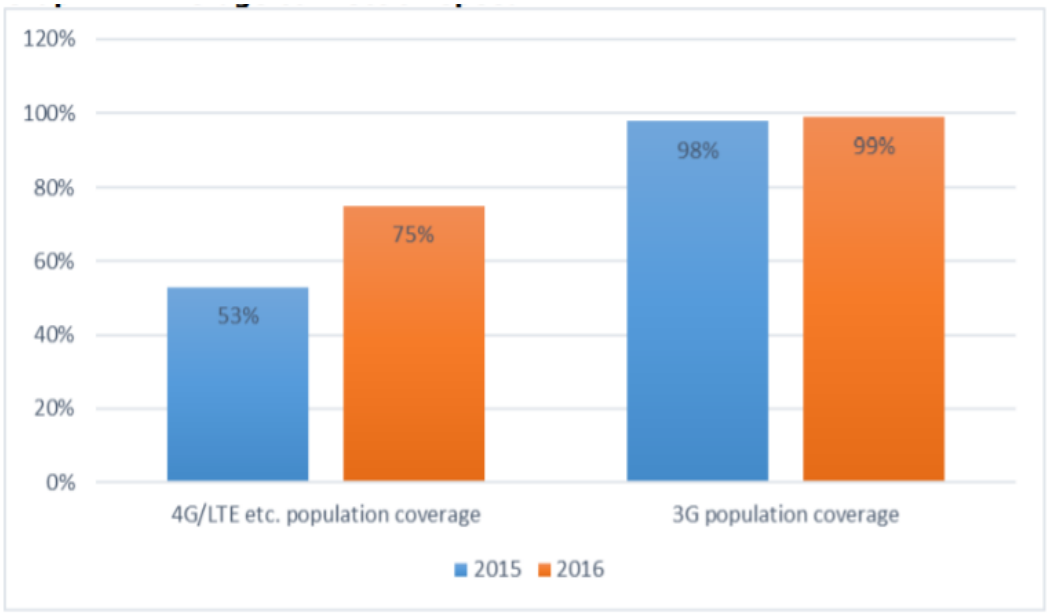
Figure 6: Internet penetration in South Africa



Source: Data from ITU (2017)

The declined Internet penetration is regarded as a result of factors such as high cost and lack of access to infrastructure as the most significant barriers for broadband uptake and usage (Brown, Letsididi & Nazeer, 2009; Naidoo, 2011; Seymor, 2012; Seymor & Naidoo, 2013). Since the introduction of the Internet in South Africa in the early 1990s, connection was primarily via fixed line technologies like Integrated Service Digital Network (ISDN) and later Asymmetric digital subscriber line (ADSL) which kept the cost of Internet high and out of reach for many households. But the fast growing mobile industry soon surpassed fixed line subscription numbers due to the added advantages of mobility and the ease of connection, vast coverage, and lower connection rates. In 2016, ICASA reported that 99% of the South African population was within 3G coverage and the Long Term Evolution (LTE) coverage grew by over 20% in the same period (see Figure 7). Mobile broadband technologies are now considered as viable substitutes and preferred methods of connecting to the Internet by majority of South African subscribers (Moroeng, 2011).

Figure 7: Percentage of population covered by mobile broadband



Source: ICASA (2016)

Furthermore, a price comparison between 2003 and 2013 indicate a decrease in both mobile and fixed data price per gigabyte, not considering line rental cost for ADSL (Muller, 2013). The price of smartphones has also reduced following initiatives by service providers to introduce low cost smart devices (e.g. Vodacom's Smart Kicka and MTN's Steppa). South Africans can now purchase a smartphone with 3G HSPA+ (High Speed Packet Access bearers capable of theoretical data transfer speed of up to 168 Mbps download and 22 Mbps upload) and Wi-Fi connectivity for just under ZAR500.

Based on the above, the argument that although cost and access to infrastructure are still key determinants, there are other factors that drive broadband demand differently can be advanced (Flamm & Chaudhuri, 2007). Hence the focus should rather shift towards other motivational factors that influence increased adoption and usage of broadband, particularly for low-income communities.

1.8 Policy and legal environment to support broadband in South Africa

Duncan (2015) states that developing countries may be pressured to embrace one-size-fits-all policies in order to prove their global relevance. But this approach may have adverse results. Primarily because when a policy blueprint is adopted, there may be less attention paid to local contextual needs. Duncan further points to ICT for

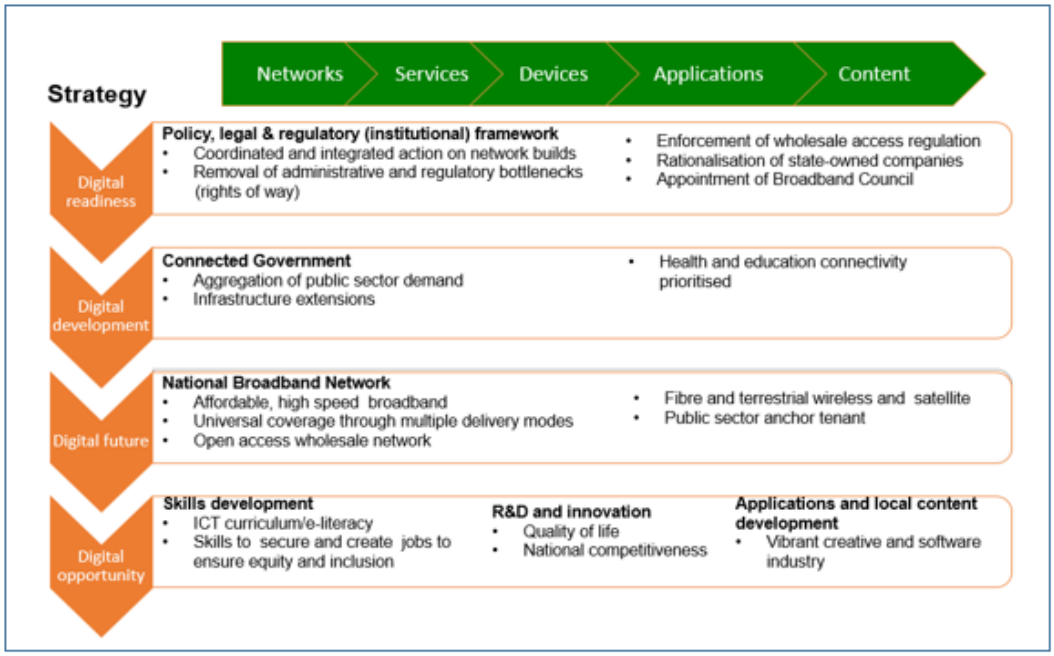
Development (ICT4D) projects as an example, with many of the projects failing to increase ICT adoption and use in the intended communities because they were mainly supply-driven. Moreover, policy makers assumed that when ICT infrastructure and facilities (e.g. community telecentres) are provided, communities will by default adopt and use them. This approach neglected the need to integrate technologies in communities, specifically the understanding of why and how communities use ICT to improve their livelihood, which in turn stimulates demand.

Since the repealing of the Telecommunications Act No. 103 of 1996 by the Electronic Communications Act No. 36 of 2005 as amended (ECA), the South African ICT sector has seen major reforms in the Internet service provisioning market. The ECA is the current legislation that governs the ICT sector and it is supported by other legislations such as the Broadcasting Act No. 4 of 1999, Postal Services Act No.124 of 1998, Electronic Communications Transactions Act No. 25 of 2002 (ECTA) and the Independent Communications Authority of South Africa Act No. 13 of 2000 (ICASA Act) which established the sector regulator.

The current licensing regime under the ECA caters for an electronic communications network services (ECNS) licence that allows a licensee to construct and operate network infrastructure, and an electronic communications services (ECS) licence which only allow provisioning of wholesale and retail services without owning and operating network infrastructure. The licensing regime enables licensees to acquire either the ECNS, ECS or both. This provides a dynamic platform where competition can be realised at both infrastructure and services levels.

The publication of the national broadband policy in 2013 was a major milestone for the country. South Africa Connect (SA Connect) as it is formally known, is premised on four pillars as illustrated in Figure 8.

Figure 8: Four pillars of the SA Connect



Source: DTPS (2013)

In summary, the policy places a strong focus on both supply and demand development by identifying and minimising legislative and regulatory bottlenecks. It strives for the facilitation of rapid infrastructure deployment and aggregation of government broadband demand as vital mechanisms to enable timely infrastructure expansion to unserved areas. The policy also views the establishment of an open access National Broadband Network (NBN) as an enabler to service based competition and the minimisation of infrastructure duplication. Furthermore, the policy calls for ICT skills development to drive industrialisation and increased demand. One of the key recommendations in the policy is that the custodian department (in this case it was referring to the Department of Communications) should ensure that research is conducted to identify barriers to broadband adoption, which will inform additional actions and demand-side targets.

The South African government has received criticism from the ICT industry for delaying the release of the so called “high demand radio frequency spectrum” to support the SA Connect objectives. The majority of this spectrum is in low frequency bands (typically below 1 Gigahertz). The spectrum is demanded by MNOs due to its propagation characteristics.

The signal can travel for longer distances without being distorted because the frequency is low, thus enabling MNOs to cover wide areas with high speed broadband at less investment on infrastructure. This is particularly beneficial in sparsely populated areas.

A considerable amount of this spectrum (in the 400 Megahertz band) is currently used by analogue television broadcasting. Hence the migration of television broadcasting from analogue to digital will release the spectrum for broadband services. The delays are embroiled in long standing legal disputes between the national Department of Communications (DoC) and broadcasters on the implementation process and the encryption of television set-top boxes. This led to South Africa missing the deadline of June 2015 that was declared by the International Telecommunication Union (ITU) for countries to migrate television broadcasting to digital.

The other aspect that has hampered the release of the high demand spectrum is the inability of the national Department of Telecommunications and Postal Services (DTPS) to provide a policy directive on how this spectrum should be licensed. The DTPS is concerned that the spectrum (as a key national resource) should be licensed in the manner that will ensure that the proceeds from the licensing process will meet the developmental objectives of the government and drive transformation. In July 2015, ICASA issued an invitation to apply for licensing part of the spectrum in the 700, 800 Megahertz and 2.3 Gigahertz bands through an auction process. The DTPS then lodged a legal challenge, claiming that ICASA was acting outside of its legal mandate to initiate the licensing process without the concern from the ministry. The DPTS won an interdict for ICASA to halt the process until the court makes a ruling on its claims.

In October 2016, the DTPS published the National ICT Policy White Paper that was approved by parliament after a lengthy drafting and consultation process. The National ICT policy white paper is said to be an overarching policy document that will govern the development of the ICT sector for the next 10 to 15 years. Therefore, the document will see the repealing of the ECA and amendments of other legislations such as the ICASA Act, Postal Service Act, and South African Post Office Act. One of the key highlights of the National ICT policy white paper is the call to establish a Wireless Open

Access Network operators (WOAN). The aim is to consolidate the high demand spectrum under the control of the WOAN for it to provide open access infrastructure to all service providers in a fair and equal manner in order to facilitate effective competition at services level.

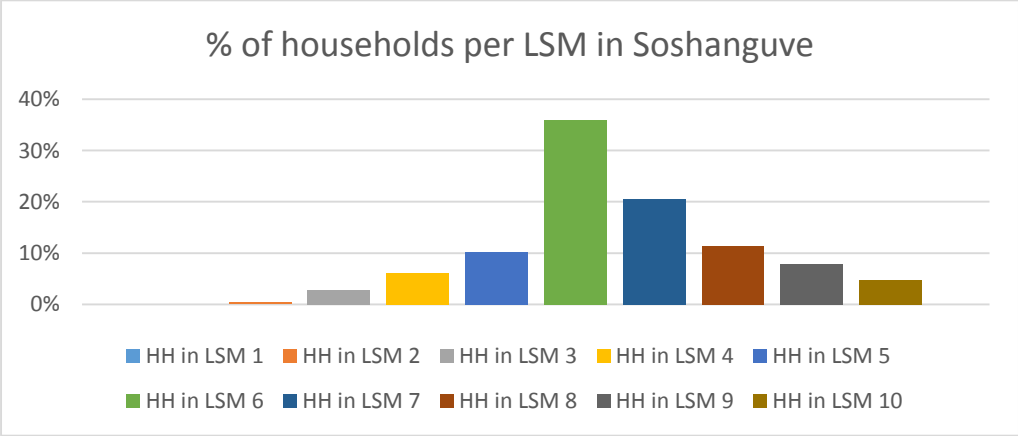
1.9 Soshanguve

The township of Soshanguve was chosen as the target population for this study. Soshanguve is located 25 kilometers on North West of South Africa's administrative capital Tshwane. It dates back to 1974 and the name "Soshanguve" was derived from abbreviating each of the ethnic groups that were relocated to the township, namely: Sotho, Shangaan (Tsonga), Nguni and Venda.

The township is subdivided into sections or extensions and covers an area of 126 km². The total population is estimated at over 400,000 with 106,057 households and a density of 836 households per km² (Statistics South Africa, 2011). Soshanguve has a diverse cultural heritage with all South African official languages represented. The township is mostly residential and the majority of people work in Tshwane central business district and surrounding areas (i.e. Tshwane North, West and East, Rosslyn, Hatfield and Centurion).

The LSMs data presented in Figure 9 shows that on average, 87% of households (HH) in Soshanguve were within LSM 3 to 8 which is above the country average of 84.1% as it was presented in Table 2.

Figure 9: Percentage of households per LSM group in Soshanguve



Source: Data from Geoterra Image LSM data (2014)

Therefore the township's income profile and its close proximity and accessibility to the researcher, presented a suitable population for this study.

1.10 Research problem statement

Apart from the commonly known determinants (i.e. cost and access to network infrastructure), there are motivational factors that can be identified from literature that influence the decision of consumers to adopt and use broadband. To this end, research is still focused on ranking factors in order of significance in an attempt to explain which factors have the most influence on the user's decision to adopt and use broadband. Little consideration is being assigned to the examination of the collective effect of these motivational factors and how they influence the behaviour of users to adopt and use broadband. There is also less emphasis on the role played by demographics such as income level to the determination of the motivational factors. Although there are studies that have presented motivational factors for broadband adoption in South Africa, there is little knowledge about how these motivational factors collectively influence the adoption and usage of broadband by low-income households, as this has not yet been studied in detail.

1.11 Research purpose statement

The purpose of this research is to investigate how motivational factors influence the behaviour of low-income households in South Africa to adopt and use broadband. The research was conducted in the township of Soshanguve in the City of Tshwane, South Africa. The study first sought to uncover how broadband was utilised by low-income households. Then it examined how low-income households are influenced by attitudinal constructs, normative constructs, control constructs as well as relevance constructs to adopt and use broadband. This sought to provide a deeper understanding on the interaction of low-income households and broadband in order to give inputs to policy, regulation and market strategies for broadband demand stimulation.

1.12 Research questions

The following research question was posed to address the aforementioned problem statement:

Main Research question

How do motivational factors influence the adoption and usage of broadband in low-income households?

To support the main research question, the following sub-questions were investigated:

Sub question 1

What are the characteristics of broadband use among low-income households?

Sub question 2

How do attitudinal, normative and control constructs influence the behaviour of low-income households to adopt and use broadband?

Sub question 3

How do relevance constructs support the influence on behaviour of low-income households to adopt and use broadband?

1.13 Research objectives

This research investigates how motivational factors influenced the decision of low-income households in terms of adoption and use of broadband. There are multiple factors that affect the decision of households and individual users to adopt broadband that have already been identified in literature. This study does not attempt to uncover additional factors, nor rate factors in terms of their prominence as previous studies have done. The focus is rather on motivational factors, as identified in literature, and how they collectively influence low-income households to adopt and use broadband. In addressing the aforementioned objectives, the study first seek to build a deeper understanding on how low-income households use broadband.

1.14 Limitations

Due to the short timelines provided to complete the study and cost considerations, samples were drawn from three sections in one township only. Therefore, the results of this study has limited generalisability to South African low-income households.

The measure that was used to classify income levels had limited accuracy because income is dynamic variable that needs to be measured frequently. In addition, the fact that a 47% of participants did not know their monthly household income may also present a weakness in validating the findings since the study was premised on income level.

The theoretical framework that was adopted for this study was extended to include relevance constructs which have not yet been proved statistically to have had any influence on technology adoption. This may imply inherent weakness on the findings deduced on these constructs.

1.15 Significance

The results of this study provide the basis for understanding how motivational factors influence the behaviour of low-income households in their adoption and use of broadband in South Africa. The study also provides suggestions for future research and make recommendations that can be beneficial to policy makers, regulators and industry players when developing broadband policy, regulations and demand strategies and also supplement the growing global knowledge in broadband adoption and usage.

1.16 Chapter Outline

Chapter 1 has provided a context on the impact of broadband in society, considerations for broadband demand stimulation and an overview of broadband network infrastructure. The chapter then provides a background on the South African broadband market, the country's digital divide, barriers to Internet adoption and the current policy environment to support broadband development. The background is followed by a profile of the selected population of Soshanguve and a summary of the research problem and purpose statements, the research questions, the research

objectives, its limitations and significance and concludes with the chapter outline for this report.

Chapters 2 is a review of literature. The chapter lays a theoretical foundation around technology adoption as related to Information Technology (IT). A global review to identify gaps in broadband adoption literature and to uncover factors that motivate potential users to adopt and use broadband is conducted. A list of the most influential factors is then selected to inform a theoretical framework for this study.

Chapter 3 builds on the research problem statement and purpose statements, then research questions are drawn from the theoretical framework developed in Chapter 2 to address the research problem. The chapter also introduces the research approach, the research design and methods used to collect and analyse data.

Chapter 4 provides a presentation of data collected from the focus groups based on the research questions and methods stated in Chapter 3. The chapter begins by providing the profile of the participants. Then the results are presented on each tested factor as per the theoretical framework and any other factors that are apparent from the collected data.

Chapter 5 is an in-depth analysis of the data presented in Chapter 4. The chapter provides a perspective narrative on the literature review on how motivational factors influence low-income household to adopt and use broadband. And lastly, the chapter presents the detailed extended theoretical framework.

Chapter 6 concludes the research report by reassessing the objectives of the study in line with the collected and analysed data and how these objectives were met make recommendations. The chapter further provides proposed areas of future research, assesses its contribution to the body of knowledge and closes with a conclusion for the study.

Chapter 2: Literature on broadband and technology adoption

2.1 Introduction

Considering the clear assertions from literature about the potential benefits and the impact of broadband on society, it is important to further outline the link between broadband and socio-economic development and what makes it a public policy issue. In this chapter, the researcher turns to literature to find a suitable definition for broadband and an insight on user patterns, as well as the importance of local content and its impact on broadband adoption and usage. The researcher also reviews literature to provide a background on technology adoption models and theories as well usage in order to define user patterns. A review of key theories and models as applied or integrated by researchers in information systems is conducted. Followed by a narrowed focus on the models developed specifically to study adoption of broadband by households and individuals in order to identify the motivational factors. Then a global overview of motivational factors for broadband adoption with an aim of identifying any differences or similarities between developed and developing countries is conducted. Lastly, a conceptual and theoretical framework for this study is drawn from the literature.

2.2 Defining Broadband

There is no standard or universal definition for the term "broadband" (Choudrie & Dwivedi, 2006; Kelly & Rossotto, 2012) therefore this chapter first turns to literature in order to identify a suitable definition of broadband for this study. Traditionally, broadband is regarded as an evolution in network technology to enhance functionality that could not be achieved with its predecessor's (narrowband) technologies due to the nature of content conveyed (Van den Broeck & Lievens, 2007). Hence broadband is commonly defined as the amount of data (in bits) that can be transferred through a particular network connection in a given period of time, usually per second (Van den Broeck & Lievens, 2007; Seymour, 2012; Abrahams, Bakker, & Bhyat, 2007).

Although the former definition is widely accepted by network and end user equipment manufacturers, network operators, content providers and users, it is limited when considering it from the view of policy and regulation because of the potential impact

of broadband to the entire economy (Kelly, Mulas, Raja, Qiang, & Williams, 2009; Picot & Wernick, 2007). There are three limitations with defining broadband in terms of data transfer speed as identified by Kelly and Rossotto (2012). First there is no consensus among influential organisations such as the ITU, Organization for Economic Cooperation and Development (OECD), Internet Society (ISOC), and the World Economic Forum (WEF) and countries on what should be the minimum data transfer speed to qualify a connection as broadband. Secondly, even if a minimum speed can be agreed upon, it will have to be revised frequently to keep up with rapid technological developments and user demands. The third limitation has much to do with the actual network configurations (different types of backbone and access technologies) and end user device capabilities. All these factors have a considerable impact on the connection speed, thus it is difficult for network operators to always guarantee data transfer speed to a user.

Considering these limitations, it is a futile exercise to set broadband policy objectives or targets using the data transfer speed definition. It can culminate in governments setting targets that are either too low or too high for network operators to meet (Kelly & Rossotto, 2012), with negative consequences to the user in both cases. The other aspect that makes developing policy under the above mentioned definition of broadband flawed is its supply side orientation. Its main concern is providing high speed data networks with less regard to different user (i.e. business, government and individual) requirements and usage. This can also lead to either over supply of network infrastructure in areas where it is not needed, resulting in return on investment issues for network operators, or under supply in high demand areas resulting in poor quality of service.

For these reasons, Kim, *et al.,* (2010) proposed that the definition should go beyond network capabilities and data transfer speed to an ecosystem that encompasses high speed networks, services, products, applications and users. The authors hold a view that policymakers should see broadband as an enabling platform and key input to growth across many sectors. In addition to the direct benefits from investment in broadband technology development and infrastructure deployment, broadband can

drive innovation to improve productivity and create new products and services in other sectors.

Kelly and Rossotto (2012, p. 3) further assert that from a policy perspective, a more holistic view of broadband should be taken, so they define it as "a high-capacity ICT platform that improves the variety, utility, and value of services and applications offered by a wide range of providers, to the benefit of users, society, and multiple sectors of the economy". Hence broadband can be considered a General Purpose Technology (GPT) with the potential to induce improvements across different sectors (Kelly & Rossotto, 2012; Kelly, *et al.*, 2009).

This study will therefore assume the holistic definition of broadband as an ecosystem as proposed by Kim, *et al.,* (2010) with the focal point being on the interaction of broadband with low-income households. This definition is congruent with the underlying objective of this study to examine how motivational factors influence low-income households to adopt and use broadband in two ways. Firstly, it does not consider broadband as just a technology but an enabler that can enhance the livelihood of its users, this is important to low-income household members. Secondly, it does not consider adoption as only access to high speed network infrastructure but also ownership of devices and usage of applications and services provided over this infrastructure.

For the purposes of this study, the words "adoption" and "uptake" refer to the ownership of any end user device capable of connecting to either mobile broadband connection (e.g. 3G, 4G or Wi-Fi), fixed wireless or fixed data connection. "Usage" refers to regular purchase of data credits (postpaid or prepaid) for Internet browsing, content download, instant messaging, social media and any other services (e.g. banking, education and government services).

2.3 Defining the broadband user

The other element that is important to technology diffusion is usage. Research shows that technology adoption does not necessarily translate to usage (Lanzolla & Suarez, 2009). Zhang (2013) affirms that technology adoption models only measure the intentional behaviour of users to adopt, but not the actual use after adoption. To

better understand broadband usage, it is important to define “the broadband user”. All that is apparent to this stage is the distinction set by performance between broadband and narrowband. But ultimately both are methods of connecting to the Internet. Therefore it will be less controversial to define the “Internet user” holding a view that users are characterised by the behaviour or patterns they exhibit once they have established an Internet connection.

In their User Diffusion (UD) model to study household use of computers, Shih and Venkatesh (2004) propose four possible types of Internet use patterns, namely: intense, experimental, specialised and low use. Each type of use pattern is premised on the rate and the variety (i.e. number of applications used) of use, where intense use relates to both high rate and high variety, experimental use refers to low rate and high variety, specialised use is high rate and low variety, while low use is both low rate and low variety. The drawback with the use patterns proposed in the UD model is that they are only limited to two dimensions, so a user can only be classified under the four possible use types.

It might however be of interest to understand other aspects that affect user patterns particularly when the aim is to use this information for further demand stimulation. Norliah *et al.* (2017) propose that the Internet usage pattern can be identified using the time spent online, location of access and the purpose of use. The authors argue that by using these three factors, a user can be classified either as an average, excessive or addicted Internet user. However, they also propose only three possible user categories and their focus is on the rate of use.

For the purpose of this study, a more elaborate approach will be used to categorise Internet users. The approach builds on the UD model by Shih and Venkatesh (2004) as well as that of Norliah *et al.* (2007) to add six dimensions as illustrated in Table 3.

Table 3: Broadband user patterns

	Use Dimension	Use Pattern	Selection
User	Frequency of Use	Frequent	
		Moderate	
		Casual	
	Time spent	progressive	
		declined	
		dormant	
	Purpose of use	Basic	
		Advanced	
	Location of use	Work	
		Home	
		Shared	
		Public	
	Preferred Payment method	Prepaid	
		Postpaid	
	Preferred Access Technology	Fixed	
		Fixed Mobile	
		Mobile	

Source: Researcher (2018)

Depending on behaviour, a user can be classified under a use pattern from each use dimension. The frequency of use describes how often the user visits or use the Internet, a user can be classified either as a frequent user (use the Internet every day), moderate user (use the Internet at least once a week) or casual user (use the Internet at least once a month).

The time spent dimension looks at the duration the user spends on the Internet within a given period (e.g. annually) to determine if it has increased, decreased or stayed the same. From these three levels, a user with increased time spent is classified as a progressive user, a user with a decreased time spent as a declined user and the user with a time spent that stayed the same as a dormant user.

The purpose of use classifies a user under two broad categories, the basic user is the one who uses the Internet mainly for communication (i.e. emails, social media, instant messaging, etc.) and information search (including for purposes of education and training) while the advanced user uses the Internet for more advanced online services such as banking, shopping and trading over and above that of a basic user.

The location of use helps to identify the location were the user has the ease of access to the Internet. Here, a user can be a home, work (this includes place of education for

learners), sharing (has access to Internet at other people's places) or public user (access to Internet at public facilities such as libraries and community telecentres).

The preferred payment method refers to how the user pays for Internet access. The user can be classified either as a prepaid user (buys and loads prepaid data vouchers), postpaid user (has contract a contract with a service provider and pays on account) or free users (prefers to use the free option available including Wi-Fi hotspots).

Lastly, the preferred access technology dimension considers if the user prefers mobile technologies, fixed-mobile technologies or fixed technologies to access the internet.

2.4 Relevance of broadband content

Howell (2002) likens the content carried over broadband networks to water or gas that is delivered to consumers through pipe systems. Howell argues that investment in infrastructure without understanding how the consumer will apply the contents thereof is a flawed approach. Garcia-Murillo (2005) adds that the availability of local content to the population in their own language will result in increased broadband uptake. Lee, Marcu and Lee (2011) further affirmed that the availability of interesting content and "killer applications" will drive broadband demand.

It is therefore apparent that the lack of relevant content may have a negative impact on the rate of adoption and usage of broadband. A study by Mwanankuwa (2016) further affirms that low broadband adoption rate in rural Zambia was partly attributable to the lack of local content that addresses the needs of a specific community.

2.5 Information Technology adoption theories and models

Information Technology (IT) adoption and diffusion is a matured field of study. Most, if not all, literature in this field originates from management information systems (MIS) or information systems (IS) studies. IS defined by the School of Economic and Business Sciences at the University of Witwatersrand, as "systems that allow individuals, organisations, and societies to gather, store, organise, protect, retrieve, share, and make sense of the information in their environments."

The focus of IS studies is therefore on how people, organisations and societies interact with technologies. Hence the study of technology adoption requires an insight in social psychology, in particular user motivation over and above the understanding of the technology itself (Davis, 1985).

There are many models and theories developed to investigate the adoption and diffusion of IT by individuals, households and businesses (Oliveira & Martins, 2011). The majority of these models are extensions or combinations of previous models and theories. Developed either to test the limits or form stronger variants or explain new phenomena as technologies and users evolve.

For this study, the focus will be on the prominent theories and models as developed by researchers who were most concerned with adoption and usage of information technology by individuals and households. A literature review by Korpelainen (2011) reveals that the Theory of Reasoned Action (TRA) (Fishbein & Ajzen, 1975), Theory of Planned Behavior (TPB) by Ajzen (1985), Technology Acceptance Models (TAM) (Davis, 1985), Diffusion of Innovation Theory (Rogers, 1983), and the Unified Theory of Acceptance and Use of Technology (UTAUT) (Venkatesh, Morris, Davis, & Davis, 2003) are among the top five most cited theories in IT adoption studies.

Most models used in IS studies today are rooted in psychology, in particular human behavioural studies. Researchers endeavoured to discover what will encourage the acceptance of new technology to assist organisations to predict if the technology will be accepted by users (Davis, 1985) or to assist innovators to predict if their innovations will be well accepted by the market and at what rate will they be diffused (Rogers, 1983). Therefore, it is important to first provide a theoretical background in human behaviour and different models that have been developed over the years.

2.6 Behavioural Intention Theories

As Ajzen (1991) pointed out, predicting human behaviour is a difficult task. It involves the consideration of many psychological and social complexities. However, it is important to understand the key aspects of human behaviour because adoption of technology is a social subject as much as it is a technical one (Rogers, 1985). Hence it

was necessary for early researchers in social psychology to develop models that can predict it to a high degree of accuracy and consistency.

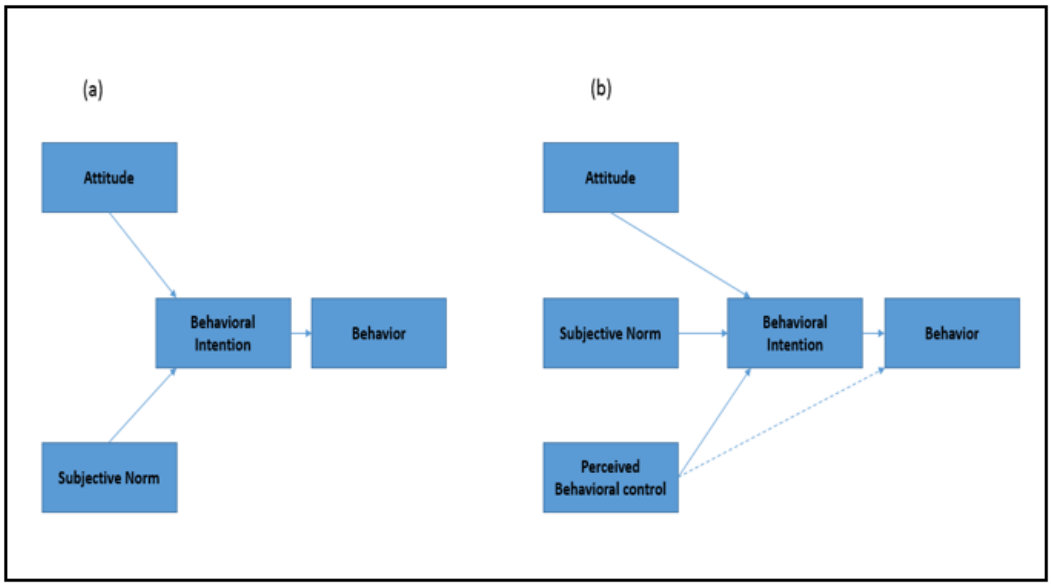
Although it was known that attitudes somehow affect human behaviour, conceptions of that time had to go under numerous reviews because they failed to underpin attitudes as a central device for explaining and predicting human behaviour (Fishbein & Ajzen, 1975). After realising the inconsistencies in literature, Fishbein and Ajzen (1975) sought to develop a coherent and systematic conceptual model that was to be used in various studies of human behaviour. The focal point of this model was to introduce a distinction among four variables (beliefs, attitudes, intentions and behaviour) that were used interchangeably and to explain their unified relationship.

To achieve this, the authors analysed and refined a model that was previously defined by Fishbein in 1967. The model depicted behavioural intention as the immediate indicators if an individual will overtly perform a certain behaviour (Davis, 1985). In more simplistic terms, a person's behaviour to perform or not to perform an act can be accurately predicted if the intention to perform the act can be measured (Ajzen & Fishbein, 1969). Intention, in this respect, is defined as the amount of effort a person is willing exert to achieve a goal. If the measure of the intention exhibits a high score, the person is more likely to perform the act and when the score is low the person is less likely to perform the act (Ajzen, 1991).

The model further indicates that behavioural intention is a sum of two main normative variables, subjective norm and attitude. Subjective norm reflects the expectation of others (referents) on how an individual should behave i.e. either to perform or not perform an act. It is theorised as a function of the individual's beliefs on whether the referents think that he or she should perform the act, the individual's motivation to conform to the expectations and the number of these referents (Fishbein & Ajzen, 1975). While attitude reflects the individual's level of favour towards such an act, according to Fishbein and Ajzen (1975), a person will always hold beliefs about an object which is tied to certain attributes (e.g. other objects, goals, and characteristics). The evaluation of these attributes and the summation of his or her beliefs, will form the overall attitude towards the object.

The work by Fishbein and Ajzen (1975) resulted in the development of the TRA as depicted in Figure 10(a) and its extension, the TPB in Figure 11(b). These two theories are the most cited in the study of information technology adoption and they are also antecedents of most models used in IS (Korpelainen, 2011).

Figure 10: Simplified Path Models for (a) TRA and (b) TPB



Source: Adapted from Madden, Allen and Ajzen (1992)

Ajzen (1985) extended the TRA to include perceived behavioural control as an exogenous variable with effects on both behavioural intention and behaviour to form the TPB. TRA was developed under the assumption that people always have full volitional control over the behaviour being studied (Madden, *et al.,* 1992). Ajzen (1991) argues that although the measure of behavioural intention might be high because of attitude and subjective norms, the overt performance of the studied behaviour will be determined by the actual level of control the person has to willingly act or not to act. This control may be limited by non-motivational or external factors (e.g. availability of resources and opportunities). Hence the effect (dotted line) of perceived behavioural control over behaviour. However, the effect of perceived behavioural control over behavioural intention is influenced by the perceived level of control, because the more people believe they have the necessary control to perform a behaviour, the higher the intentions will be (Ajzen, 1985).

A comparison test of the two theories by Madden, *et al.,* (1992) yielded that both models can accurately predict behaviour provided that the subjects have full volitional control over the target behaviour. But when the control was limited, TRA was found to be inferior and TPB recorded on average more variations of behavioural intention than TRA. This was to attest that the addition of separate belief measurement to the original TRA can improve its accuracy. Furthermore, Madden, *et al.,* (1992) also posit that in other settings, it may be beneficial to improve the level of control in order to influence the behaviour rather than focus on attitude and subjective norm.

Although TRA and TPB has been widely accepted and used in many fields of study, Ajzen and Fishbein (2005) concede that there are some concerns raised about the accuracy of the models. The models do not adequately cater for other irrational and non-cognitive determinants of human behaviour like emotions and compulsions. Consequently, people can provide different responses depending on their current moods (Ajzen & Fishbein, 2005).

2.7 The Technology Acceptance Model (TAM)

TAM is one of the most successful theories in technology adoption studies. Its success saw it being implemented in many fields like medicine, banking, and the public sector. The original theoretical model was developed by Davis (1985) with the aim of improving understanding in the user acceptance process and theoretical basis for testing and successful implementation of information systems. Davis (1985) defined MIS success criteria around three variables, namely: actual use of the system, user attitudes, and performance impact. His concern was to develop techniques that will enable policy and decision makers to motivate targeted users to accept and use the intended systems.

Since one of the main objectives for developing TAM was to understand the user acceptance process, it was essential for Davis to integrate in his framework a well-established theory with human behaviour as a foundation. Hence TRA was chosen to form the basis of TAM. Davis theorised that if users are exposed to a certain technology, they will develop an attitude that will determine the likelihood of acceptance of the technology (intention) and its continuous use. This attitude is

determined to be a function of two major beliefs which are perceived usefulness and persevered ease of use. Perceived usefulness (PU) is defined as "the degree to which an individual believes that using a particular system would enhance his or her job performance" (Davis 1985). While perceived ease of use (PEOU) is defined as "the degree to which an individual believes that using a particular system would be free of physical and mental effort" (Davis 1985).

Although TAM has received favourable empirical support through the years due to its specificity and simplicity (Todd & Taylor, 1995), it is found to be too parsimonious by other researchers because it relies only on two constructs to define the user attitude which tends to be a limitation when considering descriptive richness (Poong & Eze, 2008). Taylor and Todd (1995) view TAM as a special case of TRA because it does not consider subjective norms. This is due to the fact that the model was originally developed with a strong focus on technology acceptance by individuals at organisational level for work purposes.

But Davis (1985) contend that subjective norms have no significant impact on technology acceptance if the user's attitude and intention is influenced by the usefulness of the technology towards improving productivity.

This was proven not to be the case by Taylor and Todd (1995) and Venkatesh and Davis (2000) who view the exclusion of subjective norms as a limitation on TAM. Hence they propose the decomposed TPB (Taylor & Todd, 1995) and TAM2 (Venkatesh & Davis, 2000). This is expected to be true especially in settings where personal control and social influence play an important role in decision making (e.g. individual users and households who are intending to adopt the technology for personal use). Rogers (1983, p. 4) also emphasise that "an important factor affecting the adoption rate of any innovation is its compatibility with the values, beliefs, and past experiences of the social system."

2.8 Diffusion of Innovations Theory (DOI)

DOI was pioneered by Rogers (1983), and he defines diffusion as a managed or spontaneous process to spread (communication) messages of new ideas (innovation), through certain channels over a period of time, among members of a social system.

Hence the four main elements of DOI are innovation, communication channels, time and the social system (Rogers, 1983).

Rogers identifies three main role players in the process, namely: the change agencies, change agents and adopters. Change agencies are those who intend to address certain needs or solve problems through innovation (e.g. inventors, decision makers within organisations, governments and other authorities), change agents are the ones who influence the behaviour of others and advocate toward the successful implementation of the intended objectives of the innovation (e.g. marketers and referents) while adopters are the target society (individuals or organisations).

The main distinction between DOI and other models is that it is premised on process principles. Rogers proclaims that diffusion alone will not determine if the innovation will be successfully adopted or rejected by the society. Therefore, the author proposes that the ultimate adoption or rejection of an innovation is subject to the innovation decision process. The process involves continuous evaluation of the innovations (through five stages) towards a decision whether to adopt or not to adopt.

The knowledge stage occurs when an individual or a decision making unit in an organisation (e.g. management, government, and other authorities) is exposed to an innovation and gains sufficient information on how it functions.

The persuasion stage is when an individual or decision making unit develops an attitude towards the innovation (either favourable or unfavourable).

The decision process is when the individual or decision making unit gets to apply the innovation in activities that will allow them to make a decision or adopt or reject the innovation.

The implementation stage is when the innovation is now put into an ongoing use (but not fully adopted) and last stage is confirmation, which is said to occur when the individual or decision making unit seeks confirmation from others with similar interest to ascertain that there are no contrary views and to ensure that their final decision about the innovation will be sound (Rogers, 1983).

The author further proclaims that innovations are inherently different, this is explained by why some new products fail while others succeed. Although diffusion researchers tend to treat them as equal units because more effort is placed studying people and determining different types of adopters. Hence his proposition of the attributes of innovation, namely: Relative advantage which relates to how superior is the new innovation over its predecessor (i.e. functionality and cost), compatibility refers to how compatible the innovation is with the existing values, skills, and work practice of potential adopters, complexity is concerned with how difficult the innovation is to understand and use, trialability checks if the innovation can be subjected to trials without undue effort and cost, can it be implemented incrementally with positive benefits, and observability which confirms if the results and benefits adopting and using the innovation be observed and communicated to others. According to Rogers (1983), these attributes are what will determine the adoption rate of an innovation.

Advocates of the DOI regard it as the best model to evaluate the success of an innovation from the concept till implementation as well as post adoption sustainability (Wonglimpiyarat & Yuberk, 2005; Aizstrauta, Ginters, & Eroles, 2015; Dibra, 2015; Moore & Benbasat, 1991). For example, a developer of an innovation can engage potential adopters through the innovation decision process to evaluate the innovation based on the attributes. This will allow the developer to have an indication on the adoption rate of the innovation before even going forward with full scale production and distribution. On the contrary, Karahanna, Straub and Chervany (1999) believe that although the DOI alludes to attitudes formed by the adopter during the persuasion stage, the model is not clear on how these attitudes are developed. The authors are of the view that this serves as a lack of depth when considering the psychological aspects of understanding the adoption of an innovation.

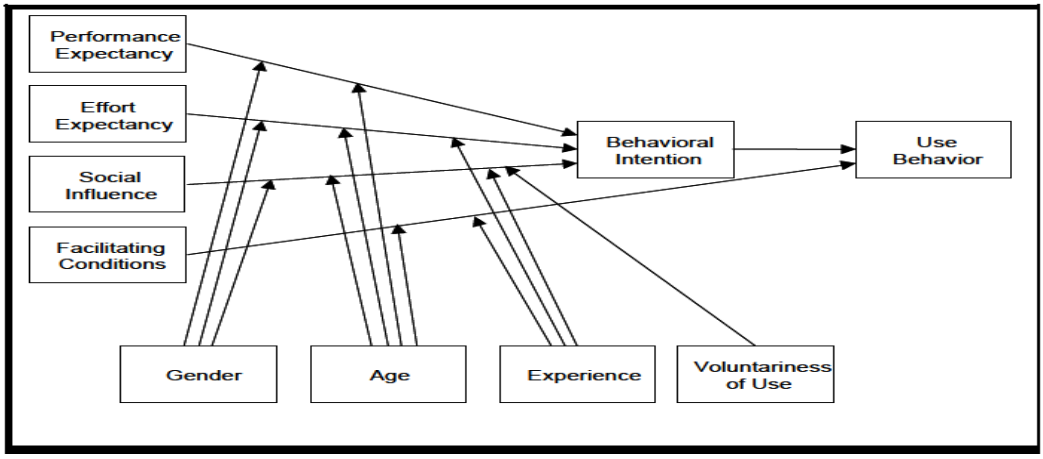
2.9 The Unified Theory of Acceptance and Use of Technology (UTAUT)

UTAUT, as the name suggests, is a combination of eight prominent models from IS, psychology and sociology. The model was developed after a need was identified to have a unified model that will combine the strengths of well-established theories.

Venkatesh *et al.* (2003) regards this as an advantage to researchers because they will not have to choose between multitudes of models or pick a favoured model while ignoring the benefits of others. With the realisation that most models only identify behavioural intention as the key dependent variable, the model also adds actual usage as a dependent variable too (Venkatesh *et al.,* 2003).

The work by Venkatesh *et al.* (2003) conducts an empirical review and comparison of TRA, TAM, motivational model, TPB, combination of TAM and TPB, model of personal computer (PC) utilisation, DOI, and social cognitive theory. There are in total 32 constructs between the reviewed models that were tested for significance. The test yielded seven constructs that formed determinants of behavioural intention and usage. But the authors theorise that only four constructs will have a significant role predicting both intentions and usage and these constructs will be moderated by gender, age, experience and voluntariness of use (see Figure 11).

Figure 11: The UTAUT



Source: Venkatesh *et al.* (2003)

Performance expectancy refers to the degree to which potential adopters believe that the technology will enhance their performance in completing their duties. The construct is derived from perceived usefulness (TAM and TAM/TBP combination) and job-fit (model of PC utilisation). Effort expectancy is explained as the degree of ease associated with the use of the technology and this is derived from perceived ease of use (TAM) and complexity (model of PC utilisation and DOI). Social influence is the equivalent of subjective norms in TRA, TPB and TAM/TPB combination. While

facilitating conditions refer to the degree to which potential adopters believe that they have access to the infrastructure and resources that will support the use of the technology, this is derived from perceived behavioural control in TPB (Venkatesh *et al.,* 2003).

2.10 Technology adoption models at household level

Venkatesh and Brown (2001) indicate that the majority of adoption studies concentrated on the diffusion of IT in the workplace. They found the need to study IT adoption at a household level so as to understand its particular driving factors. This led to the development of the model of technology adoption in households (MATH) which also drew from most technology adoption models in IS and psychology theories to investigate PC adoption in American households (Venkatesh & Brown, 2001).

MATH is based on 3 main constructs. Firstly, it considers the attitudinal constructs which consists of the perceived usefulness to enhance household productivity (utilitarian outcomes), aspects of entertainment or pleasure derived from using the technology (hedonic outcomes) and the relative advantage over predecessor technologies. Secondly, the model reflects on normative constructs such as primary social influence by other users as well as influence from secondary sources like media and advertisements. Lastly, control constructs are considered as possible constraints or barriers for technology adoption. Taylor and Todd (1995) refers to both internal and external constraints, where internal constraints are the perception of an individual's own ability to use a technology (self-efficacy) and external constraints are facilitating conditions (Venkatesh *et al.,* 2003) which includes knowledge around the technology (i.e. awareness), cost and availability of network infrastructure (Choudrie & Dwivedi, 2004; Venkatesh & Brown, 2001)

Although the model can predict the intention of households to adopt and use PCs, it received some criticism from other researchers. Choudrie and Dwivedi (2004) argue that it does not prove how attitude building can influence behaviour to adopt a technology and the findings are weak due to more emphasis on barriers and enablers of adoption.

This paved the way for the development of the model of broadband adoption (MBA) by Dwivedi, Mustafee, Williams and Lal (2010). While the MBA draws most of the constructs from TPB and MATH, its main advantage is the simultaneous consideration of psychological (attitudinal and normative) and socio-economic factors (level of education and income) that support the ability of consumers to use broadband. Due to its versatility, variations of the MBA has been used in a number of studies in different settings (Choudrie & Dwivedi, 2006; Ooi, Sim, Yew, & Lin, 2011; Mugeni *et al.,* 2012; Tiamnara, Madan, & Malisuwan, 2015) and it has proved to be effective in both individual and household investigations. The MBA was chosen for deployment in this study and extended to include relevance constructs as it is further elaborated in Section 2.13.

There are several other studies that focus on broadband adoption in households. The majority of these studies are either limited to socio economic inhibitors like the inability of a household to afford broadband (Weiner, Puniello, Noland, Ciemnecki, & Turakhia, 2012; Flamma & Chaudhuri, 2007; Ruz, Varas, & Villena, 2013; Dwivedi & Lal, 2007; Carare, McGovern, Noriega, & Schwarz, 2015) or geographical location as a limitation to broadband access (i.e. broadband adoption in rural areas) (Hill, Burgan, & Troshani, 2011; Peronard & Just, 2011).

2.11 A global overview on motivational factors for broadband adoption

Generally, all the constructs from technology adoption models have been identified as having influence on the behaviour of consumers to adopt broadband. Although the majority of constructs are common, there are distinct constructs that stand out based mostly on economic and technological developments in each country. There is an indication that under attitudinal constructs, consumers in developed countries are more influenced by the relative advantage i.e. capabilities of broadband over predecessor technologies and utilitarian outcomes more than its hedonic outcomes.

Oh, Ahn and Kim (2003) found that broadband technology had an influence on constructs such as perceived usefulness and perceived ease of use which played a major role in influencing Koreans to adopt broadband at a high rate. In the United Kingdom, relative advantage was established as the most significant motivator for

influencing household behaviour to adopt broadband, while hedonic outcomes were the least influential factors, in between the two extremes were primary influence, utilitarian outcomes, self-efficacy and facilitating conditions (Dwivedi et al., 2010). This was also confirmed by Choudrie and Dwivedi (2006) as well as Dwivedi, Khoumbati, Williams, Lal, and Gharavi (2007).

In developing countries, studies found mixed results in terms of dominant constructs. It should be noted that the settings in these studies may not be precisely comparable to the one proposed for this study when considering infrastructure development, cultural and economic dynamics. In Pakistan utilitarian outcomes, or usefulness of broadband, was found to be the dominating construct statistically, followed by facilitating conditions resources, with social influence coming out last (Manzoor, 2015). Social influence and self-efficacy were determined as the most dominant constructs in Thailand, closely followed by facilitating conditions resources and hedonic outcomes (Tiamnara, Madan, & Malisuwan, 2015).

Ooi, Sim, Yew and Lin (2011) identified primary influence as the most important motivational factor in adopting broadband amongst Malaysians, followed by self-efficacy, relative advantage and hedonic outcomes while facilitating conditions resources had the least influence. A study in Kenya show that relative advantage was the most dominant construct followed by utilitarian outcomes and broadband awareness (Mugeni *et al.,* 2012). The study conducted by Seymour (2012) illustrates that in South Africa, perceived ease of use was ranked first as most significant factor for adoption of broadband, followed by perceived IT skills or self-efficacy, while the cost of broadband, hedonic outcomes and relevant PC access were ranked on third, fourth and fifth place respectively. This finding is consistent with that of Naidoo (2011).

There are many potential explanations as to why consumers in different countries are influenced by different factors to adopt broadband, mostly socio-economic (i.e. education and income levels) and infrastructure development (Tiamnara, Madan, & Malisuwan, 2015). Consumers in developed countries where access to infrastructure is not a major concern, tend to be interested in the new features that come with

broadband technology, like entertainment, social networks and productivity enhancement. In developing countries where fixed broadband is not pervasive and access is expensive, consumers consider the relative advantage of mobile broadband (i.e. wider coverage and cheaper rates) as a key determinant for adoption (Mugeni *et al.,* 2012).

2.12 Broadband adoption studies in South Africa

There are several studies that investigated factors that influence broadband adoption and usage in South Africa by households (Seymour, 2012; Naidoo, 2011; Seymour & Naidoo, 2013; Brown et al., 2009) and businesses (Gareeb & Naicker, 2015). These studies share similar characteristic, their main focus is to depict the most influential factors in a particular setting by ranking them according to the order of significance. Although the studies are useful for presenting factors that should be considered for the adoption and usage of broadband, they stop short in explaining how these factors collectively influence users, in particular in low-income households, to adopt and use the technology. This explanation could further enhance the understanding on the interaction of users and broadband.

Furthermore, this literature did not consider income disparities when selecting a population and sampling, which can play a significant role in determining the significance of factors (i.e. high-income communities may not necessarily be affected by the same factors as low-income communities). The consideration of income disparities can assist to uncover how each factor affects different income groups, for example, the attitude of a particular income group on broadband and how it affects their decision to adopt.

Other recent broadband adoption studies in South Africa are either focused on the adoption rate of a specific access technology (Ramosolo, 2014), specific service (Wu, 2005) or specific products (Nainkin, 2014). While others focused on the supply and development of broadband infrastructure (Macharia, 2013; Jiya, 2013). Though the findings from these studies are limited to factors that influence adoption of specific facets of the broadband eco-system, they provide valuable insight and considerations for studies that are taking a holistic view such as the current one.

2.13 Choosing the theoretical and conceptual model

The review of literature provided that the attitude of potential users toward a technology is an important determinant for its adoption and ultimately its use. Hence, attitudinal constructs formed part of the motivational factors that were considered for this study. Perceived ease of use, relative advantage, utilitarian outcome and hedonic outcomes were chosen to examine the overall attitude of low-income households toward broadband and how it affected their behaviour to adopt and use it.

The second important factor that was considered is normative constructs. As literature has shown in models such as the TRA, TPB and DOI, people are most likely to be influenced directly by others or information around them to perform a particular behaviour and they are also more likely to consult for affirmation from others before making a decision. Primary and secondary influence were included to investigate how normative constructs influence the behaviour of low-income households to adopt and use broadband.

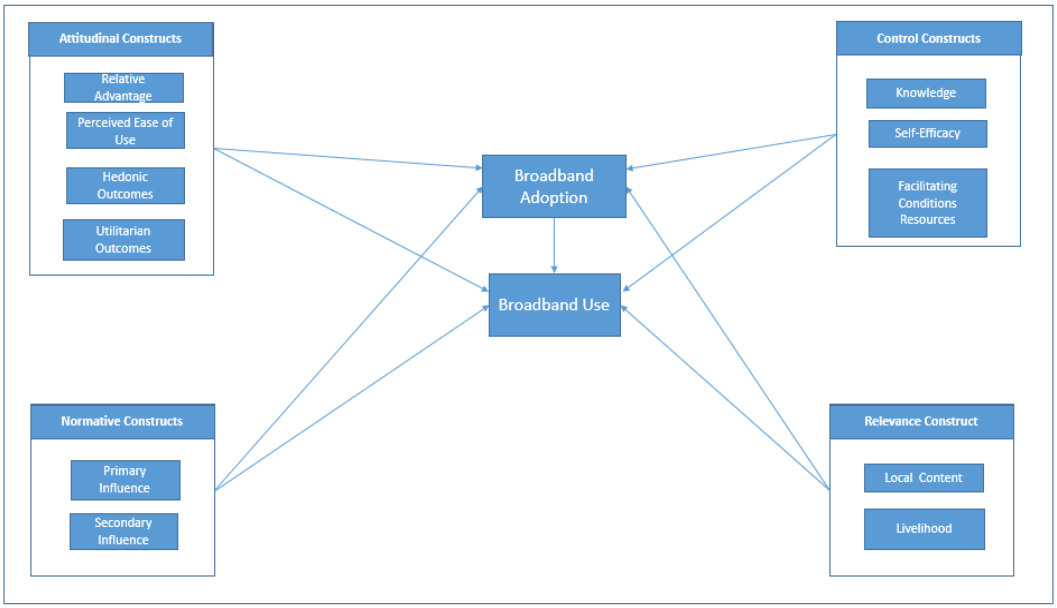
Thirdly, the TPB, UTAUT and MATH stresses the point that control contracts are also a key determinant of adoption of a technology. The models provide that even if potential users can have a favourable attitude toward a technology, and also duly influenced by others who already use the technology, their decision to adopt may still be affected by internal factors (perception on their abilities to use the technology) and external factors (not obtaining enough information and the accessibility of such technology to them). Hence the inclusion of knowledge, self-efficacy and facilitating conditions resources as control constructs to examine how they affect the behaviour low-income households to adopt and use broadband.

Since the MBA incorporates the characteristics of almost all the well-developed models that were discussed in literature, it became the best suitable model for this study.

Recalling from section 2.2 and 2.3, literature demonstrated that broadband does play a role in social development and it can provide tangible benefits to its users. Literature also illustrate that the availability of local content (or the lack thereof) affects the

adoption of broadband. Therefore, it was envisaged that the relevance of broadband to the livelihood of low-income household and the availability of local content will affect the rate of broadband adoption and usage. This resulted in the adaptation of the MBA model by Dwivedi *et al.* (2010) to include local content and livelihood as relevance constructs as depicted in Figure 12.

Figure 12: The extended Model of Broadband Adoption



Source: Adapted from Dwivedi *et al.* (2010)

2.14 Chapter Summary

This chapter first provided a definition for broadband that is suitable for this study and an insight of user patterns as well as the importance of local content to broadband adoption and usage. Then a review of literature on prominent technology adoption models and theories, models developed specifically to study adoption of broadband by households and individuals as well as usage in order to define user patterns. This was followed by a global overview of motivational factors for broadband adoption and the chapter concluded with the adoption of the extended MBA as a conceptual and theoretical framework for this study.

Chapter 3: A methodological approach for investigating the influence of motivational factors on broadband adoption and usage by low-income households

3.1 Introduction

This chapter presents the detailed approach taken by the researcher to address the research problem as previously identified in Chapter 1. The problem and purpose statements are reiterated and the main research question as well as sub questions that supports it are derived. The researcher then outlines the details and rationale on the chosen research approach, research design, research procedures and methods, as well as data analysis. The chapter concludes with the view on the ethical considerations that were made for this study and its strengths.

3.2 Research Problem Statement

Apart from the commonly known determinants (i.e. cost and access to network infrastructure), there are motivational factors that can be identified from literature that influence the decision of consumers to adopt and use broadband. To this end, research is still focused on ranking factors in order of significance in an attempt to explain which factors have the most influence on the user's decision to adopt and use broadband. Little consideration is being assigned to the examination of the collective effect of these motivational factors and how they influence the behaviour of users to adopt and use broadband. There is also less emphasis on the role played by demographics such as income level to the determination of the motivational factors. Although there are studies that have presented motivational factors for broadband adoption in South Africa, there is little knowledge about how these motivational factors collectively influence the adoption and usage of broadband by low-income households, as this has not yet been studied in detail.

3.3 Research Purpose Statement

The purpose of this research was to investigate how motivational factors influence the behaviour of low-income households in South Africa to adopt and use broadband. The research was conducted in the township of Soshanguve in the City of Tshwane, South Africa. The study first uncovered how broadband was utilised by low-income

households. Then it examined how low-income households are influenced by attitudinal constructs, normative constructs, control constructs as well as relevance constructs to adopt and use broadband. This sought to provide a deeper understanding on the interaction of low-income households and broadband in order to give inputs to policy, regulation and market strategies for broadband demand stimulation.

3.4 Research Questions

The following research question was posed to address the aforementioned problem statement:

Main Research question

How do motivational factors influence the adoption and usage of broadband in low-income households?

To support the main research question, the following sub-questions were investigated:

Sub question 1

What are the characteristics of broadband use among low-income households?

Sub question 2

How do attitudinal, normative and control constructs influence the behaviour of low-income households to adopt and use broadband?

Sub question 3

How do relevance constructs support the influence on behaviour of low-income households to adopt and use broadband?

3.5 Research Approach

A research approach (also known as research strategy or research paradigm) can simply be described as an underlying floor plan of which a research paper will be built. Creswell (2014) describes research approaches as “plans and procedures for research that span the steps from broad assumptions to detailed methods of data collection,

analysis, and interpretation. The research approach outlines the philosophical assumptions that a researcher adopts to address the research problem statement" (Creswell, 2014, p. 31).

Historically, there have been two philosophical approaches to research (Welman, Kruger, & Mitchell, 2005). The positivist or quantitative approach which is based on logical positivism, underpins all natural sciences and the notion that research results will be accepted only if they can be observed and measured objectively with no influence from the opinion and feelings of an individual (Welman, *et al.,* 2005). Starke (2010) adds that the quantitative approach "relies heavily on linear attributes, measurements, and statistical analysis" (Starke, 2010, p. 11). While Creswell (2014) defines quantitative approach as the examination of how variables relate in order to confirm objective theories.

The anti-positivist or qualitative approach is popular with human behavioural sciences. Anti-positivists believe that the study of human behaviour is a complex field that cannot only be explained with rigid natural-scientific methods. Hence it is inadequate for a researcher to detach human feelings and opinions when trying to explain a phenomenon that involves human behavioural aspects (Welman, *et al.,* 2005). According to Creswell (2014), "qualitative research is an approach for exploring and understanding them" (Creswell, 2014, p. 32), meaning individuals or groups ascribed to a social or human problem.

Throughout the years, there has been as strong development of what is referred to as "mixed methods" approach. The mixed method approach is now being recognised as the third research paradigm by researchers (Bryman 2012). The process involves collection and analysis of both quantitative and qualitative data and collective interpretation to form a more complete understanding or a problem than with either approach alone (Creswell, 2014). Mixed methods are commonly used in research to address, among others, the concerns about generalisability, e.g. a survey with a larger and more representative sample can be used to compensate for the weaknesses of unstructured interviews with small samples (Leedy & Ormond, 2013).

This study sought to gain a deeper understanding on the motivational factors that influence the decisions made by low-income households to adopt and use broadband, why these particular factors and how they use broadband in their livelihood. In considering these objectives, the qualitative approach stood out as the most appropriate approach to adopt. As it was referred in Chapter 2, the adoption of broadband is a social matter as far as it is a technological one. Hence it required a social orientated approach to address problems that relate to this topic. To further align with the objectives of this study, a qualitative approach provides rich description of personal action and complex environment, it provides different viewpoints to social issues and uncover the not-so-obvious explanations to human behaviour, it works on understanding individual perceptions, it is not concerned with rearranging things in order but rather to explain the phenomenon as it exists, and it aims to provide knowledge towards the development of policy and practice (Starke, 2010).

3.6 Research Design

A research design outlines the detailed procedure that a researcher will follow to address the research problem statement (Welman, *et al.,* 2005). The research design guides the execution of the research and determines the methods used during data collection and analysis. According to Creswell (2014), a design is a type of study or inquiry selected by the researcher within a chosen approach (i.e. quantitative, qualitative, or mixed methods). There are many designs available within the qualitative approach, in particular narrative research, phenomenological research, grounded theory, ethnography, content analysis, and case studies are popular in social science studies (Starke, 2010; Creswell, 2014).

This study adopted a phenomenological design to answer the research questions and to address the problem statement. Phenomenological research originates from philosophy and psychology, and it is centered on describing the lived experience of social groups through individual participants who have experienced the phenomenon studied (Creswell, 2014). Vagle (2016) describes a prominent design by Giorgi (2009) (a modified Husserlian approach) where one is asked to use human consciousness in order to study human consciousness and is asked to bracket his or her past

understandings and knowledge in order to be able to analyse the raw data from a fresh perspective. Phenomenological studies are typically conducted through interviews (Creswell, 2014).

The phenomenological design was best suited for this study because it helps the researcher to understand the social and psychological phenomena from the perspective of the people involved (Welman, *et al.,* 2005). This was in line with the purpose and outcomes of this study which are not only to identify the influential factors for adoption and usage but to provide a deeper understanding on the lived experience of broadband in low-income households in South Africa. The research time frame was cross-sectional, meaning the data was collected at one point in time only and there was no follow up data collection session with the selected sample.

3.7 Research Procedures and Methods

The research procedures and methods provide (in detail) the instruments that were used to collect data, where the data was collected, ethical considerations during data collection, how the data was collected and stored, how the data was processed and analysed, as well as the description of the participants who participated in the data collection process.

3.7.1 Data collection method and instrument.

There are well-developed data collection methods documented in handbooks, textbooks, and journals, but the choice of a method should be guided primarily by the research questions and the review of literature on how other researchers have approached similar studies (Starke, 2010). Creswell (2014) adds that the choice of a method will depend on whether the intention is to specify the type of information to be collected in advance or to allow it to emerge from the participants. How the data is analysed will then depend on the type of data collected (e.g. statistical analysis for numerical data or thematic analysis for words, pictures, videos, and other content).

Creswell (2014) summarises the types or methods of qualitative data collection as “when the researcher takes field notes on the behavior and activities of individuals at the research site” (Creswell, 2014, p. 239) either as a participant or an observer.

Qualitative interviews involve discussions with individual participants (either telephonically or face-to-face) or with a group of participants. Qualitative content deals with the collection of documents, audio and visual materials (e.g. sound recordings, photographs, art objects, and videos) for analysis.

In research, interviews can be structured, semi-structured, or unstructured. The distinction between them is set on how and what type of questions are prepared in the questionnaire. This is typically referred to as the interview schedule (Welman, *et al.,* 2005).

In structured interviews, the questions are pre-selected and the interviewer is restricted to the wording and the order of how they appear in the schedule and the respondent may also be restricted to pre-coded answers (Welman, *et al.,* 2005). Although semi-structured interviews also consist of a schedule with pre-selected questions, these questions are open ended and can be tailored to what is special about the participants. This provides the interviewer with flexibility to rephrase questions or to ask probing questions if he or she wishes to uncover more from participant (Starke, 2010).

With unstructured interviews, there are no prepared questions and no formal structure to follow. The interview process is guided, and the questions are shaped by the feedback from the participants while the interviewer keeps close focus on what he or she wants to discover. Unstructured interviews are often referred to as in-depth interviews because of their intimate and explorative nature (Welman, *et al.,* 2005).

Focus groups using semi-structured questions were used as data collection tools for this study. Bryman (2012) points out that a focus group researcher (usually referred to as a moderator or facilitator) is more concerned with how participants respond to each other's views on the issue under discussion. So, an unstructured setting should be maintained and the researcher should guide the session and be less intrusive. The primary role of the researcher is to initiate discussions by posing open-ended questions and keep the discussion under control. The researcher should be able to detect when the discussion is drifting towards an unproductive direction and guide it back on course (Leedy & Ormond, 2013). The researcher should also suspend any

presumptions on participants' responses. This normally occurs because in some instances the interviewer is familiar with the phenomenon and it is not easy to detach him or herself from it (Leedy & Ormond, 2013).

Focus groups offer the advantage of obtaining data rapidly and in a cost effective manner as compared to one-on-one interviews, because a number of participants who are knowledgeable about a topic can be gathered in one place and interviewed at the same time (Welman, *et al.,* 2005; Bryman, 2012). Since focus groups are meant to open up a discussion between participants, the interviewer often gets the opportunity to spot contradictory responses and can always probe participants for clarity.

According to Bryman (2012), participants can disclose issues that they deem important to the topic and it offers the researcher an opportunity to evaluate the participants' collective responses to a phenomenon. These characteristics were a best fit to answer the research questions for this study because observation of both individual and group behaviour was necessary.

Although focus groups can be a convenient way of collecting data, Welman, *et al.* (2005) warn that they can be particularly difficult to control. The authors refer to limiting selection and participation of the 'expert' in a topic under discussion because they may exhibit intimidating behaviour and inhibit other participants from freely expressing their views.

3.7.2 Population selection and sampling

In research, the term population refers to a full set of units of analysis (i.e. people, organisations, documents) identified by a researcher from which data will be collected to address a particular research problem (Welman, *et al.,* 2005). In most cases it is impractical to engage each member or unit of analysis in a population due to time, cost and ethical constraints (Marshall, 1996). Hence a number of units of analysis, or a sample, is selected to represent the wider population, this process is known as sampling (Bryman, 2012). It is thus important to choose a sample that is a representative of the wider population so that the results can be generalised to the entire population (Marshall, 1996).

Welman, *et al.* (2005) refer to two main types of sampling, namely: probability and non-probability sampling. In probability sampling, the probability that any unit of analysis in the population will be included in the sample can be determined. Probability sampling provides the researcher with an opportunity to identify sampling errors in situations where generalisability is of most importance (Welman, *et al.,* 2005). This type of sampling is mostly random and it is frequently used in quantitative studies (Bryman, 2012). Common strategies of probability sampling include simple random, stratified random, systematic, and cluster.

As the name implies, non-probability sampling is the converse of probability sampling. There is no equal probability that each unit of analysis can be included in the sample. This is due to the purposive nature of non-probability sampling, meaning the units are selected according to their relevance to the research question (Bryman, 2012) or other reasons of convenience to the researcher (e.g. proximity, cost and referral). Common strategies include accidental, quota, purposive, snowball, self-selection, and convenience.

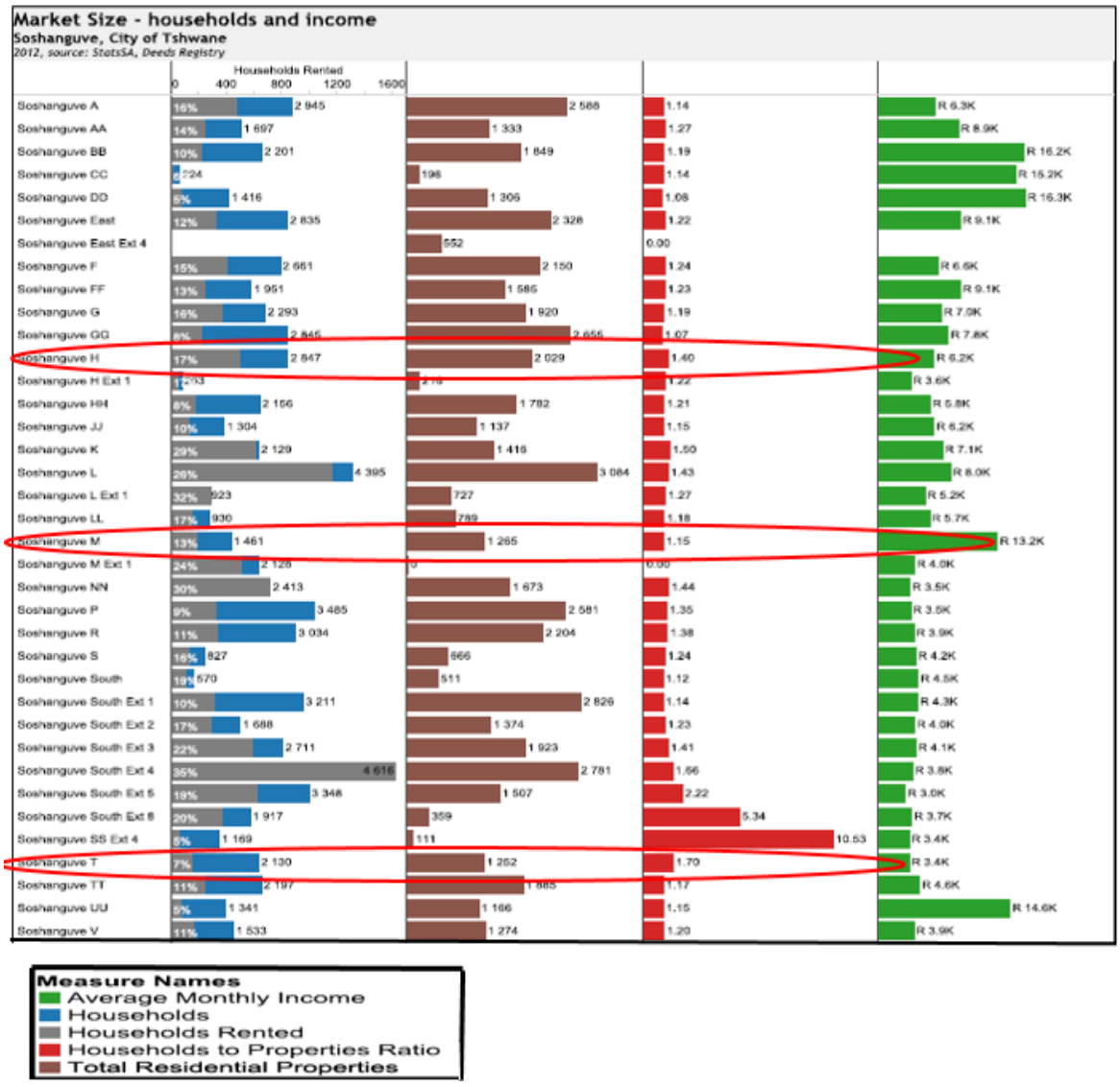
Marshall (1996) points out that the choice between probability and non-probability sampling should be guided by the research questions rather than by the preference of the researcher. The author also adds that quantitative studies are more concerned with the testing of preconceived hypotheses and answering 'what' questions. The sample sizes are usually big and units of analysis are deemed to have the same properties. While qualitative studies are concerned with providing explanations and understanding by answering 'why' and 'how' questions. The sample sizes are smaller to compensate for the laborious data collection process (e.g. one hour interviews) and the units of analysis are not regarded as having the same properties (e.g. knowledge and experience of the studied phenomenon).

Purposive non-probability sampling was used for this study. This sampling technique was chosen because it offered the researcher the convenience of gathering the required number of participants in a short period of time. The technique also aided in ensuring that the interested participants were relevant to the topic (i.e. they were adopters and active users of broadband). Although non-probability sampling may

have limited generalisability, it is more cost effective and easier to use as compared to probability sampling (Welman, *et al.,* 2005). Non-probability sampling is more suitable for qualitative studies (Marshall, 1996).

Three blocks in Soshanguve with average monthly household income that was within the low-income level as classified in Table 2 (i.e. LSMs 1 to 8) were selected randomly for sampling. The average monthly income for households in Blocks H, M and T were R6 200.00, R13 200.00 and R3 400 respectively as stipulated in Figure 13 from a report that was published by the Center for Affordable Housing Finance in Africa, this is the most recent data that could be used to determine households income in Soshanguve.

Figure 13: Households and income in Soshanguve



Source: Center for Affordable Housing Finance in Africa (2014).

3.7.3 Data collection process

Three focus groups sessions were organised in different blocks of Soshanguve. The number of groups were limited to three because by the third session, it became apparent that the information gathered from the three sessions was consistent. It was then predicted that the outcomes of the next sessions will be closely aligned to that of the previous sessions. Calder (1977) in Bryman (2012) asserts that the researcher can determine if the number of focus group sessions is adequate when it can be predict that the next group might say what is similar to the previous groups.

The first session was held on 09th July 2016 at Block M at a participant's house, the second session was held on 27th August 2016 at Block H in a pub close, while the third session was on 14th January 2017 at Block T at a participant's house.

All sessions were recorded using a voice recorder, the sessions started with an introduction of the researcher and the topic and the general rules of the focus group session were outlined. Then participants were asked to complete a 10 minutes questionnaire consisting of 17 questions to capture demographics data (i.e. gender, education, employment and income) and broadband user profile (i.e. adoption profile, broadband internet access and usage and barrier for adoption and usage). The sessions then proceeded to the open discussion where a set of semi-structured questions were posed to the participants. The questionnaire and the focus group schedule are attached in Annexure A.

The focus group questions were piloted with a group of post-graduate students from the University of Witwatersrand's post-graduate social media group. The group was asked to review the initial set of questions so as to establish if they will be relevant to the research questions, the language will be comprehensible to the target population, if the questions will encourage group discussion and if they will be relevant to the target population. The group provided inputs that were used to revise the questions to better align them with the aforementioned requirements.

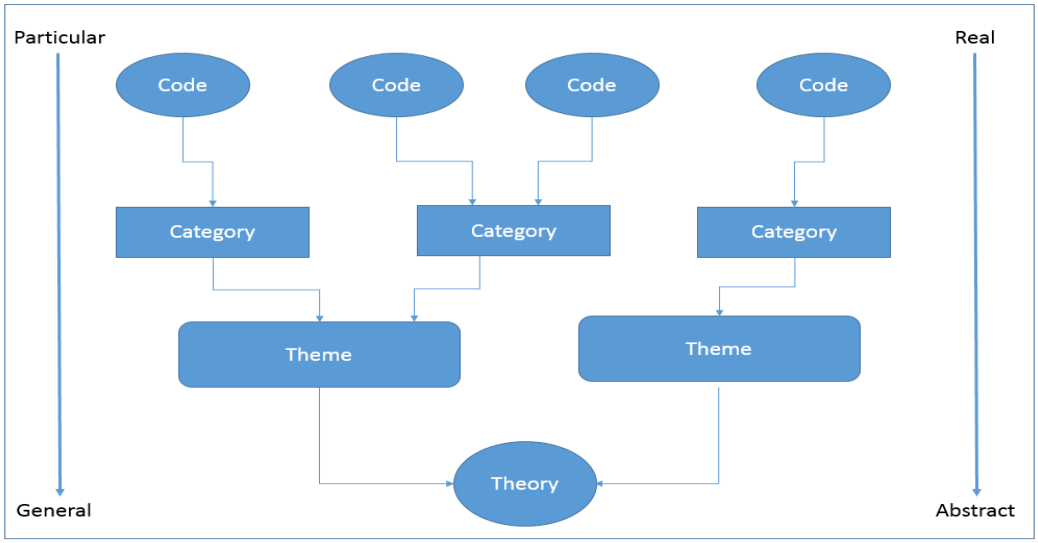
3.8 Data analysis

The qualitative data was organised into themes, coded and analysed with the aid of Atlas.ti 7, a computer-assisted qualitative data analysis software (CAQDAS). Atlas.ti 7 assisted the researcher to organise big amounts of text into codes and memos that were manageable and easy to interpret. Although CAQDAS can save a researcher time by eliminating the need for manual tasks such as to cutting and pasting notes, writing marginal codes, and making photocopies, it does not organise (code) and analyse (interpret) the data automatically. The researcher is still required to go through the data and identify key themes or points of interest and interpret it to produce results (Bryman, 2012).

Saldana (2009) recommends that qualitative data analysis process should follow a systematic process where coded data must be grouped into categories of similar characteristics. The categorised data should then be interpreted to uncover its meaning which in essence is the development of themes.

The analysis approach for this study followed the streamlined code-to-theory model depicted in Figure 14, whereby related codes are organised into high level groups of categories.

Figure 14: A streamlined code-to-theory model



Source: Adapted from Saldaña (2009)

Themes are developed from the categories to provide meaning to the data. A theory or key assertion can then be derived from themes. Saldaña (2009) describes this approach as an attempt to progress from the particular to the general or from the real to the abstract by transferring what was observed in one setting and generalising it to other comparable settings.

3.9 Ethical considerations

Ethical considerations are important in social research because subjects are, in most cases, human beings. Bryman (2012) mentions that ethics in social research revolve around two issues, "how should we treat the people on whom we conduct research?" and "are there activities in which we should or should not engage in our relations with them?" (Bryman, 2012, p. 130).

For this study, the main considerations were to ensure that the participants understood their rights in terms of participating in a focus group. The participant information sheet attached in Annexure B was compiled and circulated to prospective participants before the focus groups were conducted. The sheet included a brief introduction and background of the topic and its objectives, a section detailing the possible duration of the focus group session and explained that participation was voluntary, and the confidentiality and anonymity section pledged that the true identities of the participants will not be used in any parts on the report. Participants were also requested to sign the informed consent form attached in Annexure C to confirm that they understand the contents of the participant information sheet and gave permission for the session to be voice recorded.

A formal process to obtain an ethics clearance certificate was undertaken through the University of Witwatersrand's ethics committee. The ethics committee recommended that both the participant information sheet and the informed consent form be translated to a common language in Soshanguve and be written in a simplistic manner to accommodate participants who are not proficient in English. The recommendations of the committee were implemented and a clearance certificate attached in Annexure D was issued before data collection started.

3.10 Research strengths

It is a standard requirement in research to evaluate if a certain claim made from theory is tenable and to build confidence around a conclusion. It is critical to also evaluate if the chosen research approach, design and methods were able to successfully address the research questions and meet the objectives of the study (Welman, *et al.,* 2005).

Bryman (2012) provides that qualitative studies can be evaluated using two criteria, namely: trustworthiness and authenticity as proposed by Lincoln and Cuba (1985). Trustworthiness is the test for credibility which involves the confirmation by the studied community that the researcher understands their environment and the research findings represent their reality. While authenticity is concerned with the assessment of the political impact of the research. This criterion entails checking that the research represented the viewpoints of different members of the community (fairness), if the research helped members to better understand the phenomenon studied (ontological authenticity), was the research educational to the community (educative authenticity), has the research helped members to take action in changing their situation (catalytic authenticity), and if the research empowered the members to take such action (tactical authenticity).

To address trustworthiness, the findings of this study were shared with few participants to confirm if they represent their responses as captured in the focus groups. The information pertaining to this study (e.g. research instruments, recordings, transcripts, and analysis reports) were well documented to provide an account for the verification of the findings.

Considering that the focus of this study was not primarily to initiate a cause of action in the studied community, some of the facets of authenticity could not be addressed. Only fairness was addressed by conducting three focus groups of different demographics (i.e. age group, occupation, level of education and income) in different sections of Soshanguve.

3.11 Chapter Summary

In this chapter, the researcher provided a buildup on the research problem statement and purpose statements, and the research questions were drawn from the conceptual framework as developed in Chapter 2 to address the research problem. The chapter also introduced the research approach taken, the research design and methods used to collect and analyse data. The chapter concluded with the evaluation of ethical considerations and the strengths of the study.

Chapter 4: Presentation of motivational factors influencing broadband adoption and usage by low-income households

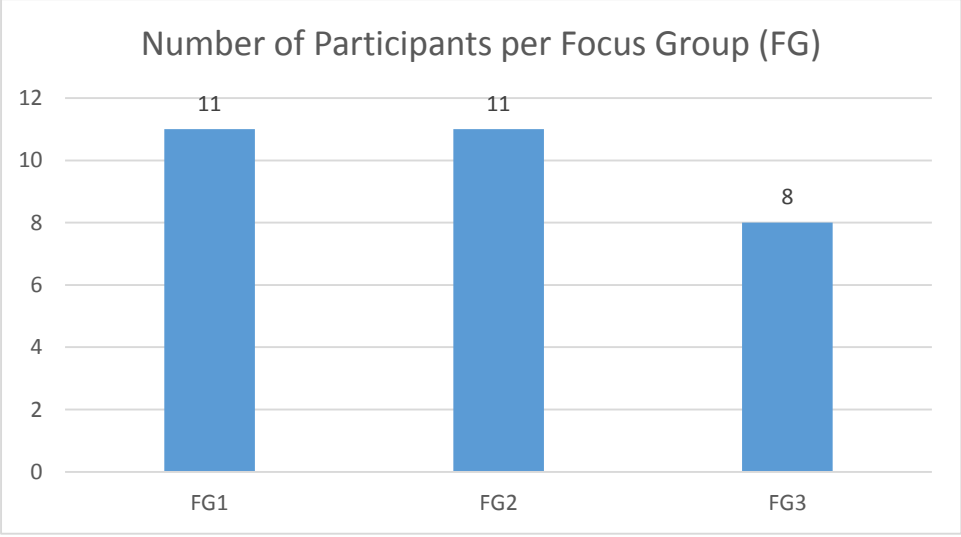
4.1 Introduction

This chapter provides the presentation of data collected to investigate how motivational factors influence low-income household users to adopt and use broadband. The researcher first presents the demographics of the focus groups, followed by the presentation of the usage related data as well as barriers for adoption based on the data collected with a short survey. These data is presented using descriptive statistics and there was no comparisons that was intended between the focus groups. The researcher then follows the theoretical framework developed in Chapter 2 to present the qualitative data on the pre-defined factors and any additional factors emerging from data collected from the focus group discussions. Recalling from Chapter 3, the qualitative data was analysed using Atlas.ti. A brief summary of the finding is then provided to conclude the chapter.

4.2 Focus groups demographics

A total number of 30 individuals participated in the focus group discussions. Figure 15 provides the breakdown of participants per focus group. The majority (87%) of participants were male.

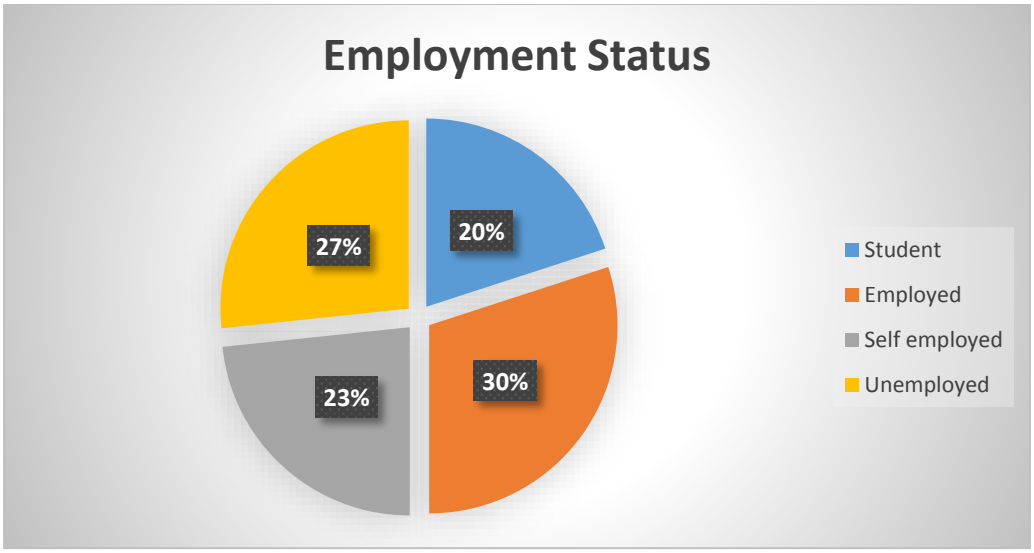
Figure 15: Number of participants per focus group



Source: Researcher (2018)

The focus groups contained a combination of students, employed, self-employed and unemployed participants. Figure 16 shows that although there was almost a balance, the majority of participants were employed, followed by unemployed, self-employed and students.

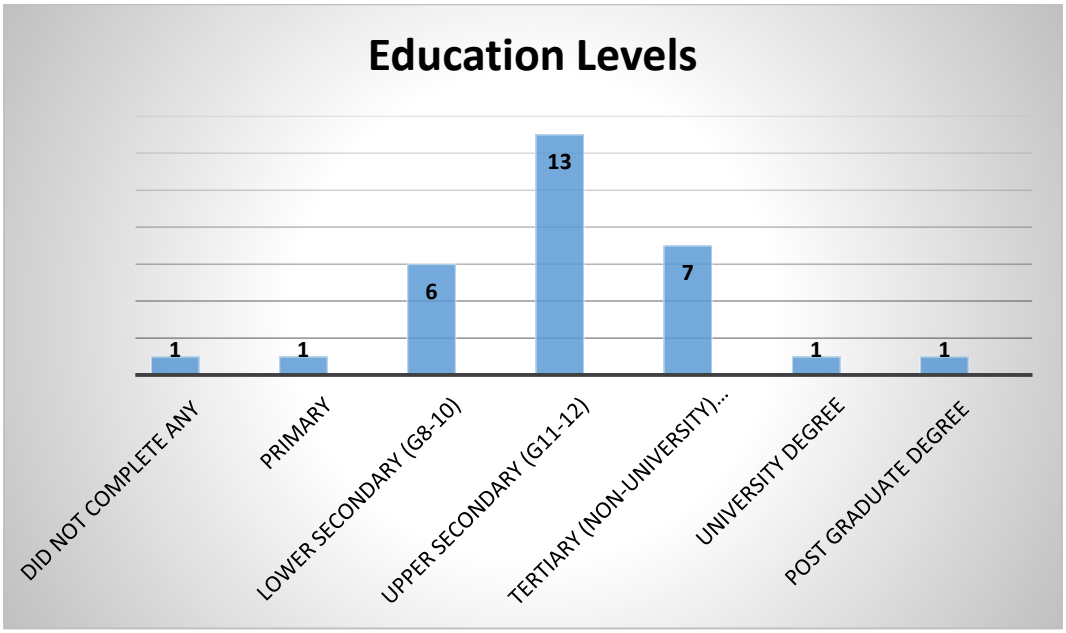
Figure 16: Employment status



Source: Researcher (2018)

Figure 17 provides the education levels of participants. From the figure, it can be observed that most participants completed either lower secondary, upper secondary or some form of tertiary qualification (post school training or certificate). However, there was only one participant per category on the two sides of the extremes (i.e. without education and with a post-graduate degree, also only one primary, and only one university degree).

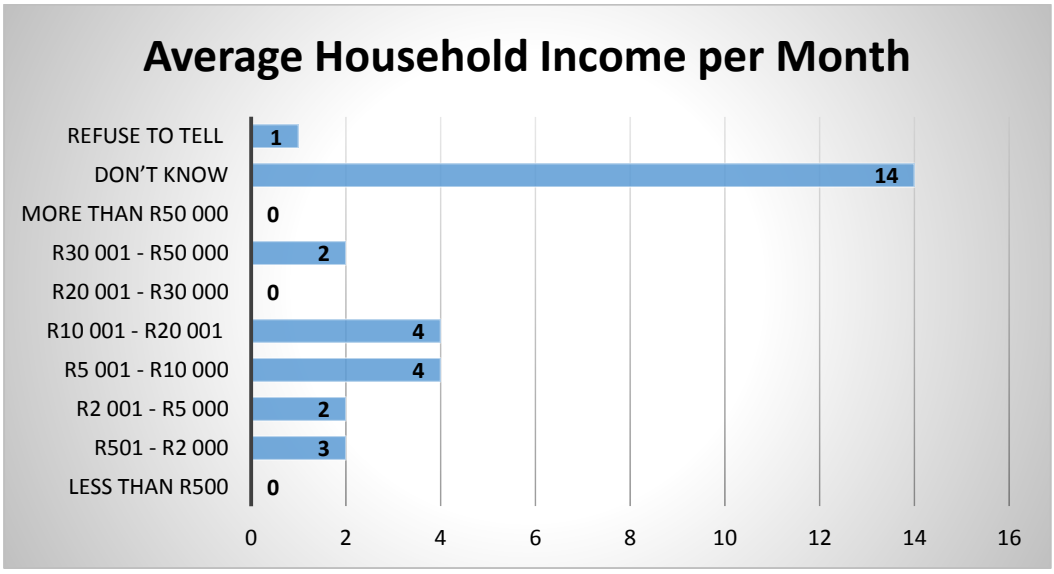
Figure 17: Education Level



Source: Researcher (2018)

The average income data as presented in Figure 18 indicates that the majority of participants (14) were not sure of the average household income per month. While 13 participants reported an average monthly income that was within the low-income level (LSMs 1 to 8), only two participants reported income in LSMs 9 and 10 and one participant opted not to disclose the income information.

Figure 18: Average household income per month



Source: Researcher (2018)

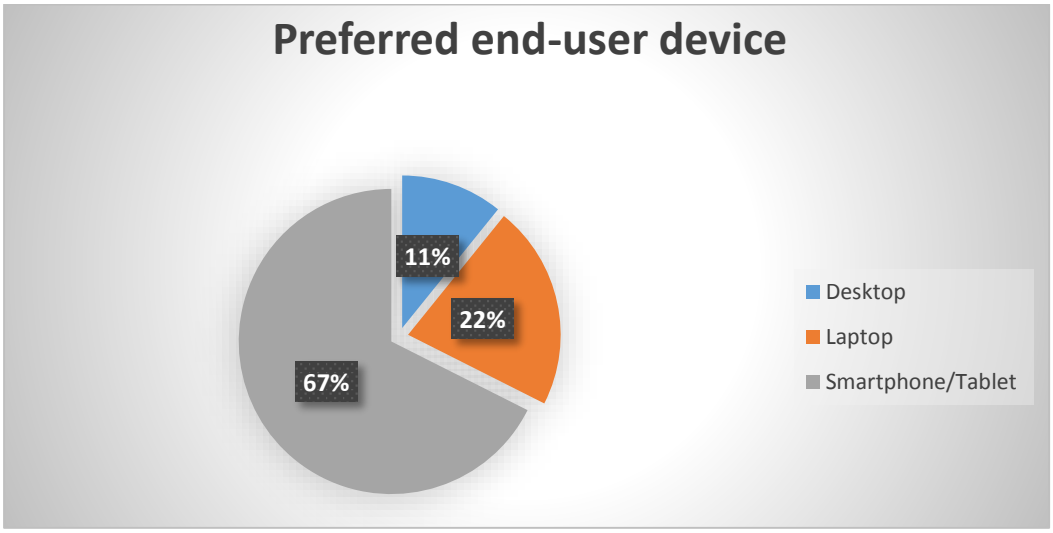
4.3 Broadband usage profile of low-income households

The data presented in this section provide the broadband usage profile of low-income households, the data was collected through a questionnaire consisting of 17 questions and is presented by means of descriptive statistics. The questions were grouped into 3 categories, namely: adoption rate, usage and barriers to adoption.

4.3.1 Preferred end user device

With respect to preference between end user devices, Figure 19 illustrates that the majority of participants (67%) chose smartphones and tablets as their preferred end-user devices. The rest of participants (22% and 11% respectively) preferred desktop computers.

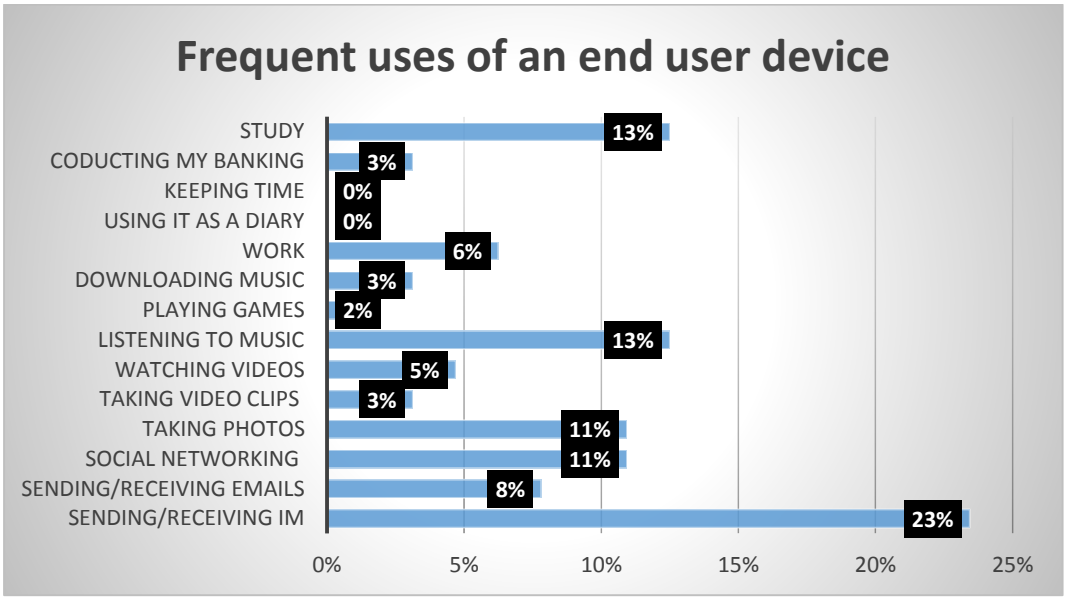
Figure 19: Preferred end-user device



Source: Researcher (2018)

Figure 20 shows a summary of the frequent uses of an end-user device. Most participants (23%), used their end-user device frequently to send and receive instant messages followed by listening to music and study both at 13%, social networking and taking pictures both at 11%, and sending and receiving emails.

Figure 20: Frequent uses of an end-user device



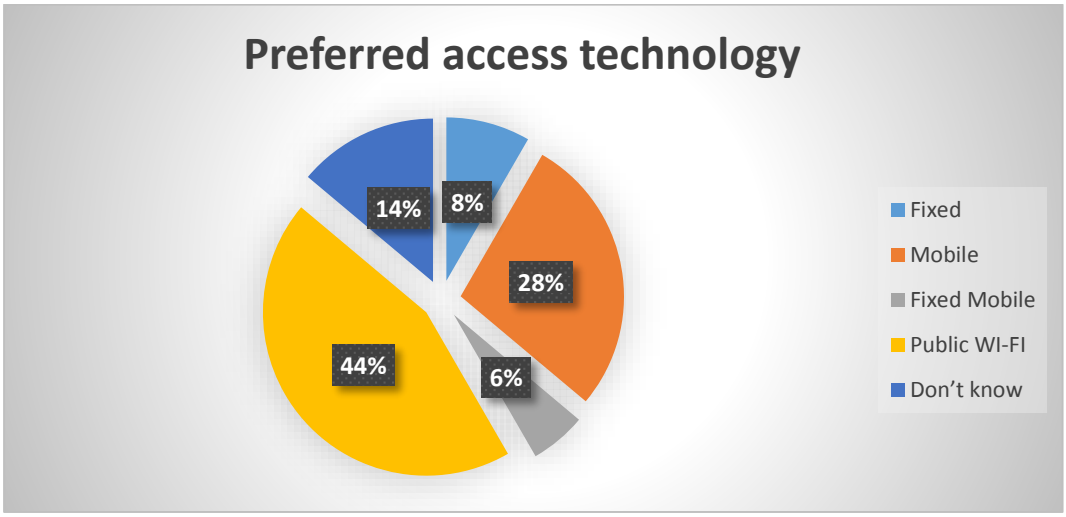
Source: Researcher (2018)

Few participants used their devices frequently for work and other activities such as banking, downloading and playing games as well as taking and playing videos. None of the participants used their devices for other productivity based activities such as keeping time or as a diary to organise their schedules.

4.3.2 Preferred access technology

The data presented in this section provide a view on the technologies preferred by low-income households to access broadband. Figure 21 shows that 44% of participants indicated public Wi-Fi as their favourite access technology and 28% chose mobile technologies. Fixed and fixed-mobile technologies were used by less than 10% of participants. Fourteen percent of participants indicated that they were not sure if they have a preference because they will use whichever access technology is available to them.

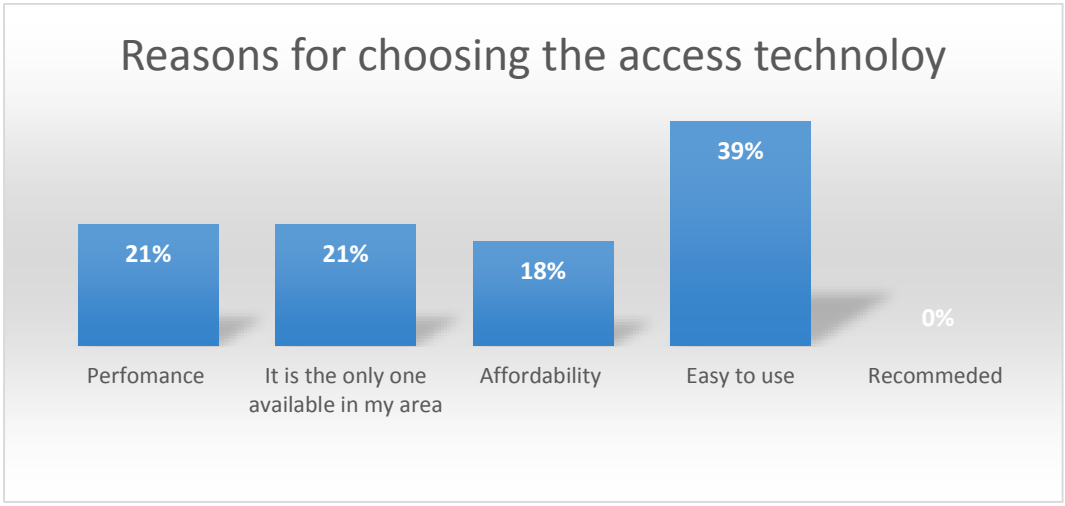
Figure 21: Preferred access technology



Source: Researcher (2013)

When asked how they make their choice of an access technology, Figure 22 shows that most participants (39%) mentioned they chose the one that was easy to use. Whereas performance in terms of data transfer speed and network availability were considered equally by 21% of participants, only 18% of participants considered affordability as a driving factor when choosing an access technology. None of the participants chose an access technology because it was recommended to them.

Figure 22: Reasons for choosing access technology

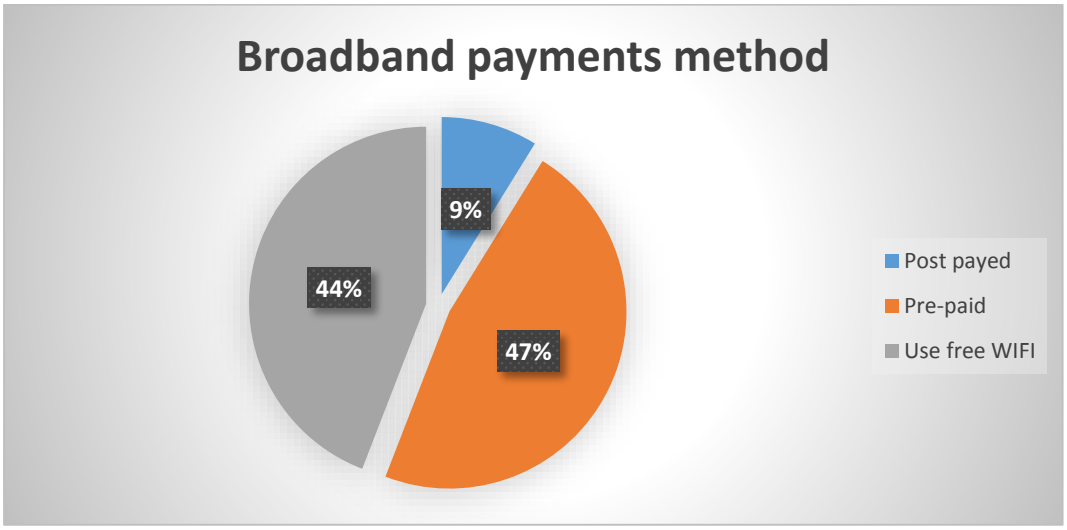


Source: Researcher (2018)

4.3.3 Payment method for broadband Internet access

When asked how they pay for the access to broadband, there was an almost equal split between prepaid and free Wi-Fi, with the majority (47%) of participants indicating that they prefer prepaid over postpaid and 44% indicating that they do not pay for access since they use free public Wi-Fi. Figure 23 provides a summary of the participants' responses on payment methods for broadband access.

Figure 23: Payment method for broadband Internet access

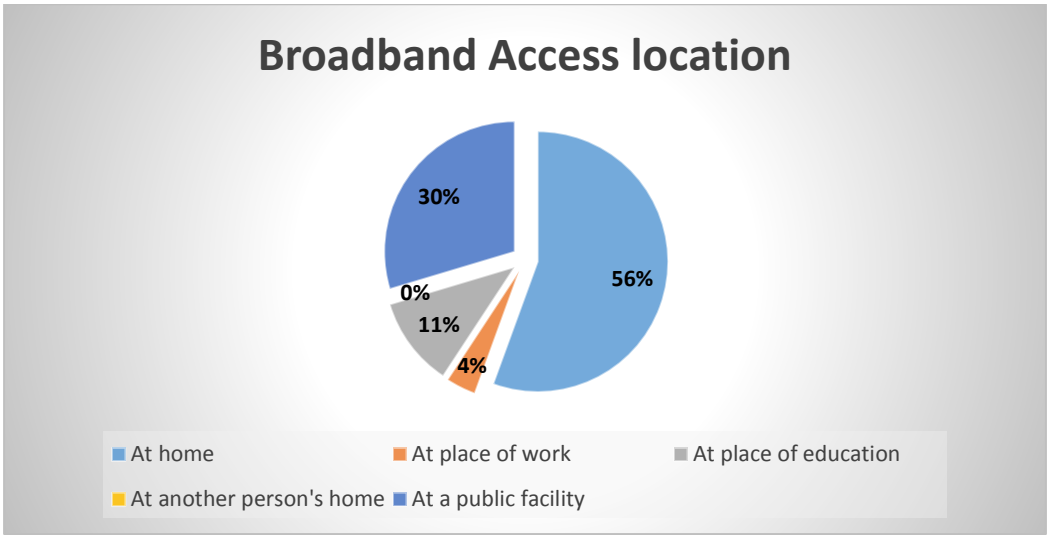


Source: Researcher (2018)

4.3.4 Access location

Figure 24 shows that most participants (56%) had access to broadband at home and 30% accessed broadband from public facilities which include the use of public Wi-Fi hotspots. Only 11% and 4% of the participants indicated that they have access to broadband at place of education and at place of work respectively. No participants relied on others or participated in sharing schemes to gain access to broadband.

Figure 24: Broadband access location

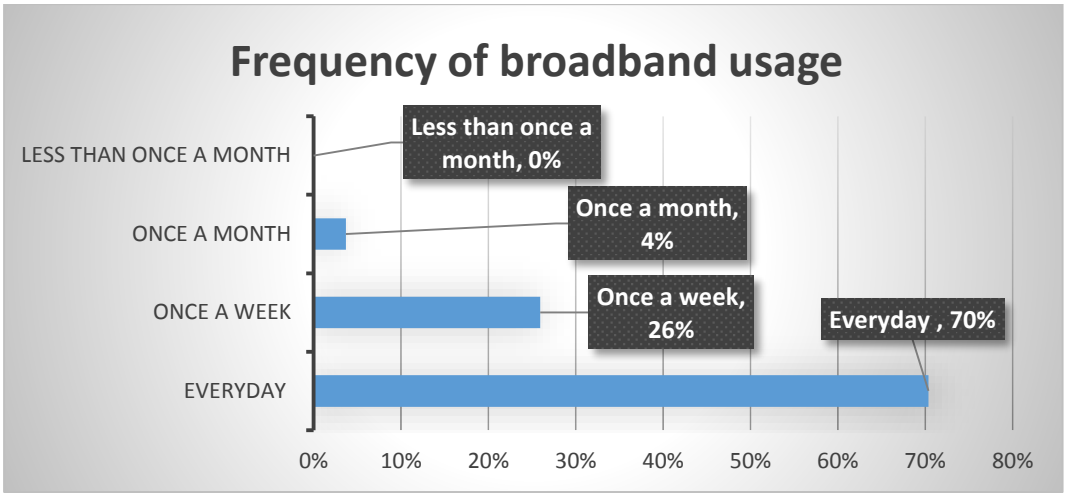


Source: Researcher (2018)

4.3.5 Frequency of use

With respect to frequency of use, Figure 25 shows that 70% of used broadband every day, 26% used it once a week and 4% used it at least once a month.

Figure 25: Frequency of broadband usage

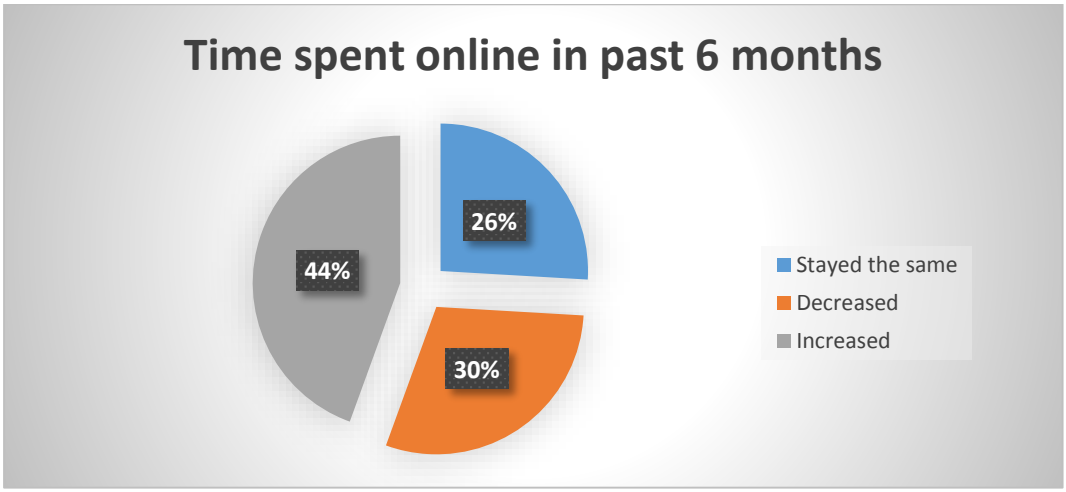


Source: Researcher (2018)

4.3.6 Change in time spent online

Figure 26 summarises the changes in the time spent online as reported by participants. Majority (44%) of participants specified that the time they spent online increased over the past six months. While other participants (30%) mentioned the time they spent online has decreased. The other 26% indicated that there was no change in the time they spent online in the past 6 months.

Figure 26: Change in time spent online in the last 6 months



Source: Researcher (2018)

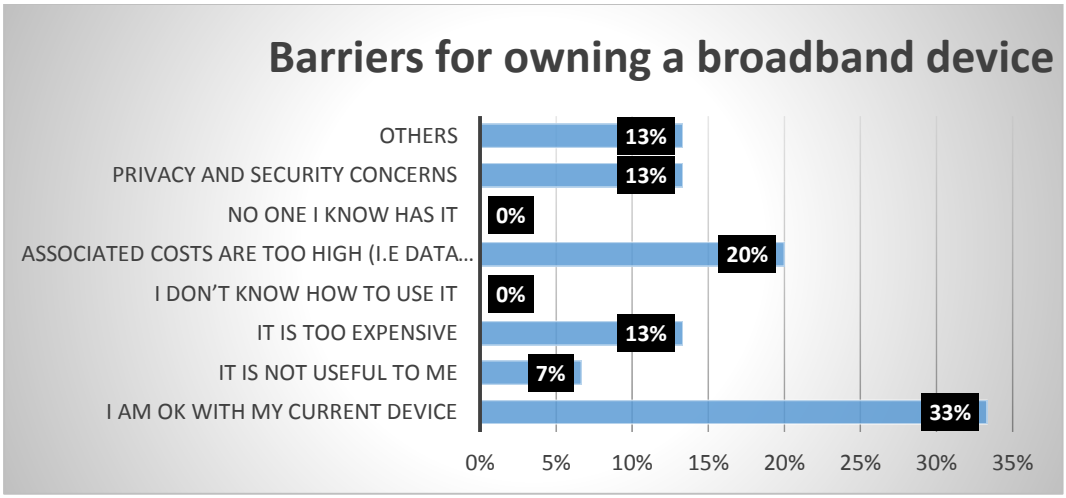
4.3.7 Barriers to adoption and usage

This section provides an overview of factors that were identified by participants as barriers to adoption and usage of broadband. In addition to the views from the few non-adopters, the adopters were also asked to share their opinions on the possible inhibitors to sustained or increased usage of broadband Internet and if they knew someone who has not adopted nor used broadband and what were the possible reasons.

The response to these questions were voluntary, therefore not all participants provided answers. Figure 27 shows that those who opted to respond said the majority (33%) of non-adopters were comfortable with the devices that they are using and would not want to procure a broadband device, some (13%) indicated that broadband devices were not affordable and 20% also alluded to the high associated costs of using the device. Security and privacy concerns about using such a device and reasons such

as crime where robbers are targeting broadband device owners were mentioned by 13% of participants. None of the participants indicated a lack of knowledge on how to use a broadband device or not knowing someone using such a device as possible barriers to owning one.

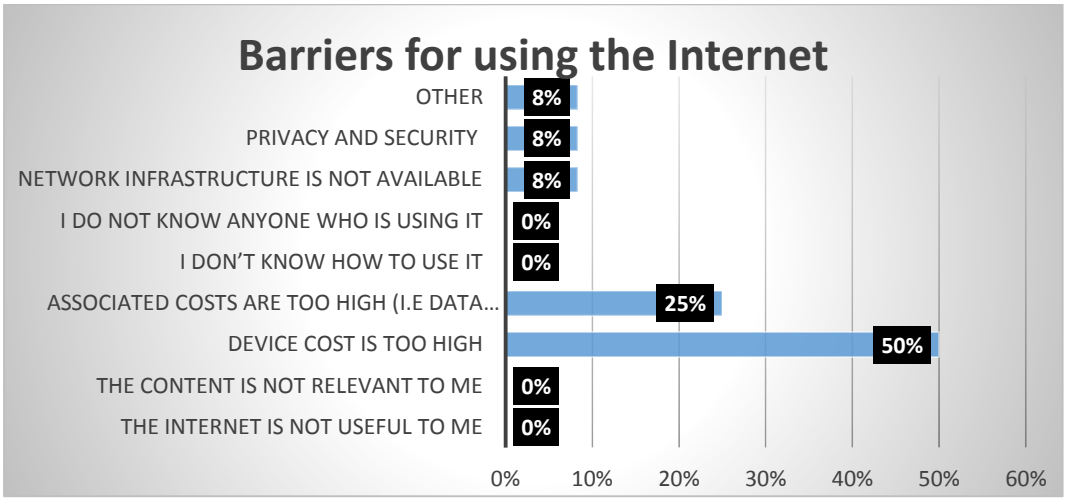
Figure 27: Barriers to owning a broadband device



Source: Researcher (2018)

Moreover, Figure 28 shows that the majority (50%) of participants pointed to the cost of devices as the barrier for them to use broadband and 25% also indicated the high cost of data as a barrier. A small percentage (at 8% each) of participants alluded to the privacy and security concerns, the non-availability of broadband network infrastructure in their communities as well as other reasons that were not mentioned as barriers to broadband usage. Similar to the barrier for adopting a broadband device, no participants indicated the lack of knowledge of using broadband or not knowing someone who is using such a device as a barrier. Also, none of the participants indicated that the reason for not using broadband is because it is not useful to them and fact that the content consumed through it was not relevant to them.

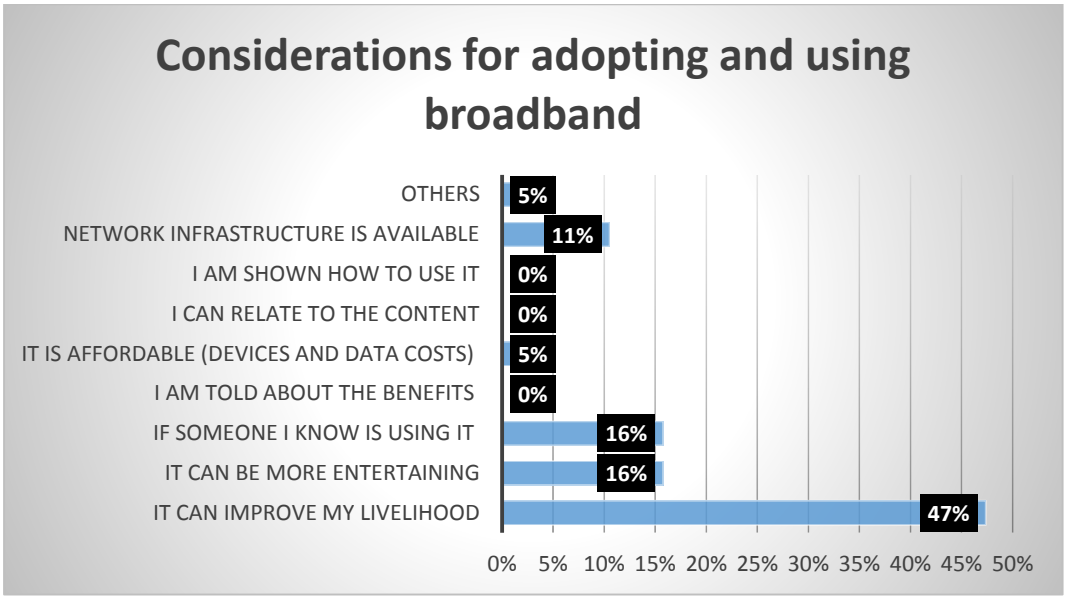
Figure 28: Barriers to using broadband



Source: Researcher (2018)

Lastly, participants were asked to identify the conditions that will influence non-adopters to adopt and use broadband and adopters to increase or sustain their usage. From Figure 29, the majority (47%) of participants mentioned that some of the non-adopters they know will consider adopting and using broadband if it can contribute towards improving their living standards. Some participants (16%) indicated that they will adopt and use broadband if someone they know is using it, while others (16%) required more entertaining content and 11% pointed to network infrastructure availability. There was a small number of participants who pointed to affordability as their main condition for adoption and increased or sustained usage. As with the ownership of a device and usage of broadband, none of the participants mentioned the lack of knowledge on using broadband and its content as considerations for using broadband. No participants believed that being told about the benefits of broadband will motivate others to adopt and use it.

Figure 29: Conditions for adopting and using broadband



Source: Researcher (2018)

4.4 Attitudinal Constructs

The data presented in this section provides responses from the three focus groups on questions related to attitudinal constructs. Attitudinal constructs describe the beliefs developed by users when exposed to a technology. From literature, this includes hedonic, utilitarian, perceived ease of use and relative advantage. Two more constructs were added as emerged from the collected data, namely: perceived lack of online security and privacy and social status.

4.4.1 Hedonic and Utilitarian outcomes

Hedonic outcomes refer to the entertainment aspects that users derive from using a technology and utilitarian outcomes refer to the usefulness of a technology to its users it terms of productivity and completing important tasks. When responding to questions related to hedonic outcomes, participants from all focus groups indicated that they use broadband to watch online videos, listen to music and sharing of content on social media. A participant in focus group 1 stated that it is easier to read content online for those who do not like to watch television.

With regards to questions related to utilitarian outcomes, the majority of participants across all three focus groups identified broadband as an enabler for convenience. They

mentioned the use of broadband to pay accounts, do banking, and pay for electricity, rent and online shopping to avoid waiting in traffic and standing in long queues. A participant in focus group three said: "...I think convenience as well because when you download an app you download to make your life easier to make things convenient for you so the one thing I look for is convenience."

Broadband was also regarded as an empowering tool to members of the community. A participant in focus group two stated: "It goes back to the issue that we talked about that it makes life easy. Even if you are sick or crippled you can do online shopping and pay your bills."

Participants also used broadband as their key source of information for educational purposes, searching and applying for jobs as well as bursaries and learnerships. A participant in focus group one supplemented:

> For us it is productivity because entertainment is not something that is more important for us to spend data on so meaning I would not spend my data on entertainment rather than go online and look at Sasol's learnerships and what bursaries are there, there is no benefit in me looking for something that won't benefit me tomorrow.

When asked to indicate if broadband means more entertainment or productivity to them, majority of participants in focus group one concurred that they use broadband equally for both entertainment and productivity. A participant in focus group one mentioned that "It covers all of the aspects of our living in todays' life, you have your emails, your camera, music, everything you need on your phone, entertainment and both personal life."

However, the majority of participants in focus group two preferred entertainment over productivity and mentioned activities such as online dating. There was no consensus among focus group three participants in this regard, while one participant indicated that for him broadband was more about entertainment, another participant pointed out that he downloads videos for learning. Another participant in focus group three added that "It depends on the user of the particular phone or computer because

if you like entertainment you will use most of your data on entertainment but if you're a busy person you can do stuff to succeed in your life."

4.4.2 Perceived Ease of Use

Perceived ease of use as the name implies, refers to how user friendly users of a technology perceive it to be. When they were asked what important considerations are taken into account when choosing a broadband end-user device, participants highlighted user friendliness as one of the main drivers for them to make a decision, a participant specified that:

> We were looking for a phone that won't give you a hassle when you are trying to access the internet meaning that it is a phone that has to be internet friendly with our community Wi-Fi that is the one thing that we look at when buying a phone.

There were conflicting views among participants on their perceptions on the ease of use of broadband, meaning both the use of broadband devices and the use of broadband services. Some participants pointed out that they perceive broadband to be relatively easy to use. A participant in focus group three highlighted that although broadband has been regarded as a technology that is more suitable for the young generation, the older generation is also adopting and using broadband because it is user friendly.

In contrast, some participants held a view that the technology still does not cater for everybody. A participant in focus group two raised a concern that the user manuals or help menus on the devices are mainly in English so this is a problem for people who cannot read and understand English. The participant went further to propose that it will make it easier if a local language was included in the help menu. Another participant in focus group two recommended voice recognition technology as a possible solution if the feature can be added to affordable devices.

Furthermore, another concern was raised regarding the need for users to always upgrade their devices. Participants indicated that although broadband is easy to use, they are compelled to frequently change their devices to keep up with technological

developments. A participant in focus group three suggested that it will be better if an application can be developed that will allow them to simply update the software on their devices when developments are made. Additionally, a participant in focus group one mentioned that some people might not be using broadband because they want something less complicated and easy to use.

4.4.3 Relative advantage

Relative advantage refers to facets of the technology that makes it superior to its predecessors or competing technologies as perceived by users. Participants submitted that fast data transfer speed is the key driver for their choice of broadband products and services. A participant in focus group two added that "for me I decided to buy it so that I can google and go on the Internet and I could Facebook and WhatsApp really fast." Participants further indicated that a fixed broadband connection is more reliable as compared to a mobile connection and it provides better performance as compared to the free Wi-Fi because there is less congestion on the network.

But it emerged that although participants deemed it beneficial to have a dedicated fixed connection, few of them actually had fixed connections installed at their houses because they regard it to be expensive. Therefore, participants preferred mobile broadband not only because it is cheaper as compared to fixed broadband, but because it also offers mobility which translates to flexibility of staying connected everywhere they go.

In addition, participants mentioned that mobile phones allow them to install applications on their personal devices without depending on a single home computer. A participant in focus group three supported the view by saying: "most of the apps we have them on the mobile phone, even now that we can get them on the laptop, but the mobile phone you can get internet everywhere."

Another feature that made participants prefer mobile devices is the ability to create a Wi-Fi hotspot wherein a number of devices can be connected to share data connection. A participant in focus group one pointed out that the Wi-Fi hotspot feature allows them to share data which makes broadband more accessible for them.

4.4.4 Perceived lack online security and privacy

Adopters and non-adopters of broadband mentioned online privacy and security as factors of concern. These factors did not form part of the conceptual framework but they proved to be of importance to participants. The factors also had a potential to affect their behaviour toward the adoption and continued usage of broadband.

Participants in focus group two mentioned that many people still do not use the Internet due to the fear of getting hacked or personal information being stolen. A participant in focus group two mentioned that "there isn't enough privacy, people can get your confidential information. You get people sending you messages that you didn't subscribe to." While another participant in focus group three also affirmed this by stating:

> Whereas, we are saying that we are trying to create a better nation to enhance South Africans or our own country views or to take South Africa to that certain level but the problem is we are not safe from security point of view, we don't have security at all because whereas we say that we communicate safely whereas the servers belong to them so how safe are we?

4.4.5 Social status

Although social status was also not identified from literature as an attitudinal construct, it was regarded as an important factor by participants for adoption and usage of broadband. Participants also added that social status plays an important role in choosing a product. A participant in focus group two supplemented:

> So you see living in the township, most of us we don't care about how a phone works, we just want the most expensive phone, even if you don't have the knowledge about the phone you just want to make sure that they know that this is the phone that you have.

4.5 Normative Constructs

The data presented in this section provides responses from the three focus groups on questions related to normative constructs. Normative constructs refer to how people get influenced by others and the information around them to adopt and use a technology. From literature, this includes primary and secondary influences.

4.5.1 Primary influence

Primary influence is the social pressure that is imposed upon an individual by family, friends and other members of the society to use a technology. A participant in focus group one pointed out: “I actually saw one of my friends using the phone I have right now and I liked it so I asked my mom to buy it for me.” Another participant in focus group three also indicated that he was referred by a business partner to try a particular service provider.

The majority of participants in all three focus groups highlighted that they rely on the experience of others as a deciding factor to buy a particular product. They mentioned that they would rather wait for more people to buy the product first and learn from their experiences and the practice also assists them to get the products at affordable prices since products are usually expensive when they are new in the market.

4.5.2 Secondary influence

Secondary influence refers to how individuals are influenced by other sources of information such as media and advertising to use new technology. The majority of participants in all focus groups believed that although broadband products and services are advertised in the media, the information was still not enough to influence more people in their communities to adopt and use broadband because there are still products and services they are not aware of. Participants further indicated that more people will consider broadband products and services if information is provided on it, and they classified television as the best form of media for advertising and informing them about new products and services.

Participants also alluded to the points that there is an element of selective marketing where information about certain products and services is not disseminated to their communities. A participant in focus group one added:

> I think he is right, it is more about the situation of where you are based due to the fact that most of the people that live in townships we don't get as much information that we should be getting compared to the people that live in the suburbs.

They also mentioned cases where infrastructure was deployed in the community but no information was provided on how to access it. Participants believed that market segmentation has led to the situation were fixed broadband products and services in particular are not marketed to them because they are not regarded as the target market, even though the infrastructure is available in some of their communities. Therefore, only few people who seek information will know about such products and services.

4.6 Control constructs

The data presented in this section provides responses to questions that were linked to control constructs. Control constructs refer to the level at which potential users believe that they have internal and external control to use a technology. From literature, these factors include knowledge, self-efficacy and facilitating conditions resources.

4.6.1 Knowledge

The knowledge construct refers to the level of awareness at which potential adopters and users of technology are exposed. This may include knowledge about the benefits of using the technology, how to procure it and how to use it optimally.

Although participants believed that they have a high level of awareness of broadband, they alluded to some aspects of the technology that they still do not understand. A participant in focus group one mentioned that in most cases they buy devices without fully understanding the capabilities and features. Another participant in focus group one added that the information about the devices is normally communicated in

technical terms like bits and pixels which is confusing to people without a technical background. The participant added: “I think the information should be simplified for someone that doesn’t know because when you come as a consumer you just want a fast phone, a phone that connect to the internet with ease.”

Another concern that was raised by the participants was the complexities of choosing between products. Participants concurred that the information they get on products does not enable them to easily compare and make a choice. A participant in focus group two stated that it is not always clear to them how much data they can get for a certain amount of money, hence they always have to do research.

Furthermore, a participant in focus group one revealed that they are also not sure how their devices utilise the data. The participant mentioned that retailers should provide information on:

> How the phone actually manages its own data, if I had to upload data, how long will it stay number one, and then on what kind of usage will it be maintained, on what type of things would I be using it for it to maintain itself and then thirdly the fact that if I had to download something, will it be faster to save me more data or would it take a while and still eat my data.

Some participants were not aware of applications and automatic updates that run in the background and use data. They mentioned that sometimes their data and airtime disappears and they do not seem to have control over the situation as the applications will update without their consent. A participant in focus group two complained:

> When you get a new modem and then things install without your consent, just like google play and its’ auto updates, it uses your data and downloads applications that you never asked for and the hundred megabytes that you bought are finished.

However, another participant in focus group one held a view that sometimes it is a matter of people being ignorant. The participants mentioned:

> What I am saying is we watch the same TV and we go to the same shops, the problem is that when we get a product, like a phone, we get there and say I like this phone, we don't ask the right questions, exactly, we are being ignorant.

Another participant in focus group one supported the view that "people do not read the terms and conditions when downloading applications, they just press ok and install". By doing this, users effectively give their consent to applications to run and update in the background. A participant in focus group two added that by letting their children play games on their devices also contributes to the issue of high data usage because they are sometimes not aware what their children do with the devices. A participant in focus group three also indicated that most of the free applications they install on their devices come with pop-up advertisements which can also add to data usage.

Although some participants were aware of features on devices that help them to restrict background data usage, others resorted to completely disabling mobile data on the devices when it is not being used as means of controlling usage. Participants felt that more awareness is needed on this matter because they believed that network operators are taking advantage of the situation. A participant in focus group one said:

> Yes, that is why I am talking about it because it used my data and then I ended up calling customer care and told them that they are ripping me off because I told them that I haven't been making calls or anything but my airtime still disappears so I called and they told me that I need to switch off my background data but since I have done it I can cope.

4.6.2 Self-efficacy

Self-efficacy refers to the internal factors or perceived confidence of users in using a technology. This includes the belief that they have the right skills and proper understanding on how the technology functions. Notwithstanding the technical issues discussed in section 4.6.1, responses from all focus groups showed that the majority

of participants were comfortable with using broadband. This is supported by the fact that the majority of participants were adopters and active users of broadband and the minority who were classified as non-adopters also have an understanding on how broadband functions.

Participants exhibited a high level of understanding with regards to the knowledge of access technologies, devices and services that are associated with broadband. Participants mentioned they were confident using mobile technologies such as 3G, 4G and Wi-Fi on smartphones, tablets and laptop computers. A participant in focus group one added: “so we have the smartphone and the modem that we use with the laptop”. Participants also listed the use of a range of services and applications from emails, social media, instant messaging, online shopping and internet banking.

However, there were some participants who believed that they did not entirely have the requisite skills and full confidence of using broadband. In this case, some rely on the younger generation of users as they are believed to have superior knowledge on the technology as compared to their older generation counterparts. As a participant in focus group two mentioned: “another thing that I saw is that we aren’t really good at using these phones but our kids are. I sometimes get stuck and my kids help me out.”

4.6.3 Facilitating conditions resources

Facilitating condition resources refers to the external factors that may serve as limitations for the adoption and usage of broadband. This includes factors such as affordability, time and availability of infrastructure with regards to broadband adoption and usage. Participants indicated that although they were aware of fixed broadband access technologies like ADSL, they preferred mobile broadband access technologies because they are cost effective and provides mobility. Participants also indicated that they use the free Wi-Fi extensively.

However, there were concerns from participants on the quality of service provided by the mobile network operators. The majority of participants in all focus groups indicated that the availability of mobile network coverage was not consistent throughout their community and the network gets congested which slows down the

connection speed. Therefore, their choice of a service provider depends on who has the best coverage in a particular area. A participant in focus group three mentioned:

> I think what he is saying in terms of Cell C it differs on location, where I am right now MTN is the problem, where he is staying Cell C is the problem. Right now I am currently using Cell C and it is fast, it's okay but not in his area so it depends on location.

Participants pointed out that the quality of service must be improved to provide uniform coverage everywhere. A participant in focus group three mentioned that this situation limits their choice and compels them to choose more expensive service providers over cheaper alternatives just because the quality of service is better in their area. Another participant in focus group three indicated that they have to carry multiple sim cards from different service providers to allow them to access the best network at a specific location. A participant in focus group one also added that the connection speed is fast after midnight when less people are on the network.

Participants also alluded to the limited range of the free Wi-Fi hotspots as a challenge. A participant in focus group one stated: "this free Wi-Fi, can't reach it from here, I wish I could reach it from my own bed, so the person that stays closer to the Wi-Fi station has a better advantage than I do." Another participant in focus group one raised a concern that they risk a chance of getting robbed every time they carry their devices to get closer to the Wi-Fi hotspot.

The cost of adopting and using broadband was also cited as a major barrier by participants. The indication was that more people would adopt and use broadband if the devices and associated usage costs (i.e. purchase of data bundles) were affordable. A participant in focus group two referred to the prices they pay to purchase data bundles as being "unfair." While a participant in focus group three stressed that it was a common view among everybody in their communities that data bundles are too expensive and it is not financially viable for increased usage. Another participant in focus group two further supplemented that devices that are considered to be of good quality are expensive and out of reach for them.

4.7 Relevance constructs

Relevance constructs refer to the use of broadband by low-income households toward the improvement of their livelihood, as well as the availability of content that is produced locally to keep the community informed and advance community development programmes.

4.7.1 Livelihood

By and large, participants who were broadband adopters confirmed that it is already an integral part of their lives. Participants regard broadband as an essential service to their communities to unlock potential and improve their living conditions. Participants described broadband as “a must have” and a participant in focus group two said:

> Most of the time you cannot say people must not use it because now it is a must have, whenever you apply for a job they tell you, you must go to the internet so for more of us to get jobs we have to have broadband.

Another participant then added: “I believe in these days every house must have a computer, these things are very useful.” A participant in focus group one also mentioned that all people must use the internet. While a participant in focus group three said he recommends broadband to everyone in the community because it is easy to use and it makes life easy.

4.7.2 Local content

With regards to local content, participants indicated that there was (to some extent) information that is relevant to their communities on platforms such as application stores, video and audio online stores and social media. Although there was no mention of specific community based websites, blogs or chat groups, participants mentioned that the free Wi-Fi portal provided information on local news and other community based information. A participant in focus group one mentioned: “like this free Wi-Fi, you can apply for a job on that free Wi-Fi, you can see opportunities, even if you have maxed out your 500 Meg usage you can still view jobs and news that are happening around.”

Participant in focus group three added that although the free Wi-Fi provides this facility, people tend to ignore it most of the time. While another participant in focus group one supplemented: “because that free Wi-Fi was put there for educational purpose but we use it for our entertainment that’s why if you can see most of the entertainment websites they are blocked from the website.”

When asked if there was sufficient production and consumption of local content through broadband, participants alluded to the issue of low data transfer speeds and high cost as a limiting factors for uploading and accessing the content. A participant in focus group three said:

> We don’t have local content because of the lack of speed in terms of downloading and uploading those things, you create them, there is a lot of videos there is a lot of content out there but for them to actually upload them to the internet is a process on its own, it costs money, it’s not affordable for them to do that, you understand so now for us to actually get that we need to actually improve our infrastructure

In addition, there was also a concern about hosting of content online. A participant in focus group three stated that they do not feel comfortable in sharing their ideas on the internet because there is not sufficient protection for intellectual property. The participant asserted that because the information is hosted on servers, the owners of the servers will always have access to the information so they run a risk of their ideas being stolen. Another participant in focus group three also alluded to the lack of developmental funding and lack of information for innovators. The participants cited:

> We may have free WIFI and then take ourselves there to get information about building some apps but first thing that we have to watch out, where are we going to get the funds to proceed with that app, where are going to get that sort of material to proceed with that app?

4.8 Chapter summary

The data collected through the short survey found that low-income households had access to a variety of network technologies in both fixed and mobile broadband, although it was not pervasive. They used broadband frequently to perform basic and advanced activities ranging from information search, emails, social media and instant messaging to banking, online shopping, training and education. The data collected through the focus group discussions revealed that low-income households were influenced by all motivational factors discussed in the literature. In addition to the pre-determined motivational factors, perceived lack of online security and privacy as well as social status emerged from the collected data as influential attitudinal factors for broadband adoption and usage by low-income households.

Chapter 5: Analysis on motivational factors influencing broadband adoption and usage by low-income households

5.1 Introduction

This chapter provides the interpretation and discussion of the data presented in Chapter 4. The analysis followed Saldaña (2009) streamlined code-to-theory model described in section 3.8. The chapter is structured according to the research questions posed in Chapter 3 and also in the context of the theoretical framework that guides this study. The main research question for this study is how do motivational factors influence the adoption and usage of broadband in low-income households? And following sub questions were derived to support the main research question:

Sub question 1

What are the characteristics of broadband use among low-income households?

Sub question 2

How do attitudinal, normative and control constructs influence the behaviour of low-income households to adopt and use broadband?

Sub question 3

How do relevance constructs support the influence on behaviour of low-income households to adopt and use broadband?

Section 5.2 sought to answers Sub question 1, using the data collected through the short survey and presented using descriptive statistics in Chapter 4. While Sections 5.3 to 5.6 sought to address Sub questions 2 and 3 respectively.

The findings in these sections are presented in line with the extended model for broadband adoption as proposed in Chapter 2 as well as new constructs that emerged in the interpretation and analysis of the collected data. Themes are developed and discussed under each construct to build explanations on how it affects the behaviour

of low-income households to adopt and use broadband. The discussions are also built around the context of the background information discussed in Chapter 1 as well as the literature discussed in Chapter 2 and the use of evidence from other secondary sources assertions and arguments.

The analysis involved the use of Atlas.ti from which emerged various diagrams based on inputs from data coding which also assisted in developing the themes.

5.2 Low-income households usage profile

The data presented in Figure 20 provided that an average of 90% of participants across all three focus groups were broadband adopters. The data analysed in this section are inputs provided by these adopters. Table 4 presents the use pattern of low-income households as derived in Section 2.3 and drawn using the data presented in Section 4.3. The table is used to develop discussions on the broadband usage profile of low-income households.

Table 4: Low-income households use pattern

	Use Dimension	Use Pattern	Selection
User	Frequency of Use	Frequent	X
		Moderate	
		Casual	
	Time spent	progressive	X
		declined	
		dormant	
	Purpose of use	Basic	X
		Advanced	
	Location of use	Work	
		Home	X
		Shared	
		Public	
	Preferred Payment method	Prepaid	X
		Postpaid	
	Preferred Access Technology	Fixed	
		Fixed Mobile	
		Mobile	
		Public Wi-Fi	X

Source: Researcher (2018)

5.2.1 Low-income households are frequent broadband users

As the data in Figure 27 provided, the majority (70%) of focus group participants used broadband every day. Following the use pattern table, low-income households were

classified as frequent broadband users. Based on Rogers (1995) DOI, low-income households can be said to be at the confirmation stage of broadband diffusion because the technology was used frequently and on continuous basis by the majority of the studied population, even though there was still a small number of users that still sought confirmation on the benefits of the frequent use of the technology.

5.2.2 Low-income households are progressive users

Although the data in Figure 26 provided that the majority of participants in low-income households were progressive users because the time they spent online had increased in 6 months, the same figure also shows considerable percentages of dormant (26%) and declined (30%) users, which suggested that there are factors that hamper the increased usage of broadband. Combining the data presented in Figures 27, 28 and 29, it was realised that the declined and dormant usage were attributable to the high cost of data. This may be an indication that some low-income households did not find value in spending more on data (to increase the time spent online), but rather bought enough data to meet their basic needs and some even reduced their spending. This should be an important consideration for policy makers and services providers. The cost of data as a barrier to broadband adoption and usage is elaborated further in Section 2.6.2.2

5.2.3 Low-income households are basic users

Looking at the range of broadband services and application used as presented in Figure 20, low-income households were classified as basic users. Although low-income households used less advanced services and applications, this may not suggest that a demographic indicator such as income played a significant role in determining how users used broadband. The use of broadband by low-income households was observed to be influenced by a mixture of applications which covered both productivity and entertainment activities.

Lee, Marcu and Lee (2011) refer to killer applications as the main catalysts of adoption. Today instant messaging and social media applications such as WhatsApp and Facebook are common and most popular applications that can be found in any smartphone and that drives the user interest to smartphones. The popularity of these

applications was raised by the ability to provide easy to use and cost effective instant communication everywhere as long as one has an Internet connection. The inclusion of voice and video calling services further strengthened their global dominance over the conventional short message service (SMS), voice and video calling. This further provided an indication that for advanced applications and services to also gain popularity among broadband users, they should be developed in way that will provide tangible benefits to users.

5.2.4 Low-income households use broadband at home

The data presented in Figure 24 showed that although the majority of participants (56%) indicated that they had access to broadband at home, 30% of participants also had access to broadband at public facilities. This observation suggested that public facilities did play a critical role in providing access to broadband for low-income households. The availability of Wi-Fi hot spots at public parks, schools, libraries and other public facilities provided much needed broadband access infrastructure to low-income households. This is characterised by the success of the Tshwane free Wi-Fi project as further outlined in Section 5.2.6.

5.2.5 Low-income households are prepaid users

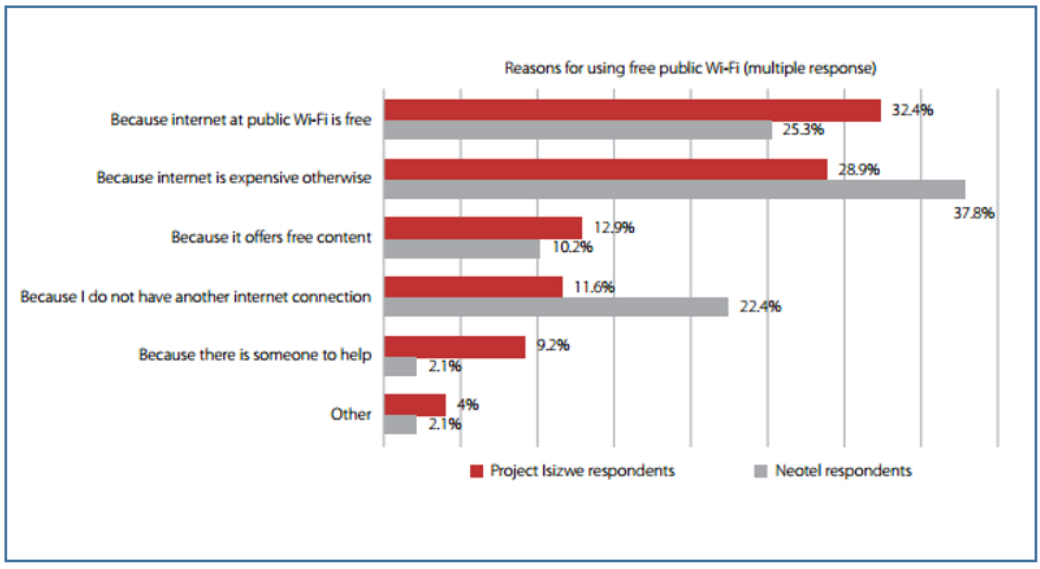
Recalling from Section 4.3.4 specifically Figure 23, it emerged that the majority of participants preferred pre-paid as a method of paying for broadband access. Participants associated post-paid with high cost because of the mandatory monthly subscription fees and lack of control over data usage. The dominant prepaid market was not a surprise as research has shown that 80% of mobile phone users in South Africa are on prepaid (ICASA, 2016). This trend is likely to continue for many more years to come because prepaid services provide users with the freedom to vary and control their spending on data bundles depending on how much they can afford. It also offers ease of porting or changing service providers (i.e. users do not have to wait for contracts to expire or pay penalties to port to a new service provider). This has created a highly dynamic and competitive environment which has compelled service providers to respond quickly with products that are attractive to the prepaid market.

5.2.6 Low-income households prefer public Wi-Fi

In Figure 21, 44% of participants which was also the majority preferred public Wi-Fi as the access technology and in Figure 23, 44% of participants also indicated that they rely on the public Wi-Fi to gain free access to the internet. While in Section 4.4.4 the majority of participants mentioned mobile as their preferred access technology because of mobility and ease of access and lower cost as compared to fixed broadband.

It emerged that free public Wi-Fi was being used as a substitute to prepaid data and it comes as a relief from the high data cost for the majority of participants. Section 4.6.3 provided further evidence on the reliance of participants on the public Wi-Fi and their need for the extension of its range. Geerdts *et al.* (2016) observed that South African users seem to be cautious when it comes to using mobile data and other means to access the Internet. Their survey results as depicted in Figure 31, show that the majority of their participants quoted the expense of access to the Internet through other means as one of their main reasons for using free public Wi-Fi. Figure 22 also show that although the majority of participants indicated that they choose an access technology because it easy to use, affordability was also mentioned by 18% of the participants.

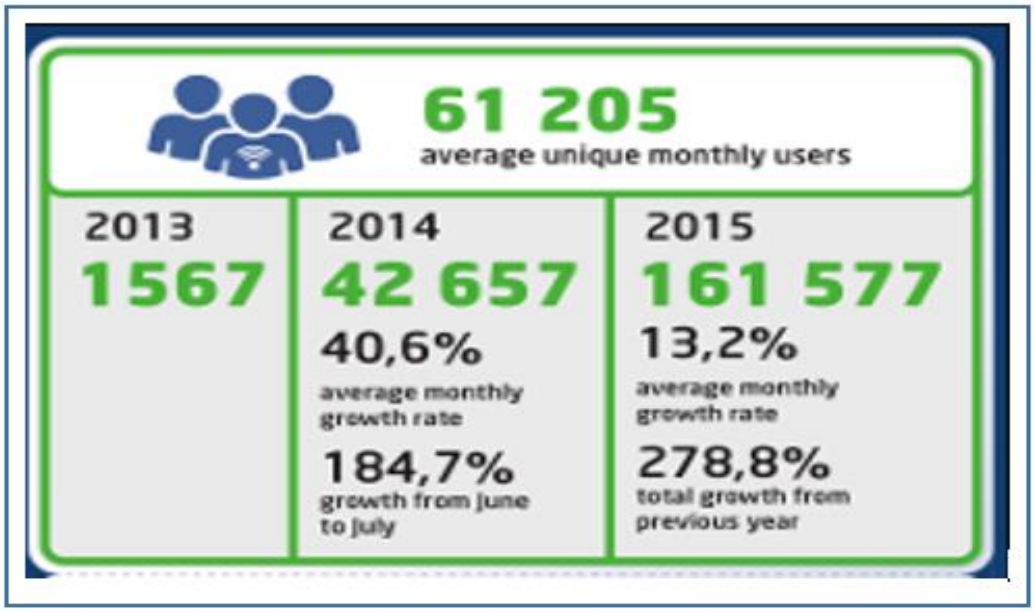
Figure 30: Reasons for using free public Wi-Fi



Source: Geerdts *et al.* (2016)

The data from Project Isizwe (2016) showed that the average number of unique users on the Tshwane Free Wi-Fi grew by 278.8% in just three years as depicted in Figure 30. This serves as further testimony on the demand for public Wi-Fi.

Figure 31: Increase in users on Tshwane Free Wi-Fi

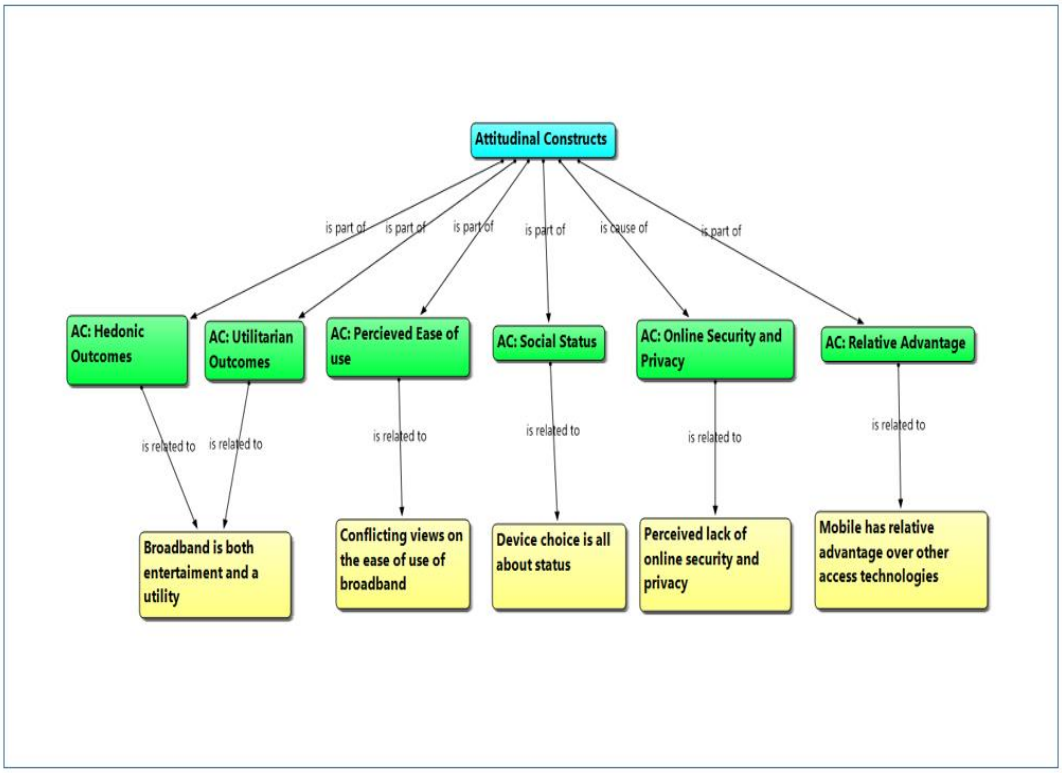


Source: Project Isizwe, 2016

5.3 The influence of attitudinal constructs on low-income households broadband adoption and usage

As Davis (1986) theorised, the potential user's attitude towards a technology is determined by whether they will use it or not. This section determines the influence of attitudinal constructs on broadband adoption and usage by low-income households. From the theoretical basis, four constructs (i.e. hedonic outcomes, utilitarian outcomes, perceived ease of use and relative advantage) were identified. Two more constructs were added as emerged from the findings (i.e. social status and perceived lack of online security). The analysis that follows was based on Figure 32, where the themes that emerged from the data are presented and discussed in line with the attitudinal constructs.

Figure 32: Attitudinal constructs analysis diagram



Source: Researcher (2018)

5.3.1 Broadband is both entertainment and a utility

Hedonic outcomes represent the pleasure derived from the use of a product or service while utilitarian outcomes are the degree at which the use of such product or service enhances the effectiveness of executing important activities (Venkatesh & Brown, 2001). Previous research has identified hedonic and utilitarian outcomes as key determinants for adoption of broadband in households (Choudrie & Dwivedi, 2004; Choudrie & Dwivedi, 2006; Naidoo, 2011; Seymour, 2012).

From the collected data, it emerged that participants found it difficult to set a clear distinction on whether broadband is an entertainment or productivity tool. Their motivation seemed to be driven by how broadband meets their needs for both entertainment and productivity based on their past experience. While broadband was regarded as an essential tool for communication, access to educational material and buying and selling of goods and services online, it was also found to be equally vital for downloading, sharing and consumption of content such as music and videos.

The results were consistent with those of Adams, Farrell, Dalgarno, and Oczkowski (2017) who argued that household users will look for a technology that will provide both entertainment as well as productivity in line with their current needs and past experience without setting a distinction between productivity and entertainment. The authors therefore proposed “lifestyle compatibility” as a single measure that includes both utilitarian and hedonic outcomes. This also supports the measure proposed by Rogers (1983) of “compatibility” which was later affirmed by Moore and Benbasat (1991). The measure refers to the degree to which an innovation is consistent with the potential adopter’s existing values, past experience and needs.

However it must be borne in mind that the majority of broadband adoption models insist in treating hedonic and utilitarian outcomes as separate measures (Choudrie & Dwivedi, 2004; Choudrie & Dwivedi, 2006; Dwivedi *et al.,* 2010; Naidoo, 2011). A possible explanation for this might be entrenched in the origins of these constructs in the context of measuring IT adoption by households. Venkatesh & Brown (2001) proposed these constructs for PC adoption in households. Their view was that a PC has the potential to provide both hedonic and utilitarian outcomes to household users but the aim was to measure which one will mostly influence the behaviour to adopt. Due to the technological advancements since the introduction of the PC and the introduction of broadband, it can be argued that user’s expectations have changed. Hence different measures are necessary to determine their motivation for adopting the technology.

5.3.2 Conflicting views on the ease of use of broadband

Davis (1986) defines perceived ease of use as "the degree to which an individual believes that using a particular system would be free of physical and mental effort” (Davis, 1986, p. 26). Literature indicates that people are more likely to have a positive attitude toward adopting and using a technology if they believe that it is easy to use (Davis, 1986; Venkatesh & Davis, 2000). From these theoretical basis, it was envisaged that the behaviour of low-income household users to adopt and use broadband will be affected by the extent to which they perceive broadband to be easy to use.

The data did not provide a conclusive view on whether the participants perceived broadband to be easy or difficult to use. The convolution arose from the impact of other demographics such as age, level of education, gender, and skills. The data suggested that age, the level of education attainment and lack of e-skills are the divisive factors that determined the perceived ease of use of broadband in low-income households. It is important to note that since income level was the focal demographic for this study, other demographics were not considered as motivational factors but rather moderators to the motivational factors as outlined in the discussion of the UTAUT in Section 2.9.

However, Venkatesh *at el.* (2003) outline the importance of moderators towards the determination of behavioural intention. Dwivedi and Lal (2007) also found that the majority of broadband adopters in the UK were the youth and the middle aged, who had higher levels of educational attainment, higher household annual income, and were male. Hence it is important to target moderators when the aim is to improve motivation in order to change behaviour.

Since some demographics such as age and gender cannot be altered, and others like annual household income are highly dependent on external factors such as economics, the easier option for most countries to influence the perception of citizens on broadband is through education. Kim *et al.* (2010) recognise awareness, ICT skills development and digital literacy as one of the key components that facilitated broadband demand in Korea.

In the South African context, both the SA Connect and the National e-strategy calls for the development of e-skills in three tiers, namely: the integration of ICT in teaching and learning in basic and higher education curriculums (the integration in this instance refers to ICT being used as a tool to deliver other subject contents and ICT as a subject), ICT skills development to build work force capacity in related sectors, and conducting awareness and e-literacy campaigns to ensure that citizens in general have the requisite skills to use ICT.

5.3.3 Device choice is all about status

Rogers (1983) provided that social status is an inherent aspect of adopting an innovation. In fact, he maintained that for certain innovations (e.g. fashion), social status can be the only benefit the adopter will enjoy. Rogers added that the adoption of all highly visible innovations is likely to be status motivated.

Social status was found to be an influential factor on the attitude of the participants towards the adoption of broadband. The finding yielded that some participants chose certain broadband products and services to attain social recognition. Participants referred to a practice where they will prefer certain brands or types of devices only because they are associated with a certain status in society (e.g. wealth and fashion). In this instance, less consideration was made towards other aspects such as features and cost.

In a seminal piece of work, Moore and Benbasat (1991) observed that social status was generally regarded as part of relative advantage by most researchers. They proposed a standalone construct and referred to it as "image" to measure "the degree to which use of an innovation is perceived to enhance one's image or status in one's social system" (Moore & Benbasat, 1991, p. 195). In subsequent research, Venkatesh and Brown (2001) later proposed "social outcomes" as part of attitudinal belief. They defined the construct as the "recognition that would be achieved as a result of adopting an innovation…" which "may lead to an elevation in power, knowledge, and/or status if the decision is thought by others to be a good one" (Venkatesh & Brown, 2001, p. 74).

However, the construct was considered irrelevant by Choudrie and Dwivedi (2004) based on the argument that broadband was not a directly observable product. This view might have been motivated by the definition of broadband that the authors adopted for their study. Since their definition was only limited to connection data transfer speed, end-user devices were not considered as part of their definition of broadband adoption. But the definition of broadband that was adopted for this study encompasses end-user devices as part of the broadband ecosystem. Therefore, broadband cannot be regarded as a non-observable product.

5.3.4 Perceived lack of online security and privacy

Online security and privacy are seldom considered as factors in broadband adoption and usage studies. Albeit being important considerations for users with a potential to define their attitude towards the adoption and use of broadband. These factors are not considered in most broadband adoption models (Naidoo, 2011). The perception of users on how secure the use of broadband is and the level of surety that their private data is protected can have an impact on their attitude to use broadband for security sensitive activities such as online shopping and banking (Naidoo, 2011).

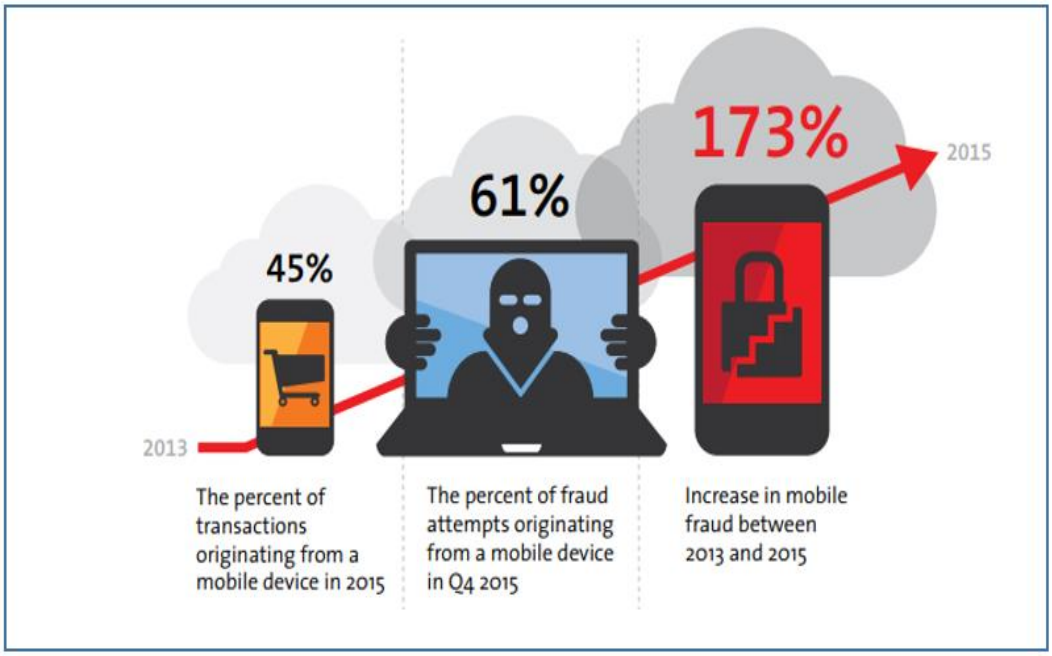
The data suggested that online security and privacy, as a construct, had an influence on the behaviour of low-income households towards the use of broadband. It was observed that low-income household users perceived the use of broadband as less secure and lacked privacy. The common view was there is no guarantee that if they share their data online it will be kept secure. Participants also felt that their online activities are being monitored. The finding also concurs with that of Brown *et al.* (2009) that there is a general concern about online security among South African Internet users.

However, Naidoo (2011) observed that knowledgeable users were generally satisfied with the level of security provided by their Internet service providers. Hence a closer look into the matter revealed that the concerns about privacy and security were influenced by the lack of awareness on how to stay safe online and how broadband or the Internet functions beyond the devices and network connections. There was anxiety due to users not knowing who owns the infrastructure that is used to transmit and store their personal information. There were also concerns about who else has access to their information when it is online? What do they do with it? And who is watching what they do online? Thomson, von Solms and Louw (2006) identified lack of knowledge as the major contributor to unsafe online user behaviour.

The RSA (2016) stated that as mobile platforms are becoming dominant for instant communication, banking and commerce, they have also become new targets for cybercriminals. As illustrated in Figure 33, mobile and other non-PC platforms are particularly vulnerable to cyberattacks because they are less secure (RSA, 2016). This

renders low-income household users suitable targets for cybercrime considering the high penetration of mobile broadband devices.

Figure 33: Mobile is the new target for cybercrime



Source: RSA (2016)

The National Cybersecurity Policy Framework for South Africa (NCPF) states: "To effectively deal with Cybersecurity, it is prudent that civil society, government and the private sector play their part in ensuring South Africa has a culture of Cybersecurity" (RSA, 2015, p. 25). To cultivate this culture, the NCPF provides for among others, the implementation and promotion of a comprehensive national cyber security awareness programme and the support of outreach to civil society. Kortjan (2013) also adds that governments should provide adequate resources to cybersecurity awareness and education campaigns in order to equip all members of the society to act responsibly online.

5.3.5 Mobile has relative advantage over other access technologies

According to Rogers (1983), the relative advantage of a technology refers to the degree to which users deemed it to be advantageous over a predecessor idea. The advantage can be in economic terms (i.e. cost), social importance, convenience or satisfaction. Rogers further asserts that although the advantage may be objective,

what matters is the perception of the potential users which drives their attitude toward the technology. Therefore, the greater the relative advantage of a technology, the higher its adoption rate will be.

Relative advantage is commonly found to be an influential factor to user's attitude and it is featured in the majority of models and theories in IT adoption literature (Choudrie & Dwivedi, 2004; Choudrie & Dwivedi, 2006; Naidoo, 2011; Seymor, 2012). However, the premise has always been to compare newer technologies with their predecessors (e.g. broadband versus narrowband). This might be considered as investigating the obvious since innovators and technology developers will always seek to include improvements in newer technologies to provide advantage over their predecessors in order to guarantee success in the market.

The approach that was taken for this study was to investigate relative advantage between broadband access technologies. The data suggested that low-income household users prefer mobile broadband over other access technologies (i.e. fixed and fixed-wireless). Due to mobility, low input and subscription cost (no installation and line rental charges) and being ubiquitous, mobile was regarded to have a significant relative advantage over fixed broadband.

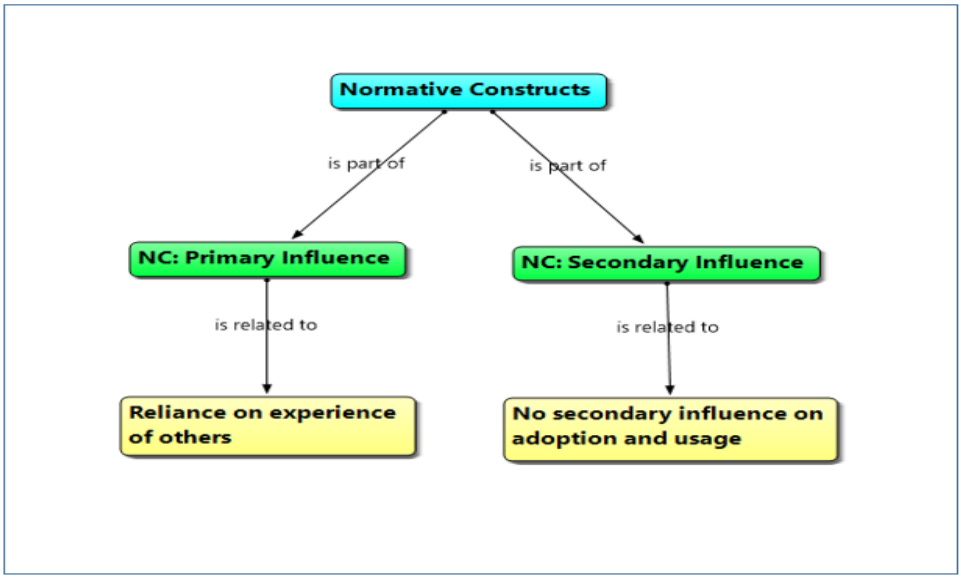
Although public Wi-Fi was also favoured by some participants, it was still not considered as a viable alternative but rather a supplement to mobile broadband. This was due to it being accessible only at hotspots around public parks, municipal facilities and public schools. The usage limit set per user device and the low data transfer speed due to high traffic during peak hours were also mentioned as limitations to the public Wi-Fi.

This finding supported the observation made by Ramosolo (2014) that users in the townships preferred mobile broadband over ADSL as a cheaper and always available option. Moroeng (2011) also affirmed that South African users preferred mobile broadband because it offered an always on connection with multimedia capabilities everywhere they go.

5.4 The influence of normative constructs on low-income households broadband adoption and usage

Fishbein and Ajzen (1975) as one of the first studies to discuss an individual's behaviour, asserts that an individual's decision to perform a certain behaviour is influenced by the beliefs on whether his or her referents expect him or her to perform such behaviour. This section determines which normative constructs were considered as factors by low-income household users to adopt and use broadband. From the theoretical basis, two constructs (i.e. primary influence and secondary influence) were expected to influence the behaviour of low-income household users to adopt and use broadband. The analysis that follows was based on Figure 34, where the themes that emerged from the data are presented and discussed in line with the normative constructs.

Figure 34: Normative constructs analysis diagram



Source: Researcher (2018)

5.4.1 Reliance on experience of others

From the data presented in Section 4.5.1, it emerged that low-income households placed reliance on the experience of other users for making a decision on what products and services to buy and use. Some participants confessed that their choice of devices and service providers were motivated by those close to them. While others

held a view that when a new product or service was launched in the market, it was always best to wait and learn from others before they tried it.

Primary influence is the social pressure that is exerted to a potential adopter of a technology by friends and family (Dwivedi, et al., 2010). Early adopters of a technology will influence future adopters through word-of-mouth and referrals, while also more often future adopters will wait for the technology to be proven and well-settled in the market before making a commitment (Venkatesh & Brown, 2001). Rogers (1983) also proposed that "the observability of an innovation, as perceived by members of a social system, is positively related to its rate of adoption" (Rogers, 1983, p. 232). Therefore, if potential adopters see more people around them using a technology and they can clearly observe the benefits, they are more likely to also adopt it (Moore & Benbasat, 1991).

The concept of eWOM as discussed in Section 1.3 refers to the sharing of consumption experience by consumers using Internet-based communication (Vimaladevi & Dhanabhakaym, 2012; Elwalda & Lu, 2014). Studies show that there is a positive relationship between eWOM and product sales (Duan, et al, 2008; Vimaladevi & Dhanabhakaym, 2012; Elwalda & Lu, 2014). Power Reviews (2016) showed that other than the variety of products, free shipment and better deals, 55% of Amazon online shoppers regard reviews, as the most important aspect of their shopping experience. The report further reveals that 61% of these shoppers always consult reviews before making their decision on a product and 92% of them finalise the purchase online.

5.4.2 Secondary influence

Secondary influence refers to how individuals are influenced by other sources of information such as media and advertising to adopt and use a technology (Dwivedi, et al., 2010). Venkatesh and Brown (2001) argue that early adopters are less likely to be influenced by friends and family since the information about the technology will not be available in their social circles. Consequently, early adopters will learn about the technology from secondary sources of information.

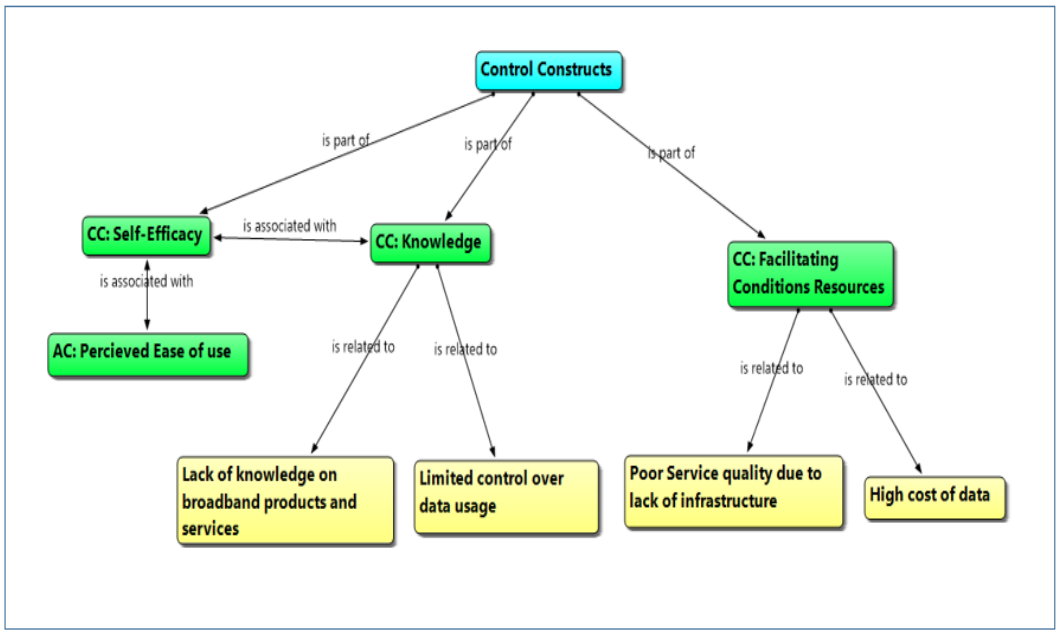
The data suggested that secondary influence did not have much influence on the behaviour of low-income households to adopt and use broadband. This may be

related to low-income households not being particularly early adopters of technologies. Although participants alluded to the lack of information on some broadband products and services, there was no evidence that this is linked to secondary influence. It was observed that it is rather more applicable to lack of awareness on broadband products and services which is regarded as a control factor.

5.5 The influence of control constructs on low-income households broadband adoption and usage

As Ajzen (1991) argued, the behavioural intention to perform a particular act might be favourable as a result of attitude and subjective norm, but the overt performance of the studied behaviour will be determined by the level of control an individual perceives to have in order to willingly act or not to act. The perceived control is affected by both internal factors to the individual and external constraints (Taylor & Todd, 1995). From the theoretical basis, three constructs (i.e. knowledge, self-efficacy, and facilitating condition resources) were expected to have an influence on low-income household users to adopt and use broadband. The analysis that follows was based on Figure 35, where the themes that emerged from the data are presented and discussed in line with the control constructs.

Figure 35: Control constructs analysis diagram



Source: Researcher (2018)

5.5.1 Knowledge

Knowledge construct can be considered from two aspects, namely: the knowledge about the technology and its benefits (awareness) as well as requisite skills to use the technology (Choudrie & Dwivedi, 2004). The view is that potential adopters are less likely to adopt a technology if they are not aware of its availability and benefits or if they lack requisite knowledge on how to use it (Choudrie & Dwivedi, 2004).

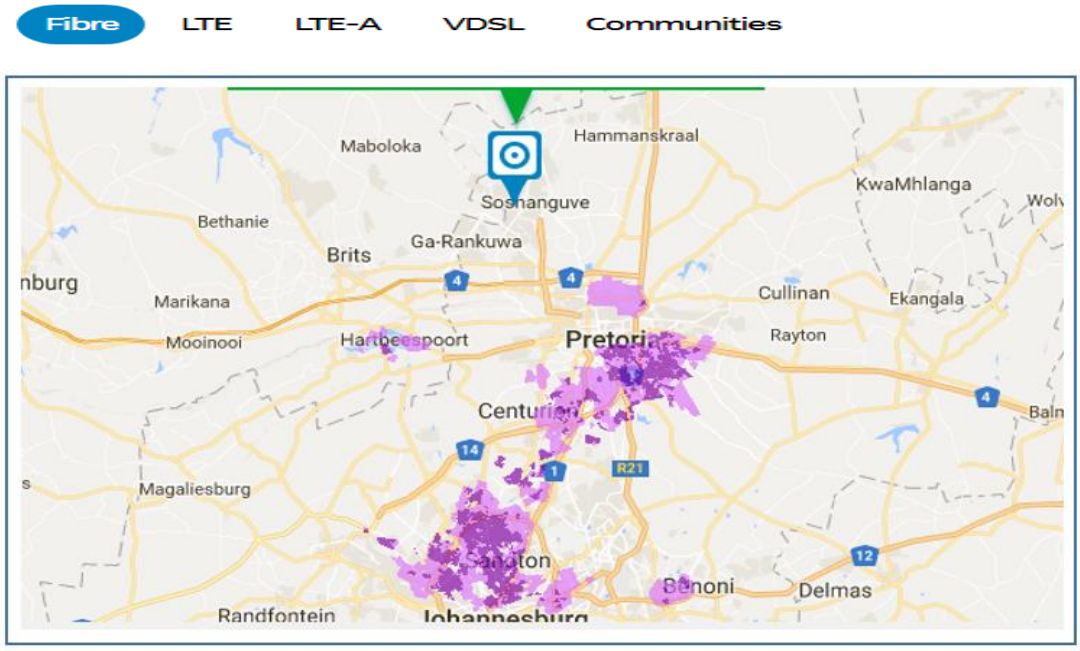
5.5.1.1 Lack of knowledge on broadband products and services

While it was observed that the majority of low-income household users were aware of most broadband products and service, it was discovered that some low-income household users believe that they do not receive similar access and information on broadband products and services as compared to users in more affluent communities. This led to them not knowing about the availability of new products and services offerings.

It is important to note that it is not uncommon for service providers to launch certain products and services based on market segments in the ICT industry. Aligned with Roger (1983)'s diffusion of innovation theory, high-income users may be associated with early adopters of an innovation and low-income users with late adopters and laggards. This is attributed to the inherent high cost of products and services when they are initially launched in the market (Venkatesh & Brown, 2001). Therefore, service providers will focus their marketing efforts on high-income users during the initial stages of diffusion.

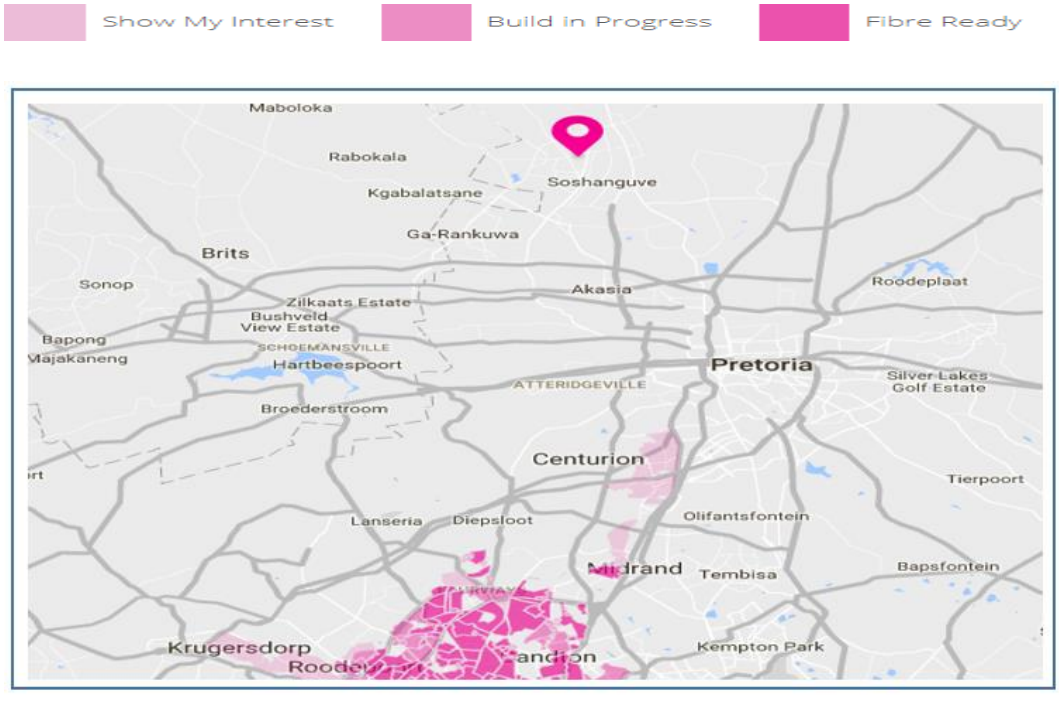
This is evident through the trend followed by service providers in rolling out technologies such as FTTH in South Africa. Figures 36 and 37 below are snapshots of FTTH availability maps in Soshanguve as of July 2017. The pictures were taken from Telkom SA and Vumatel websites respectively, which were the most competitive players in the rollout of FTTH. From the maps, it was evident that low-income households in Soshanguve were not target areas for rollout of new broadband technologies such as FTTH.

Figure 36: Telkom FTTH coverage



Source: Telkom (2017)

Figure 37: Vumatel FTTH coverage



Source: Vumatel (2017)

However, Naidoo (2011) and Seymour (2012) found that the awareness of South African users about broadband was affected by media, skills level, social influence and

the following of trends. Both authors also observed that non-adopters who were not aware of broadband and its benefits associated their lack of awareness to them not taking the necessary initiatives to find information about the technology. But these findings were based on the assumption that there is seamless coverage of broadband technology and equal dissemination of information in all communities.

5.5.1.2 Limited control over data usage

The collected data suggested that some low-income household users admitted to not having control over their data usage. There were number of instances where participants raised their frustrations on the issue of “disappearing data”. Participants complained about quick an unjustified depletion of data on their devices. There was a common belief that service providers are using complex billing methods to exploit consumers into spending more on data.

At face value, it seemed like the matter was linked solely to the lack of knowledge on how to use smartphones and manage data usage, as some participants admitted that although they use broadband devices and applications, they still do not know much about certain features. Not all participants were aware that applications can be restricted to run, refresh and update in the background through the proper settings on their devices. Moreover, service providers also put the blame on consumers for not taking control and monitoring the usage of data on their devices and recommended measures such as disabling mobile data when not in use, disabling application auto updates, avoiding applications with advertisements, streaming of video in standard definition and the use of Wi-Fi to download and upload big files and to perform software updates.

However, as it appeared from the results of an experiment conducted by Mybroadband (2017), some of the allegations made by users about disappearing data were not completely unfounded. The experiment revealed that MTN was charging or deducting data from its subscribers for LTE connection setup messages. These are default handshake data messages between the user device and the network to establish a data connection before the user starts the actual transmission which should be at no charge to the user as other service providers indicated.

5.5.2 Facilitating conditions resources

Venkatesh *et al.* (2003) define facilitating conditions "as the degree to which an individual believes that an organisational and technical infrastructure exists to support use of the system" (Venkatesh *et al.,* 2003, p. 453). Taylor and Todd (1995) argue that from an IT usage perspective, facilitating conditions provides two dimensions, namely: resources (which includes time and money) and the availability of compatible technology that allows the user easy access (conditions). Hence the lack of facilitating conditions resources will constrain adoption and usage of a technology (Taylor & Todd, 1995).

5.5.2.1 Poor Service quality due to lack of infrastructure

The fact that participants reported mobile broadband coverage to be sporadic with poor service reception and low data transfer speed, suggested that there was insufficient network infrastructure in their communities to provide seamless mobile broadband coverage and capacity. From these responses, it was determined that there was no sufficient investment in upgrading and provisioning of broadband infrastructure in low-income communities.

Service quality was proposed by Choudrie & Dwivedi (2004) as a measure of user's satisfaction with their current service provider. The authors hypothesised that users are more likely to continue their subscription with a service provider if they perceive the service quality to be satisfactory.

The South African Customer Satisfaction Index (SAcsi) reported that the South African mobile broadband average satisfaction score has been declining in the past three years. Consumers provided a score of 76.7 out of 100 in 2014 which decreased to 75.4 in 2015 and further declined to 68.2 in 2016. Low broadband speed and unreliable service was listed among the key contributors to dissatisfaction (SAcsi, 2016).

The Akamai (2016) further indicated that South Africa was ranked 80th in the world with an average connection speed of 6 Mbps. Furthermore, a study by Chetty, Sundaresan, Muckaden, Feamster, and Calandro (2013) found that low data

throughput and high latency to popular websites are the limiting factors for broadband performance in South Africa.

Although ICASA reported an increase of 18,8% in telecommunications infrastructure investment within a 12 months period ending December 2016, its report does not provide details of what portion of this investment was dedicated to broadband infrastructure development in low-income communities. But the aggressive strategies that have been adopted by South African network providers to rollout LTE and FTTH might suggest that the focus was on higher income communities. This observation corroborated the finding by Nedohe (2014) that investment on high speed broadband infrastructure by private and public owned companies was still focused in densely populated urban areas where the prospect of returns on investments are high.

Pearson and Chevalier (2015) assert that national regulatory authorities can play a vital role in improving the quality of service for broadband users. This can be achieved by implementing regulations, monitoring and reporting interventions such as publishing of service performance and price comparisons, conducting consumer satisfaction surveys and comparing ISP services, defining and enforcing broadband traffic management regulations as well as quality of service frameworks with potential financial penalties. In the case of South Africa, there has not been any intervention by ICASA to actively monitor and ensure the improvement of broadband quality of service. ICASA was still developing a data quality of service framework by the completion of this report.

5.5.2.2 High cost of data

Cost was observed to only have an impact on sustained or increased broadband usage but not necessarily on adoption of devices. As previously alluded, low-income household users were less affected by the price of devices because ownership of smartphones and tablets was primarily motivated by social status. However, participants were particularly unhappy about the costs of data. They deemed it too high and as a barrier to increase usage.

There are multiple references to the unusually high cost of data in South Africa which has so far adversely affected the usage of broadband (Brown, Letsididi & Nazeer,

2009; Naidoo, 2011; Seymor, 2012; Seymor & Naidoo, 2013). The data collected by Research ICT Africa (RIA) in 2016 show that the price for 1 Gigabit of data in South Africa dropped by almost 50% in three years, which averages to 17% per year as presented in Table 5. A comparison with other African countries yields that the rate at which the data price has been declining in South Africa is still not adequate. For example, the data price in Nigeria decreased by a total of over 70% and at an average rate of 23% per year in the same period.

Table 5: Data price changes in Africa

Country	**2014**	**2015**	**2016**	**% Change**
Ghana	4.7	3.96	2.54	-45.96%
Uganda	5.85	3.49	3.59	-38.63%
Mozambique	6.39	3.62	2.27	-64.48%
Tanzania	7.92	6.03	2.39	-69.82%
Kenya	8.7	4.97	5.02	-42.30%
Nigeria	11.15	5.06	3.25	-70.85%
Rwanda	11.92	4.13	3.91	-67.20%
Morocco	12.28	5.1	5.16	-57.98%
South Africa	14.06	6.97	7.04	-49.93%
Cameroon	20.81	6.68	6.8	-67.32%
Ethiopia	21.07	9.6	7.55	-64.17%
Namibia	21.7	5.77	5.83	-73.13%
Botswana	26.3	21.61	18.02	-31.48%

Source: RIA, 2016

The high cost of data in South Africa received media attention in 2016 with the launch of the social media campaign termed #Datamustfall which prompted government to highlight data price reduction as a policy priority for 2017. This action proved that the

high cost of broadband is affecting all users irrespective of income, which makes its impact even more severe on low-income households.

Data prices are currently not regulated in South Africa. This has arguably been one of the contributing factors to the slow decline in data cost. In 2016, the DTPS issued a policy directive to ICASA to investigate data prices and competition in the ICT sector. In March 2017, ICASA announced its plans to develop a framework for data prices regulation.

5.5.3 Self-efficacy

Taylor and Todd (1995) defines self-efficacy as the perceived ability to perform an act. A high level of self-efficacy means an individual has the confidence to use a technology without any assistance (Dwivedi, Khoumbati, Williams, Lal, & Gharavi, 2007). The data provided that although the majority of participants exhibited high levels of confidence in using broadband, there were cases where self-efficacy was proven to be a limitation for adoption and usage , particularly among elderly users.

Although it might not be uncommon for age as a moderating factor to be associated with low confidence in using new technologies (Venkatesh *at el*., 2003), it was also observed that there was a link between knowledge, perceived ease of use and self-efficacy. The participants who lacked the relevant knowledge on the use of broadband, perceived it to be difficult to use and exhibited relatively low levels of confidence in using broadband without being aided by others.

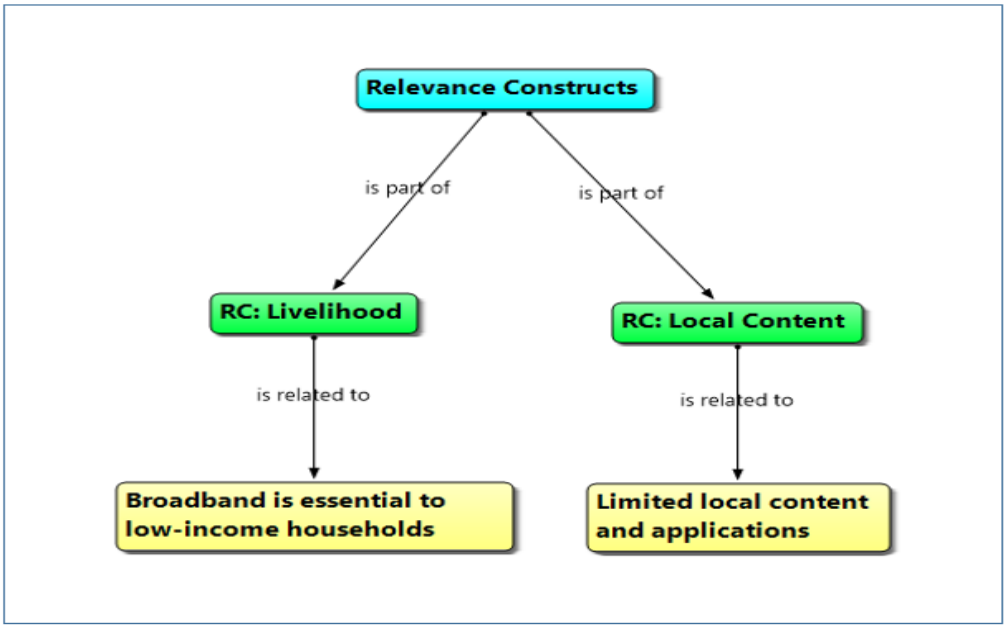
Therefore, self-efficacy is not considered to have a direct influence on the behaviour of low-income household users to adopt and use broadband because of its high dependence on other motivational factors and moderators. This validated the contention by Venkatesh and Brown (2001) that the lack of relevant knowledge has an adverse impact on self-efficacy and further affirms the finding by Brown *et al.* (2009) that a perception of ease of use lends credence to a high level of self-efficacy.

5.6 The relevance of broadband to the livelihood of low-income households

Rogers (1993) refers to consequences of innovations as the “changes that occur to an individual or to a social system as a result of the adoption or rejection of an

innovation" (Rogers, 1993, p. 371). Rogers argues that an innovation will have desirable and undesirable, direct and indirect, and anticipated and unanticipated consequences to an individual or social system. He further adds that the adoption rate of an innovation is determined by its compatibility with sociocultural values and beliefs as well as the degree to which it meets the needs of a potential adopter. This section determines which relevance constructs were considered as factors by low-income household users to adopt and use broadband. The section also provides an analysis on how these factors influence their behaviour to adopt and use the technology. From the theoretical basis, two constructs (i.e. impact on livelihood and local content) were expected to bare relevance of broadband to low-income households. The analysis was based on Figure 38, where the themes that emerged from the data are presented and discussed in line with the relevance constructs.

Figure 38: Relevance constructs analysis diagram



Source: Researcher

5.6.1 Broadband is essential to low-income households

Choudrie and Dwivedi (2004) proposes that broadband will have an impact on daily activities of its user since it provides new ways of working and entertainment. A positive experience on an individual through continued usage of broadband is also likely to have an effect on others (Naidoo, 2011). For example, non-adopters may

change their attitude towards broadband when they observe the benefits derived by its users and those who are positively impacted are likely to recommend it to more people.

The data provided that low-income households are positively impacted by the use of broadband. Although there was no observable evidence on how and to what extent has broadband improved the livelihood of low-income households, their assertions confirmed that broadband to them is indeed a public good as Picot and Wernick (2007) proposes. Participants referred to broadband as an integral part of their livelihood. It is part of their communication, work, entertainment, education, business and other daily activities.

However, Firths and Mellor (2005) cautions on unintended consequences that may be foreseen on the extended use of broadband. The most relevant to low-income households being the increased expenditure on data may leave less money for other essentials such as food and clothing. Moreover, the intensive use of social media may lead to other issues such as reduced personal contact, cyber bullying and exposure of children to inappropriate and harmful content with negative psychological impact. But this negative outcome can be averted through awareness to promote responsible and controlled usage.

5.6.2 Limited local content and applications

As Howell (2002); Garcia-Murillo (2005); Lee, Marcu and Lee (2011) insists, the availability of local and relevant content can drive broadband demand. Participants mentioned that there was content produced locally and applications developed by local entrepreneurs but they were not readily available for download. The low extent of the availability of local content and use of locally developed applications was found to be associated with the lack of ICT skills, high cost of data, low data transfer speeds, lack of local hosting facilities, online security and lack of developmental funding.

OECD (2008) recommends that in order to foster local digital content development, governments should focus (over and above the increased access to broadband infrastructure) on improving ICT literacy, reduce the cost of ICT hardware and software, promote the development of local hosting to reduce the cost of

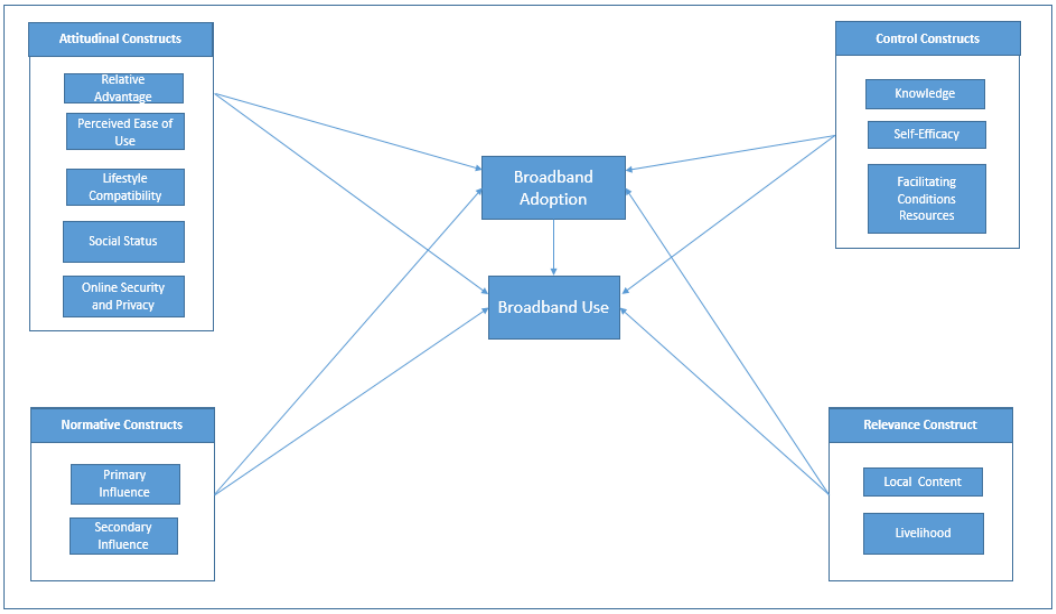
international transit and improve the speed of content storage and delivery, make public sector information readily available and enable an innovative environment for content creation.

The SA Connect states that "Digital inclusion extends beyond the rollout of networks, and is in many ways dependent on the availability of relevant content for local users." (RSA, 2013, p. 48). The policy seeks to address most of the OECD recommendations mentioned above through the digital opportunity pillar. It further provides that local content development can be encouraged through the production, supply and use of public information (e.g. digitisation of archives, museums and other).

5.7 Chapter summary

This chapter provided the interpretation and analysis of the data presented in Chapter 4. The findings deduced from the data provided an insight on how motivational influenced the adoption and use of broadband by low income households. Hence, Figure 39 illustrates the detailed theoretical framework as elicited from the analysis.

Figure 39: Extended model for broadband adoption and usage



Source: Adapted from Dwivedi *et al.* (2010),

It is important to note that the intention of the detailed theoretical framework is not to replace the MBA by Dwivedi *et al.* (2010), but rather to depict the outcomes of the

studied setting and provide more insight on how motivational factors influence low-income households to adopt and use broadband.

Chapter 6: A perspective on the influence of motivational factors on broadband adoption and usage in low-income households

6.1 Introduction

This chapter relooks at the objectives of the study in line with the collected and analysed data. It provides high level recommendations for policy makers, regulatory authorities and service providers and also proposes future areas of research and draws a conclusion for the study based on the findings. The MBA developed by Dwivedi *et al.* (2010) provided a basis for the theoretical conceptual frameworks for this study. The MBA was extended to include relevance constructs with the aim of exploring the impact of broadband on the livelihood of low-income households and the availability of local content to establish how they also influence adoption and usage. Since technology adoption models such as the MBA only provides theoretical frameworks, the results can be different if the model is applied in different settings as detailed in sections 2.11 and 2.12. Hence the detailed extended MBA was derived after the analysis of the collected data in Chapter 5.

6.2 Revisiting the objectives of the study

This study sought to provide an insight on how motivational factors including the relevance of broadband collectively influence the behaviour of low-income households to adopt and use broadband. To achieve the latter, it was imperative to first uncover how broadband is being utilised in low-income households. By grouping the data into themes in line with the extended MBA and research sub-questions, more insight was gained towards answering the main research question on how motivational factors influence low-income households to adopt and use broadband. The answers to the main research question adds on the existing knowledge to aid policy makers, regulatory authorities and service providers to increase broadband demand particularly in low-income communities.

6.3 Broadband usage in low-income households

Usage profile of low-income households was pursued through the collection and analysis of data using a questionnaire that was handed to participants prior to the

focus group discussions. In determining the usage pattern of low-income households, it was discovered that the majority of low-income households can be classified as basic users. Although this might be the case, there is potential to introduce even more advanced services and applications to assist low-income households to improve their livelihood through broadband. Considering that the majority of participants regarded themselves as frequent and progressive users, linked with the observation that the majority of non-adopters indicated that they can consider adopting and using broadband if it can improve their livelihoods, this can be used as a stepping stone by online service providers such as banks, retailers and government to introduce platforms were low-income households can interact seamlessly with their offerings.

6.4 Outcomes of the extended and applied theoretical framework

The extended MBA provided constructs pre-determined by Dwivedi *et al.* (2010) with the addition of relevance constructs. The analysis of data showed that all the factors (i.e. attitudinal, normative, control and relevance) influenced the behaviour of low-income households to adopt and use broadband. The analysis also prompted the updating of the theoretical framework presented in Chapter 2.

6.4.1 Attitude as a factor

The literature provided that the attitude that potential users develop towards a technology will ultimately determine its adoption rate and usage (Rogers, 1983). Literature also provides that attitude is a psychological factor that can be changed through motivation or persuasion (Davis, 1985).

Since attitude forms the basis of technology adoption and usage, it was important to consider its influence on low-income households to ascertain if it impedes or promotes the adoption and usage of broadband. As the data analysis and presentation revealed, there are multiple constructs that affect the attitude of low-income households towards broadband. These constructs have the potential to influence the attitude in both positive and negative ways.

The constructs that are observed to have positive influence on the attitude of low-income households towards broadband are lifestyle compatibility, relative advantage

and social status. Lifestyle compatibility which is a construct that was realised through combining hedonic and utilitarian outcomes also following the assertion by Adams *et al.* (2017), served as the key deciding factor if broadband will provide the required level of entertainment and productivity to enhance the life style of its users.

The relative advantage between broadband access technologies proved to be a considerable attitude factor for low-income households. As it emerged, wireless technologies that provide seamless connection and flexibility were more favoured over fixed technologies. This may also be linked to the historical connotation and seemingly the current trend where low-income communities are not considered as viable markets for fixed broadband access technologies by service providers, leaving low-income users with the belief that fixed broadband access technologies are expensive and cumbersome to setup.

The social status that is gained by using certain devices provided a positive contribution towards the attitude of low-income households about broadband. Participants indicated that their choice is all about the most popular devices at the time because devices are also considered fashion accessories.

The perception of low-income households about the ease of use of broadband was inconclusive. Although some participants alluded to the fact that more can be done to simplify and customise broadband devices and recommended the use of less technical terms to describe broadband products and services, there was no evidence that this influenced their attitude that broadband is a difficult technology to use. What was apparent though is that other demographical factors such as age, education and e-skills levels played a critical role in influencing this perception. Hence it is important for policy makers to introduce e-skills programmes that target the elderly and the least literate to ensure that this does not continue to become a barrier for adoption and usage.

The only construct that seemed to have had a negative influence on the attitude of low-income households towards broadband adoption and usage is online security and privacy. As it emerged from the data, low-income household users were anxious about how their personal data is being handled online and they had fears of their activities

being monitored. Recent cybercrime literature proves that these concerns are not unfounded as low-income households fall under the most vulnerable user groups because of their extensive use of mobile technologies which are now the most targeted by cyber criminals (RSA, 2016). Moreover, low-income households seemed not to have had adequate awareness around safe online behaviour and protection of personal information. This will have a negative impact towards the uptake and usage of applications and services that require sensitive personal data (e.g. online banking and shopping). Hence the recommendation by Kortjan (2013) government should provide adequate resources to cyber security awareness and education campaigns in order to equip all members of the society to act safely online is upheld.

6.4.2 Normative beliefs as factors

Recalling from Chapter 2, subjective norms reflect the expectation of others on how an individual should behave (i.e. either to perform or not perform a behaviour). It is theorised as a function of the individual's beliefs on whether the referents think that he or she should perform the behaviour, the individual's motivation to comply with the exception and the number of these referents (Fishbein & Ajzen, 1975). Literature further provides that the expectation or pressure to comply with social norms can come from primary sources such as those close to the individual or secondary sources such as media and advertising (Venkatesh & Brown, 2001).

The data analysis revealed that primary influence had a positive influence on adoption and use broadband by low-income households. Word-of-mouth served as the key channel to spread information about broadband products and services. Today social media and instant messaging applications provide a fertile ground for consumers to share information about their experience with certain products, giving rise to eWOM. The eWOM phenomenon has grown to be an important aspect of every business today. Every major brand around the world has a Facebook and Twitter account and companies invest substantially on monitoring and maintaining these platforms. Primary influence was also closely linked with social status in attitudinal constructs, both constructs tap into the social element and the need for the user to be associated with the current trends.

Although secondary influence was not identified as an influential factor by low-income households, it cannot be ruled out as a tool to also drive broadband demand. New advertising strategies may be necessary to captivate targeted audiences such as low-income households.

6.4.3 Control as a factor

Ajzen (1991) argues that although the attitude might be favourable and there is enough pressure and intention for an individual to comply with social norms to perform a certain behaviour, the overt performance of the studied behaviour will be determined by the actual level of control the person has to willingly act or not to act. This control may be limited by external factors (e.g. availability of resources and opportunities) as well as internal factors such as the proficiency and the level of confidence the individual poses to perform the studied behaviour.

The data analysis suggested that the lack of knowledge on new broadband technologies by low-income households limited their options when it comes to the choice of broadband connection. As indicated in section 5.4.1.1, low-income households are often kept in the dark when it relates to new access technologies because they are not deemed to be the target market. But this action is often justified by those providing the infrastructure as protecting their investment by targeting areas with the potential of high returns first, which is an acceptable fact when considering the amount of money that is required to develop this infrastructure.

The data analysis also showed that low-income households were not entirely satisfied with the broadband quality of service they received. This was found to be related to the inadequacy of infrastructure to cater for the growing demand. Service providers are found to be lagging behind when it comes to upgrading and expanding network infrastructure, leading to degraded quality of service over time.

The analysis further confirmed the negative influence that the high cost of data in South Africa has on the adoption and usage of broadband by low-income households. The cost of data was highlighted as the most significant barrier to adoption and usage of broadband in low-income households. This coupled with their suspicions that service providers were using unscrupulous methods to deplete their data balances,

has left low-income households with doubting the value they get for their money. Hence is vital for regulatory authorities to protect the interest of the consumers and shield them from exploitation by their service providers.

The dependence of self-efficacy on other motivational constructs such knowledge and perceived ease of as well as on moderating factors or demographics such as the level of education, gender and level of income, made it difficult to determine if it has any kind of influence on the adoption and usage broadband by low-income households.

6.4.4 Relevance as a factor

Recalling from section 1.3, the attractiveness of broadband refers to the noticeable benefits that it delivers to its users. This includes the relevance of content, applications and services to the livelihood of its users. Hauge and Prieger (2010) assert that programmes that are targeted at specific market segments with information of specific use are important to mitigate against perceived lack of value as a barrier to adoption.

Hence relevance was considered as a motivational factor to broadband adoption and it was added to extend the MBA. The assertions by participants to the fact that broadband plays an important role in their daily lives as a utility, proved that although low-income households were observed to be basic users, they are increasingly advancing to a stage where they will use broadband to earn a living. This further strengthened the positive influence on its adoption and usage.

Furthermore, the data also suggested that low-income households do appreciate consumption of local content, but raised concerns about its limited availability and the lack of support to local content developers. This was observed to have had a negative influence on increasing the adoption rate and usage of broadband.

6.5 Conclusion

This study took a qualitative approach in determining how motivational factors influence low-income households to adopt and use broadband. Based on the findings, the assertion is upheld that motivational factors form a key determinant to broadband adoption and usage by low-income households. Therefore motivational factors should

be considered as important aspects of broadband demand stimulation strategies by policy makers, regulators and the ICT industry. The learnings from this study can form key input in understanding how broadband infrastructure that is rolled out in low-income communities will be effectively utilised, and also in ensuring that services and content that is provided to these communities will be relevant to the users to increase adoption and usage.

6.6 Contribution to the body of knowledge

By taking a different approach in building an understating around how motivational factors affect low-income households to adopt and use broadband, the study has added to the current knowledge on broadband adoption particularly in developing countries. Since income level has never been used as a distinguishing demographic for studying broadband adoption in South Africa, the study sets the basis on income level broadband adoption. The study also brought an in-depth understanding on the relevance of broadband to low-income households and how local content affects their decision to adopt and use the technology.

6.7 Suggestions for future research

Although the qualitative data analysis provided depth in understanding how the motivational factors collectively influenced low-income households to adopt and use broadband, the study was only limited to one community. This may present generalisability issues when considering the vast population of low-income households in South Africa. This presents an opportunity for future research wherein the approach can be adopted to collect and analyse data from a number of low-income communities to further enhance the findings of this study. In addition, the extended MBA may be subjected to quantitative data analysis to prove the statistical relevance of the relevance constructs since all other constructs (i.e. attitudinal, normative and control) have been proven before in many settings.

6.8 Limitations of the study

Due to the short timelines provided to complete the study and cost considerations, samples were drawn from three sections in one township only. Therefore, the results of this study has limited generalisability to South African low-income households.

The measure that was used to classify income levels had limited accuracy because income is dynamic variable that needs to be measured frequently. In addition, the fact that 47% of participants did not know their monthly household income may also presented a weakness in validating the findings since the study was premised on income level.

The theoretical framework that was adopted for this study was extended to include relevance constructs which have not yet been proved statistically to have had any influence on technology adoption. This may imply inherent weakness on the findings deduced on this constructs.

6.9 Recommendations

From the theoretical basis, the MBA model that was adapted from Dwivedi *et al*. (2010) and used for this study presents a cornerstone for all stakeholders that are involved in the development and proliferation of broadband. Since the model is rooted on human behavioral theories and IS, it can be used as an effective tool by policy makers and regulatory authorities to advance the understanding on the interactions between low-income households and broadband. This will help them to design policy and regulatory interventions that are relevant to the lived experience of low-income households and reduce the temptation to apply one-size-fits-all policies as recommended by Duncan (2015). Furthermore, the same understanding can be used by service providers for development of products and services that are tailored specifically for low-income households.

In light of the findings of this study as derived from the collected and analysed data, the following recommendations are made for further consideration by policy makers, regulatory authorities and ICT industry players:

Although this might seem like an overstated fact, the outcomes of this study explicitly portray cost as a major barrier to broadband adoption and usage by low income households. This means that while the transition to understand other motivational factors is important, it will be premature to underplay the effects of cost as a control construct.

Hence it is critical for policy makers and regulatory authorities to expedite policy interventions that are meant for the reduction of cost associated with broadband to ensure that it is inclusive of all income groups. In the South African context this refers to the release and licensing of high demand radio frequency spectrum and the regulation of data prices.

To further improve the attitude of low-income holds about broadband, efforts should be made by policy makers and the ICT industry on awareness campaigns to inform users on safe online behaviour and to address the concerns that were raised about online security and privacy.

Since low-income households placed value on status, service providers and retailers of broadband products can leverage on this to drive demand by making trendy products that are affordable so that they can be appealing to low-income households.

To provide and improve access to good broadband quality of service, it is important for government to support infrastructure development programmes to ensure that other access technologies such as FTTH are expanded to realise an access technology mix of high speed broadband to low-income communities too. It is also important for regulatory authorities to keep a close eye on the grade of service provided to consumers and put mechanisms in place that will incentivise compliant service providers and equally penalise non-compliance.

With regard to increasing the availability and consumption of local content, the government needs to continue providing platforms where local content can be easily accessible and to incubate and provide financial support to local content developers particularly those from low-income communities. The move towards promoting local hosting of content will also assist in curbing costs for accessing content.

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Annexure A

Investigating motivational factors influencing broadband adoption and usage in South African low-income households.

Session Leaders

Kopano Monyetsane, Researcher

Kiru Pillay, Supervisor

Focus Group Program and Questions

PROGRAMME

Introduction **15 min**

The researcher provides a brief overview of Wits University, describe the objectives of the research and the description of broadband products and services, adoption and usage in the context of this research. Then the participants are allowed to ask questions of clarity on the above.

Completion of the questionnaire **15 min**

Participants complete a short survey to build household profiles and covers the broad issues relating to broadband adoption and usage.

Open Discussion Session **1hr 0min**

According your understanding, what is broadband?

Which broadband products/services are you aware of?

Which broadband services/products are available in your community?

Do you or your household use broadband?

If yes:

- What specific broadband products/services are you using?
- What interest did you have when you started looking for a broadband product/service?
- How did you know about the particular broadband product/service you are using?
- Why did you choose the particular broadband product/service?
- What do you use your broadband product/service for the most?
- What are other benefits of using this broadband product/service?
- What are the challenges you are facing with using this broadband product/ service?
- Which broadband products/services are you not using but have a desire to use and why?
- How do you respond towards new broadband products/services on the market?

- Would you recommend to others to use broadband products/service?
- If yes, which products would you recommend most and why?
- Any additional information we didn't cover in the discussion?

If no:

- Why are you not using any of the broadband products/services?
- Any additional information we didn't cover in the discussion?

Break & Refreshments, End of Programme

A: Participant Profile

Household Composition

HM	Name (only first name)	Gender 1: Male 2: Female	Educational Level	Employment
01				
02				
03				
04				
05				
06				
07				
08				
09				
10				
11				
12				
13				
14				
15				
16				
17				
18				

Codes
Employment
1 = Student
2 = Employee
3 = Self employed
4 = Family worker
5 = Child not yet at school
6 = Unemployed
7 = Retired/ Pensioner
8 = Disabled

Codes
Educational Level
0 = Did not complete any
1 = Nursery school
2 = Primary school
3 = Lower secondary (G8-10)
4 = Upper secondary (G11-12)
5 = Tertiary (non-university)
6 = University

19											
20											
21											
22											
23											
24											
25											
26											
27											
28											
29											
30											
31											
32											
33											
34											
35											
36											
37											

7 = Post- Graduate Degree

Codes
Population Group
A = African/ Black
C = Coloured
I = Indian/ Asian
W = White

Household Income (net monthly income)			
Less than R500		R10 001 – R20 000	
R501 – R2 000		R20 001 – R30 000	
R2 001 – R5 000		R30 001 – R50 000	
R5 001 – R10 000		More than R50 000	
Don't know		Refuse to answer	

[Please circle the name of Household Member in the HM column who is being interviewed]

B: Adoption Profile

Ownership of Smart Devices and Computer

1. **Do you own a smart mobile device (Smart phone or Tablet) or computer (Desktop or Laptop)?**

☐ Yes *(Continue to next question)* ☐ No *(go to Section D)*

2. **Tick the 3 most frequent uses of your smart mobile device, beside from making and receiving calls and SMS/MMS (Smart phone or Tablet) or computer (Desktop or Laptop)?**

Tick		Tick	
☐	Sending/Receiving IM (WhatsApp, etc.)	☐	Sending/Receiving emails
☐	Taking photos	☐	Work
☐	Taking video clips	☐	Using as a diary
☐	Watching Videos (Movie, etc.)	☐	Keeping time
☐	Listening to music	☐	Conducting my banking
☐	Sending/Receiving emails	☐	Playing games
☐	Study	☐	Downloading music
☐		☐	Social networking (Facebook, etc.)

3. **How many of you living in the house own smart mobile devices or computers?**

☐ (number of *people* with mobile phones living in the house)

C: Broadband Internet Access and Usage

4. **Which one of the following statements best describe you?**

a) I am using/have used the Internet before ☐ ***(Continue to next question)***

b) I am not/have never used the Internet ☐ ***(Go to Section D)***

5. **Does your household have a dedicated connection to broadband Internet?**

☐ Yes ☐ No

6. **What type of broadband Internet connection do you use (more than one answer possible)?**

a) Fixed (ADSL) ☐
b) Wireless (3G, 4G) ☐
c) Fixed Wireless ☐
d) Public Wi-Fi (Free) ☐
e) Don't know ☐

7. **Why did you choose this type of broadband Internet connection (more than one answer possible)?**

a) Performance is better (stable connection and faster download speed) ☐
b) It is the only one available in my area ☐
c) It is the most affordable ☐
d) It is easier to use ☐
e) A friend/family member recommended it ☐
f) Don't know ☐

8. **How do you pay for Internet access (more than one answer possible)?**

a) Post-payed (monthly bill) ☐
b) Pre-paid (data bundles) ☐
c) Use free Public Wi-Fi ☐
d) Don't know ☐

9. **Which of these devices do you mostly use to access the Internet (more than one answer possible)?**

a) Desktop computer ☐
b) Laptop computer ☐
c) Smart Phone/Tablet ☐
d) Other (specify):_____ ☐

10. **On average, how often have you used the Internet in the last six months?**

a) Every day or almost every day ☐
b) At least once a week (but not every day) ☐
c) At least once a month (but not every week) ☐
d) Less than once a month ☐

11. Where have you used the Internet mostly in the last six months (using a computer or any other means) (more than one answer possible)?

a) At home
b) At place of work (other than home)
c) At place of education
d) At another person's home
e) At other places:
   i. Public library
   ii. Post office
   iii. Community centre
   iv. Internet Café
   v. Government office

12. For which of the following activities did you use the Internet in the last six months for private purposes (as opposed to for work purposes) (more than one answer possible)?

Communication, Information search and on-line services

a) Sending and receiving emails
b) Finding information about goods and services
c) Using services related to travel and accommodation
d) Downloading software (other than games software)
e) Reading or downloading online news/ newspapers/ news magazines
f) Looking for a job or sending a job application
g) Seeking health-related information

Banking, selling of goods or services

h) Internet Banking
i) Selling of goods or services
j) Buying goods or services
k) Paying online using credit cards

Training and education

l) Looking for information about education, training or course offers
m) Doing an online course (in any subject)
n) Consulting the Internet with the purpose of learning

13. **For which of the following advanced services did you use the Internet in the last six months for the following communication activities (more than one answer possible)?**

a) Telephoning over the Internet ☐
b) Video calling (via webcam) over the Internet ☐
c) Using services related to travel and accommodation ☐
d) Posting messages to chat sites, newsgroups or online discussion fora ☐
e) Using instant messaging ☐
f) Reading weblogs or blogs ☐
g) Creating and maintaining own weblog or blog ☐
h) None of the above ☐

14. **Would you say that compared to six months ago, the time you spent on the Internet has**

a) Stayed the same ☐
b) Decreased ☐
c) Increased ☐

D: Barriers for adoption and usage

15. **What are the reasons for not owning a smart device or computer (more than one answer possible)?**

a) I am ok with my current device ☐
b) Don't need it (because not useful, not interested, etc) ☐
c) It is too expensive ☐
d) I don't know how to use it ☐
e) Associated costs are too expensive (i.e Data costs) ☐
f) No one I know has it ☐
g) Privacy and security concerns ☐
h) Other (Specify):_____ ☐

16. **What are your reasons for not using the internet (more than one answer possible)?**

a) Don't want Internet (because the content is not relevant to me) ☐
b) Don't need Internet (because not useful, not interested, etc) ☐
c) Equipment cost too high ☐
d) Access cost too high (Data cost, etc.) ☐
e) I don't know how to use it ☐
f) I don't know anyone who is using it ☐
g) Network infrastructure is not available in my area ☐
h) Privacy and security concerns ☐
i) Other (Specify):_____ ☐

17. I can consider using the internet if: (more than one answer possible)

a)	It can improve my livelihood (more useful).	
a)	It can be more entertaining	
b)	Someone I know is using it.	
c)	I am told about the benefits	
d)	It is affordable (Devices and Data Costs)	
e)	I can relate to the content (local content, language)	
f)	I am shown how to use it	
g)	Network infrastructure is available	
h)	Others (Specify):_____	

Annexure B



PARTICIPANT INFORMATION SHEET

MASTERS RESEARCH

INVESTIGATING MOTIVATIONAL FACTORS INFLUENCING BROADBAND ADOPTION AND USAGE IN SOUTH AFRICAN LOW-INCOME HOUSEHOLDS.

I am a student at the University of the Witwatersrand. In part completion of the Master of Arts in the field of ICT Policy and Regulation, I am conducting a research study on the motivational factors for broadband adoption and usage in selected households. You are invited to take part in this research study. Please read the following information carefully before you decide to take part in the study.

Ke moithuti univesithing ya Witwatersrand. Ke kgauswi le go fetša dithuto tša Masters ya Arts lefapeng la ICT Policy and Regulation, ke dira dinyakišišo tša thuto go magato a thlotleletšo ya gore go fihlelelwe le goba gona ga broadband ka malapeng a mangwe. Le memiwa go tšea karolo mo dinyakišišong tše tša boithuti. Ka kgopelo bala magato a latelago pele o ka tšea karolo go dithuto tše.

Background and overview of the study

Kakaretšo ya dithuto

The purpose of the study is to investigate what motivational factors can influence the behaviour of low-income households to adopt and use broadband, in addition to factors like cost and access to network infrastructure.

Morero mogolo wa dithuto ke go nyakišiša gore ke magato afe a ka tutuetšago mokgwa wa batho ba hwetšago mogolo wa fase gore ba ka filhelela goba go shomiša broadband, go akaretša le mašeleng le phihlelelo go ditlabakelo tša network.

Deciding whether to participate

Kgetho ya go tšea karolo

Taking part in the research is entirely voluntary and you may withdraw your consent and participation at any stage and without giving a reason. If you decide to take part, you will be given this information sheet to keep and be asked to sign a consent form. Additionally, you will be asked participate in a focus group discussion that will last a maximum of 180 minutes with breaks and refreshments provided. Questions will be translated to a common language used in your community and you will also be allowed to respond in your own language. The interview may be recorded and the researcher will organise a meeting venue in your community. There are no direct risks in participating in this study and focus group discussion. There will be no direct monetary benefits to you for your participation.

Go tšea karolo go dinyakišišo tša boithuti ke ka boithaopo le gona motho a kana a se tšee karolo nako efe goba efe ntle le go fa mabaka. Ge o ethaopa, o tla fiwa setlankana se lego se tleketlela. Ka go tlaleletša, o tla kgopelwa go tšea karolo go dikgobotho tša batho tša go sekaseka bo nako yeo e ka lekanago metsotso e 180 re akaretša nako ya go ikhutša le go itapološa. Diputšišo di tla hlathollwa ka leleme le šomišwago motseng wa geno le gona o tla fiwa sebaka sa go fetola ka leleme la geno. Diputšišo di ka gatišiwa le gona monyakišiši o tla nyaka lefelo la go kopanelwa mo motseng wa geno. Ga gona ditla morago tše tseneletšego go tšeeng karolo mo dithutong le go batho ba go sekaseka. Ga gona tshelete ye e tla go holang ge o tšere karolo.

Anonymity and confidentiality
Tiiswa hore lebitso le lekunutu

Any personal information collected about you will be kept strictly confidential. Identifiers will be removed from data when the research findings are consolidated into a report and will not be included in any subsequent publications. The anonymised data generated in the course of the research will be kept securely in paper or electronic format for a period of five years after the completion of the research. It may be used for further research and analysis. This report can be made available to you upon your request. Please note that anonymity and confidentiality will not be guaranteed because you will be participating in a focus group

Sengwe le sengwe sa boetsibišo bja gago se tla tšeiwa bjalo ka sephiri. Boetsibišo botla tlošwa ge dinyakišišo di kgobokeditšwe go pego, gape di ka se akaretšwe go dikgatišo dife goba dife. Go se tsebjwe ga melaetša ye e bilego gona dinyakišišong go tla beiwa go lephephe le lebolokegilego goba ka mokgwa wa electronic go mengwaga e mehlano ka morago ga dinyakišišo. Se se ka šomišiwa for dinyakišišong tša pele le ditshekatshekong. Pego ye e ka ba gona ge o ka e kgopela. Hlokomela, gare tiisetše gore boetsibišo ke lekunutu gobane otla tšea karolo go dikgobotho tša batho tša go sekaseka.

Research Ethics

If you have concerns about the research, its risks and benefits or about your rights as a research participant in this study, you may contact the program director or supervisor, see contact details below.

Ge o ena le maikutlo mabapi le dinyakišišo tše, ditlamorago, le mehola goba ditokelo blale ka motšeakarolo wa boithuti, o kana wa ekgokaganya le molaodi wa lenanego goba mohlokomedi. Dinimoro ke tše latelago

Contact for Further Information

Program Director:	Supervisor:	Researcher:
Lucienne Abrahams	Kiru Pillay	Kopano Monyetsane
luciennesa@gmail.com	kiru2010@gmail.com	ksmonyetsane@yahoo.com
+27 (0) 825697675	+27 (0) 826027261	+27 (0) 812111141

Annexure C



Faculty of Humanities

University of the Witwatersrand, Johannesburg

P O Box 601, Wits, 2050

INFORMED CONSENT FORM FOR SIGNATURE

Title of Study: Investigating motivational factors influencing broadband adoption and usage in South African low-income households.

Please initial box

1. I confirm that I have read and understand the information sheet for the above study and have had the opportunity to ask questions. ☐

   Ke kgonthišiša gore ke badile le go kwešiša lephephe la molaetša go dithuto tše di lego mo godimo, ka ba le sebaka sa go botšiša diputšišo.

2. I understand that my participation is voluntary and that I am free to withdraw at any time without giving a reason. ☐

   Ke kwešiša gore go tšea karolo ga ka keg a maethaopo le gona ke lokologile gore nka tlogela go tšea karolo nako e kgolo le e nyane ntle le go fa lebaka.

3. I understand that the researcher will not identify me by name in any reports using information obtained from this interview and that the views I express will remain confidential; **OR** ☐

   Ke holofela gore moithuti wa dinyakišišo tše a ka se hlagiše leina laka go dipampiri dife kapa dife a šomiša molaetša gotšwa go dipotšišo/diteko le

gore dipono tše ke dihlagišago go tla ba tša sephiri goba go se phatlalatšwe.

4. I agree to my name being listed as a participant in this study in the annexure to the report, but not to be referenced in the main body of the report. ☐

   Ke dumela gore leina laka le ka phatlalatšwa bjalo ka motšeakarolo dithutong tše

   setlankaneng sa pego, mara ke sa duleme gore leina la ka le šomišwe go diteng

   tša pego.

5. I agree to the interview being audio recorded. ☐
   Ke dumela gore diputšišo ditla kgatišiwa.

6. I agree to the use of anonymised quotes in the dissertation. ☐
   Ke dumela go tšhumišo ya go setsebje go dissertation

7. I agree that data gathered from me in this study may be stored (after it has been anonymised) and may be used for future research. ☐

   Ke dumela gore melaetša go tšwa go nna mo dithutong tše e ka šomišiwa

   dinyakišišong tše di sa tlago

Name of Research Participant Date: Signature:

KOPANO MONYETSANE

Name of Researcher: Date: Signature**:**

Annexure D

Research Office

HUMAN RESEARCH ETHICS COMMITTEE (NON-MEDICAL)
R14/49 Monyetsane

CLEARANCE CERTIFICATE	**PROTOCOL NUMBER: H16/03/20**
PROJECT TITLE	Investigating motivational factors for broadband adoption and usage in low-income households
INVESTIGATOR(S)	Mr K Monyetsane
SCHOOL/DEPARTMENT	SLLM/
DATE CONSIDERED	18 March 2016
DECISION OF THE COMMITTEE	Approved unconditionally
EXPIRY DATE	28 April 2019

DATE 29 April 2016 **CHAIRPERSON** pp (Professor J Knight)

cc: Supervisor : Ms K Pillay

DECLARATION OF INVESTIGATOR(S)

To be completed in duplicate and **ONE COPY** returned to the Secretary at Room 10005, 10th Floor, Senate House, University.

I/We fully understand the conditions under which I am/we are authorized to carry out the abovementioned research and I/we guarantee to ensure compliance with these conditions. Should any departure to be contemplated from the research procedure as approved I/we undertake to resubmit the protocol to the Committee. **I agree to completion of a yearly progress report.**