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Exploring the digital divide in underserved communities in rural Mpumalanga, South Africa

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A research report submitted to the Faculty of Commerce, Law and Management, University of the Witwatersrand, in partial fulfilment of the requirements for the degree of Master of Management in the field of Digital Business

Johannesburg, 2024

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Abstract

This research report explored the digital divide in underserved communities in rural Mpumalanga, South Africa, focusing on how owning a smartphone can help bridge the gap. Despite the widespread use of digital technology, financial constraints and limited digital literacy continue to create disparities, especially among marginalised populations.

The study employed a qualitative research design, primarily through eight in-depth interviews, to explore how smartphones can impact digital inclusion and overall quality of life in these communities.

The findings reveal a digital divide, particularly among young Black individuals, due to barriers in smartphone and internet accessibility. While ease of access to technology can enhance social and economic capital, challenges such as pricing and infrastructure limitations exacerbate disparities, perpetuating cycles of poverty and marginalisation.

The synthesis of findings highlights and emphasises the interconnected nature of the digital divide. It emphasises the need to address these challenges to achieve digital inclusion and improve the overall quality of life in underserved communities.

KEYWORDS

Digital Divide, Underserved communities, Smartphone ownership, Digital literacy, Network service providers.

DECLARATION

I declare that this project is an original report of my research. It has been written by me and has not been submitted for any previous examination. I further declare that I have obtained the necessary authorisation and consent to carry out the research. I also declare that Grammarly Premium was used for editing purposes to improve readability and language.

Name : Linda Shandukani Signature:

Signed at Nelspruit

28 February 2024

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I express my deepest gratitude to the Almighty for granting me the strength to reach this significant milestone.

To my cherished daughter, Mulalo, your unwavering patience, belief in me, and constant encouragement have been my guiding lights. I am indebted to you, my dear daughter.

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LIST OF ACRONYMS

ADSL – Asymmetric Digital Subscriber Line

ICASA – Independent Communications Authority of South Africa

ICT - Information Communication Technology

ITU - International Telecommunication Union

NSP – Network service providers

RAT - Resources Appropriation Theory

UK – United Kingdom

UN – United Nations

UNESCO - United Nations Educational, Scientific and Cultural Organization

USA – United States of America

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CHAPTER 1: INTRODUCTION

1.1 Purpose of the Study

The study aimed to explore the digital divide in underserved communities in rural Mpumalanga, South Africa, focusing on the transformative impact of smartphone ownership.

1.2 Background of the Study

Over the past decade, the digital divide concept has been a topical issue. It has been an area of interest within academic research and policymakers since the early 1990s and progressed to the first level of the digital divide focus from 2000 to 2010 (Van Deursen & Van Dijk, 2019). The digital divide refers to the disparity between individuals with sufficient access to information communication technology (ICT) and those with limited or no access to ICT (Ragnedda & Kreitem, 2018). The unequal distribution of technological resources and infrastructure highlighted by this gap can significantly impact the opportunities for individuals for connectivity, information access, and participation in the digital world (Lythreatis et al., 2022; Munga, 2022). During the early stages of research on the digital divide, it was often viewed as a simple binary division between those who had access to computers and the internet and those who did not.

However, as research progressed, it became clear that the issue was much more complex than that, with multiple factors contributing to the divide, such as socio-economic status, race, geographic location, age, and education level (Dewan & Riggins, 2005; Hoffman et al., 2000).

Information networks exhibit significant variations in different regions, populations, and households, leading to an uneven distribution of access to ICTs (Graham et al., 2014). This disparity is particularly pronounced in South Africa, where a small minority (22%) has access to sufficient ICT infrastructure, such as internet

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connectivity. In contrast, more developed countries like the United Kingdom (UK) (92%) and the United States of America (USA) (89%) boast significantly higher rates of ICT access. These statistics highlight the significant disparity in the digital divide between countries and underscore the urgent need to address the inequalities in ICT access on a global scale (International Telecommunication Union [ITU], 2017). According to the ICT Development Index, South Africa is ranked 92 globally and third in Africa, tracking behind Mauritius and Seychelles (ITU, 2017). Nevertheless, various forms of digital divide persist among different population groups, as evidenced by the growing disparities in access to digital technologies between rural and urban areas, households, and gender groups. The digital gap between these population segments highlights the unequal distribution of resources and opportunities in the digital realm (Correa et al., 2021; Hindman, 2000). Bridging these gaps and ensuring equitable access to digital technologies remains a crucial challenge in achieving digital inclusion and narrowing the digital divide (Dixon et al., 2014).

The figure below depicts the geographical digital divide within the South African context from a metro vs urban vs rural perspective. The research also shows that cell phones are the most common way to access the internet.

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Place where internet is	Rural/Urban status	Province (per cent)									
		WC	EC	NC	FS	KZN	NW	GP	MP	LP	RSA
At home	Metro	30,3	10,7	_	12,1	10,2	_	16,5	_	_	17,2
	Urban	18,3	5,1	6,7	5,1	10,0	5,2	15,4	2,5	4,4	8,8
	Rural	12,2	0,2	4,1	4,5	0,2	0,3	29,7	1,0	1,3	1,2
	Total	**25,9**	**5,0**	**5,9**	**7,1**	**6,4**	**2,4**	**16,4**	**1,7**	**1,9**	**10,4**
At work	Metro	20,4	15,2	_	18,8	27,9	_	29,0	_	_	26,1
	Urban	27,9	11,8	18,1	9,4	22,3	13,0	20,1	10,0	17,8	17,1
	Rural	11,9	7,2	5,8	8,9	3,2	1,7	9,1	4,4	4,8	4,6
	Total	**22,2**	**11,3**	**14,4**	**12,1**	**17,3**	**6,6**	**27,8**	**6,8**	**7,3**	**17,6**
Using mobile devices	Metro	75,4	61,7	_	62,8	83,5	_	72,4	_	_	73,4
	Urban	78,9	73,2	64,3	66,3	80,8	72,9	74,5	68,7	79,1	73,7
	Rural	55,0	53,6	52,9	72,5	57,8	61,7	63,2	66,3	57,5	59,2
	Total	**75,4**	**60,5**	**60,8**	**66,0**	**73,2**	**66,5**	**72,6**	**67,3**	**61,7**	**69,4**
At Internet cafes or educational facilities	Metro	17,1	12,5	_	5,8	28,2	_	23,2	_	_	21,6
	Urban	18,3	1,6	1,4	6,5	7,4	3,6	24,6	18,8	1,7	11,1
	Rural	3,7	1,3	0,0	11,3	3,9	2,7	16,9	8,1	1,5	3,5
	Total	**16,8**	**5,4**	**1,0**	**6,9**	**14,4**	**3,1**	**23,3**	**12,7**	**1,5**	**13,6**

Figure 1*: Households access to internet by place of access, urban/rural status and province (ICASA, 2023, p. 13).*

1.3 Research Problem

Access to digital technology has become increasingly prevalent globally, yet significant disparities persist, particularly in underserved communities such as those in rural Mpumalanga, South Africa. Despite the proliferation of smart devices, a notable gap remains between those with access to these technologies and those without (Lythreatis et al., 2022). This disparity is exacerbated among low-income populations and marginalised communities due to financial constraints and limited digital literacy (Freiman et al., 2018; Lythreatis et al., 2022; Mutula, 2021). Even in societies where internet access is widespread, certain groups, including those in rural Mpumalanga, face exclusion from vital social and economic opportunities that rely on digital connectivity, such as education, healthcare access, and job searching (Van Deursen & Helsper, 2015).

Smartphones are often heralded as the gateway to digital inclusion, offering a relatively affordable means of accessing the internet and engaging with digital technology (Correa et al., 2020). Studies suggest smartphone ownership can

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empower underserved communities by facilitating communication, information exchange, and community engagement (Halstead et al., 2022; Hsiao & Chen, 2015). However, despite the global surge in mobile phone adoption, adoption rates vary significantly across regions, with disparities particularly pronounced in countries like South Africa (Stump et al., 2008). While mobile device adoption has seen significant growth in Southern Africa, including South Africa, with cellular subscriptions increasing by 40.91% from 2021 to 2022, a substantial portion of the population, especially in rural areas, still lacks access to these technologies (Independent Communications Authority of South Africa [ICASA], 2023).

The South African context reveals a complex landscape of evolving technology infrastructure, with a notable shift from traditional landline communication to mobile cellular devices. However, access to home internet still needs to improve, with only a fraction of households having access to fixed or wireless services (ICASA, 2023). Despite advancements in broadband technologies and network coverage, affordability remains a significant barrier to access (ITU, 2017, 2022a). Within this context, the correlation between pricing, smartphone accessibility, and the digital divide becomes evident. However, existing literature may need to address the nuanced challenges faced by rural communities in Mpumalanga fully. Therefore, the research aimed to delve deeper into the barriers to digital inclusion in these underserved areas and explore how access to digital technologies, particularly smartphones, impacts on social equity and economic empowerment.

The study investigated how the potential of smartphone adoption and usage could improve people's lives in underserved communities and alleviate the digital divide. By identifying these challenges and understanding the implications, this study aimed to contribute to developing targeted interventions and policies to bridge the digital divide in underserved communities.

1.4 Research Questions

The research questions stem from recognising that data and device affordability barriers persistently impede digital inclusion, particularly in underserved

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communities across South Africa. Despite advancements in access to different digital technologies, such as fibre and wireless connectivity, disparities persist due to affordability, digital literacy, and the nature of access. The study sought to answer the following research questions.

i. How does the pricing and availability of smartphone drive the digital divide in underserved communities?
ii. What are the perceived benefits associated with smartphone access and usage in underserved communities?
iii. How do the perceived benefits of smartphone accessibility and use contribute to digital inclusion, social equity and economic empowerment in underserved communities?

1.5 Assumptions

The following assumptions have been derived for this study:

i. Access and usage of digital technologies are influenced by affordability, level of education, age, and cultural background.
ii. The availability of more affordable smartphones and digital technologies (data, fibre and wireless) can reduce social disparities.
iii. Digital inclusion policies and initiatives should consider different demographics and communities' specific needs and circumstances.

1.6 Delimitations of the Study

The delimitations of the study were as follows.

i. The study focused primarily on smartphones, not laptops, desktops, and tablets/iPads.
ii. The interviews were limited to rural and deep rural areas in South Africa within the Mpumalanga province.

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iii. The study focused on Black South Africans between the ages of 18 to 35, with a minimum to no tertiary qualification, who were both employed and unemployed, and resided in rural underserved communities.

1.7 Definition of Terms

Digital divide: The gap between those who have and do not have access to computers and the internet (Fuchs & Horak, 2008; Munga, 2022; Van Dijk, 2006).

First level digital divide: The disparity in access to basic information and communication technologies infrastructure and resources (Van Dijk, 2002).

Second level divide: The disparity in the ability to use and utilise digital technologies effectively (Van Dijk, 2005).

Third-level digital divide: The disparity in the outcomes, opportunities and benefits received from digital technologies (Van Deursen & Helsper, 2015).

Digital inclusion: A phrase used to define ensuring that all societies have access to and use digital technologies and resources despite their demographics (Helsper, 2008).

Digital technologies: Electronic tools, systems, devices and resources used to generate and store data.

Smartphone: A type of mobile phone with advanced computing capabilities and connectivity over and above voice and text messaging services (Merriam-Webster, 2023).

Digital literacy: The ability to use information and communication technologies to find, evaluate, create, and communicate information, requiring both cognitive and technical skills.

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1.8 Report Outline

The research is divided into six chapters. Chapter 1 introduces the topic and provides contextual background, Chapter 2 reviews existing literature and theoretical frameworks, Chapter 3 outlines the research methodology, Chapter 4 presents the findings of the data collection efforts, Chapter 5 engages in a discussion of the findings, and Chapter 6 offers a conclusion to the research with recommendations for future action to address the digital divide in South Africa's underserved communities.

CHAPTER 2: LITERATURE REVIEW AND THEORETICAL FRAMEWORK

2.1 Introduction

Despite extensive research on the digital divide and its levels, there are still gaps in understanding how smartphones contribute to or alleviate these disparities, particularly with regard to social inequality.

The main objective of this study was to evaluate digital divide disparities by exploring how smartphones impact digital inclusion and access in underserved communities. It was assessed if smartphone adoption perpetuated the digital divide. Prior literature, particularly in the South African context, was examined to provide information on the subject in the literature review.

2.2 Definition and Background

The digital divide further gained international prominence and became a prominent topic of discussion following its inclusion in numerous reports by the United Nations (UN). Since then, it has become a pressing concern for organisations, policymakers, and scholars across diverse disciplines. Recognising the far-reaching implications of unequal access to digital technologies, stakeholders from various sectors have

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increasingly focused on addressing this issue and developing strategies to promote digital inclusion and bridge the digital divide (Lythreatis et al., 2022).

Ragnedda and Kreitem (2018) state that different forms of the digital divide can further increase the disparities within societies as they can either restrict or improve the social and economic capital within communities and their abilities to participate in society. The digital divide has also been described as a critical topic for social justice in the twenty-first century (Rogers, 2016). Ragnedda et al. (2022) further suggest that there is a need for multidimensional approaches to address the challenges, and these approaches must be beyond mere access and usage to minimise reinforcement of the divides and the limited impact on social and economic disparities. Previous research has also demonstrated that smartphones can improve communication, network development and social support, thus increasing social capital and strengthening community resilience (Arceneaux, 2005; Dixon et al., 2014; Tsetsi & Rains, 2017).

The global usage and access disparity dimensions indicated that the penetration rates are still low, thus aligning with existing literature concerning the digital divide. These statistics highlight the levels of disparity across different regions, alluding to Anrijs et al. (2023), that a considerable portion of the population is not connected to the internet.

Lythreatis et al. (2022) conducted additional studies to explore existing disparities in our societies further. The findings showed that contributing factors affecting the digital divide cannot be limited to only the classified three dimensions, as they are also linked to nine other main categories: socio-demographic, socio-economic, personal elements, social support, type of technology, digital training, rights, infrastructure, and large-scale events. In his study, Van Dijk (2005) further emphasises that the disparities of digital inequality do not end after physical access has been attained but start when digital media is incorporated into daily life. Literature on the third level of the divide has also shown evidence that access and usage of digital technologies will further perpetuate the existing divide, more so in underserved communities (Freiman et al., 2018; Lembani et al., 2020).

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There are still societal disparities and minimal impactful economic processes in our communities due to the second and third digital divide (Castells, 2002). Digital divides persist across various spheres of economy and society, extending beyond the traditional rural-urban divide. These divisions encompass social and democratic disparities, regional discrepancies, and noteworthy gaps related to gender, proficiency in the English language, professional skills, quality of school education, age groups, and societal class (Fuchs & Horak, 2008). These multifaceted digital divides highlight the unequal distribution of digital resources and opportunities, highlighting the need for comprehensive strategies to bridge these gaps and ensure digital inclusion for all segments of society (Fuchs & Horak, 2008; Lembani et al., 2020).

Access to digital technologies through devices such as laptops, desktops and mobile devices was perceived as enablement tools in reducing and addressing the divide and, more so, digital inclusivity. With the rise of the digital economy, devices evolved and were thought to be enablers of internet access; however, education or a lack thereof hindered the process, and it was found that mobile devices were increasing the digital disparities due to affordability, accessibility, digital literacy and awareness thereof (Tewathia et al., 2020).

2.2.1 Definition of the digital divide

The digital divide can be defined as a gap or disparity between individuals or communities with access to information and communication technologies and those who do not (Van Dijk, 2002). Furthermore, the digital divide is not only limited to access to technology but is also concerned with how individuals use technology and how they can benefit from it (Van Dijk, 2005). He further alluded to the fact that the digital divide resulted from unequal distribution of resources within individuals/communities due to socio-economics. There have been some achievements concerning the digital divide research; however, there are still shortcomings pertaining to the phenomenon. Van Dijk (2006) further alludes that the research has also made substantial progress in understanding the origins and

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implications of the digital divide. However, Van Dijk (2005) argues that much more must be learned about the digital divide.

2.2.2 Definition of levels of the digital divide

i. The first level concerns access: This refers to the physical and financial ability to connect to the internet and use ICTs (Van Deursen & Van Dijk, 2019).
ii. The second level emphasises usage and skills: This refers to the ability to use ICTs to access information, communicate with others, and participate in online activities (Hargittai, 2001).
iii. The third level concerns benefits: This refers to the ability to use ICTs to enhance one's life (Van Deursen & Helsper, 2015).

2.2.3 Definition of smartphone adoption

With the advent of telephony, mobile phones have become one of the most prevalent technological instruments worldwide (Baishya & Samalia, 2020). The World Bank (2016) report revealed that mobile phones and the internet are increasingly regarded as necessities for information exchange. The World Development Indicators (World Bank, 2016) showed that in the recent decade, access has changed dramatically over the world, and mobile phone subscriptions have nearly quadrupled every two years since 2002. By the end of 2011, there were 5.9 billion mobile cellular subscriptions worldwide, almost one for every person if distributed equally (World Bank, 2016).

A smartphone device can be defined as a mobile multimedia device that possesses both a mobile cellular phone and a fully portable computer, with added functionalities such as cameras, voice recorders, GPS navigation, notebooks and health sensors (Chmielarz, 2020). A variety of factors influences the adoption of technology. In their research, Gangwar and Date (2016) considered ‘perceived usefulness’ and ‘ease of use’ as key technology adoption factors. In the recent study, Baishya and Samalia (2020) define adoption as the user's decision-making process regarding acquiring and using new commodities.

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2.3 Levels of Digital Divide

The digital divide is a complex and multidimensional issue that researchers have studied for many years. Early research on the topic defined the divide as the gap between those who do and those who do not have physical access to internet connectivity and computers (Van Dijk, 2002; Van Dijk, 2005, 2006). In his book The Deepening Divide, Van Dijk (2005) further states that the divide was also a form of information poverty, social exclusion and digital inequality caused by unequal distribution and access to digital technologies.

Several approaches were derived by researchers pertaining to the phenomenon to conceptualise the digital divide. However, the one approach that has been applied and used frequently is the three levels of the digital divide.

2.3.1 The first level of the digital divide: Access

This is the most fundamental level of the digital divide, which was derived within the first years of the research (1999 to 2002), and it relates to the difference between people who have access to digital technologies and those who do not (Van Dijk, 2017). Further argument was made by Bornman (2016), stating that the first level of the digital divide was not only concerned merely with access to technology. However, it was also interlinked to the skills and knowledge required to use technology and digital tools effectively, which would assist the users in navigation the online platforms efficiently. Digital skills and literacy are essential for participating in the digital world as they enable individuals to utilise digital technologies to access information and communicate with others; without these skills, individuals and underserved communities may be disadvantaged in various facets of their lives, including education, health and employment. Ogbo et al. (2021) highlight that digital literacy and skills are crucial in curbing the digital divide and further state that individuals who possess higher levels of digital skills and literacy are mostly likely to use the internet effectively.

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Lutz (2019) and Van Dijk (2017) allude that physical access to digital technologies and devices was also correlated to socio-economic factors such as income levels, age, levels of education and socio-economic status, which may perpetuate the disparities due to inequalities. Access to digital technologies was be a significant barrier in South Africa, especially in underserved communities, due to a lack of infrastructure and access to the Internet (Bornman, 2016).

The urban-rural divide was also identified as one of the factors perpetuating the divide due to barriers posed by geographic isolation. Research further alluded that there is a direct correlation between geographical location and socio-economic status (Hindman, 2000). Additional factors contributing to the urban-rural divide, such as network infrastructure and connectivity, were further identified through research studies (Lembani et al., 2020). Ogbo et al. (2021) indicate the disparities, such as limited educational and employment opportunities for underserved communities due to a lack of digital resources. Baishya and Samalia (2020) argue that the penetration rate of smartphones among low-income people and underserved communities was significantly low and identified the influencing factors as low literacy, poor health conditions, limited access to media and digital technologies, affordability and geographical isolation.

The digital divide's first level concerns physical access to digital technologies. This includes factors such as the availability of infrastructure, the cost of devices, and the affordability of internet access. The digital divide often correlates with socio-economic factors, such as income level, education level, and geographic location.

2.3.2 The second level of the digital divide: Usage and Skills

At this level, research studies established that the digital divide was not only concerned with individuals having access to internet connectivity but rather about the individual’s ability to use the internet in a meaningful and beneficial way. Van Deursen and Helsper (2015) identified three dimensions of the second level of the digital divide, namely skills, motivation and opportunities. However, Tewathia et al. (2020) further argue that the spheres of the divide also included gender, command

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over the English language, professional skills, quality of education and age group, further alluding to the literature suggesting that individuals with higher levels of digital skills and literacy are most likely to interact and participate in the digital realm in a meaningful manner.

There are various skills and knowledge that were identified as crucial for one to use digital technologies effectively, namely:

i. Basic computer skills: The ability to use a computer mouse and keyboard, navigate the internet, and open and use software applications.

ii. Information literacy: The ability to find, evaluate, and use information effectively.

iii. Communication skills: Communicating effectively in online forums, chat rooms, and social media.

iv. Collaboration skills: The ability to collaborate on projects and tasks.

v. Problem-solving skills: The ability to troubleshoot problems with digital technologies and find solutions.

Studies have also shown significant differences pertaining to skills and literacy levels between individuals; those who possessed higher and better quality of education performed better in digital skills compared to those with lower education. As the world becomes more digital, communities and people need to have the skills and knowledge to use digital technologies effectively in order to participate in society and the economy (Tewathia et al., 2020; Van Deursen & Helsper, 2015; Van Dijk, 2017).

According to Baishya and Samalia (2020), the growth in smartphone adoption and usage has contributed to reducing the digital gap and social isolation. The study further argued that communities and people that are in the lower levels of the economic pyramid have a larger sense of social isolation than those in the upper

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level. As a result, they tend to consume newer digital products and technologies to minimize this alienation.

A study conducted by Correa et al. (2020) identified disparities amongst smartphone users in how they utilise and interact with their devices, which had a direct correlation to the individual's level of digital literacy. This was aligned with literature pertaining to motivation and self-efficacy.Ogbo et al. (2021) suggest that people and communities that were motivated to use the internet and digital technologies were most likely to do so as they are more likely to find ways to overcome barriers to access, such as a lack of financial resources or a lack of technical support. They can be motivated by various factors, such as the desire to learn more, be connected to others or improve their livelihoods through education and improving their employment prospects.

Literature suggests that digital skills and knowledge are essential for participating in the digital world as they enable people to use digital technologies to access information, communicate with others, and complete tasks. People with digital skills are more likely to be able to find jobs, learn new things, and stay connected with friends and family.

However, many factors could limit people's ability to use digital technologies effectively, such as a lack of motivation, a lack of opportunities, and a lack of access to support.

2.3.3 The third level of the digital divide

Van Dijk (2002) and Van Dijk (2005, 2017) define the third level of the digital divide as concerned with the benefits that people derive from using digital technologies; however, Van Deursen and Helsper (2015) expanded the research, stating that the third level of the digital divide was also related to the individual's capacity to translate their internet access and usage into favourable offline outcomes. Ragnedda and Kreitem (2018) conducted an analysis of the third level of the digital divide. Further, they argued that more emphasis should be placed on social implications and

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disparities in the tangible outcomes gained from the different forms of access and internet usage.

The benefits and opportunities of using digital technologies can be distributed unequally, thus perpetuating disparities such as income, education, and access to health services and information (Van Deursen & Helsper, 2015). Whilst there has been notable progress in digital inclusion and participation in the digital realm, there are still people and communities that do not have access to digital technologies (World Bank, 2016), with approximately 6 billion people globally without access to high speed internet, thus being unable to participate fully in the digital landscape. The South African landscape has, however, shown significant growth in their network coverage investment over the years. The recent ICASA (2023) report states that in the past five years, 4G/LTE population coverage has increased from 85.7% in 2018 to 98% in 2022, with a notable increase in 5G population coverage from 7.5% in 2021 to 20% in 2022.

Bornman (2016) further alludes that integration into the information society was also believed to hold positive social and economic consequences, such as improvements in productivity, increases in employment opportunities, distribution of information and knowledge, and support for development and improvement in the population's quality of life.

According to Tewathia et al. (2020), there is a substantial disparity in how people from different socioeconomic backgrounds use the Internet. It is noted that individuals with a higher socio-economic level, better education, and more advanced digital skills are more likely to engage in complex and lucrative online activities such as online learning, professional networking, e-commerce, and access to high-quality information, as they are more likely to have access to devices and connectivity.

Differential internet use can have a variety of repercussions, as it can perpetuate the gap in educational achievements and economic opportunities between people of different social backgrounds. It may also lead to poor access to critical information and resources for persons in underserved communities.

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2.4 Digital divide in underserved communities

The digital divide is a multifaceted phenomenon with multiple dimensions that can impact people's lives and communities. The phenomenon is not static and can change as new technologies emerge. Several factors contribute to the digital divide, including socio-economic status, gender, race, ethnicity, and geographic location. Holden and Tilahun (2021) argue that digital information and communication technologies, such as smartphones and the internet, must be recognised as vital tools for empowering marginalised groups, such as women in underserved communities, by reducing the cost of access to these technologies.

The digital divide is not solely a problem in developing countries; it also exists in developed countries. Therefore, it is crucial to understand the digital divide and its impact on people's lives to develop solutions that will help bridge the divide and make the internet a more inclusive and equitable place for everyone, especially in underserved communities (Giebel, 2013). Addressing the digital divide in underserved communities is vital for promoting equal opportunities for people. The research aimed to gain insights in relation to the factors influencing smartphone adoption, people's attitudes towards education and mobile learning, digital exclusion of others, and fostering economic empowerment by analysing literature from various contexts, including global, African, and South Africa.

2.4.1 The global digital divide

The global digital divide refers to the disparities in access to and usage of digital technologies across countries, regions, and social groups. Chen and Wellman (2004) investigated the global digital divide by examining differences in internet access within and between countries. They found that while there have been some improvements in recent years, significant gaps remained. For example, internet penetration rates were much higher in developed and developing countries. Additionally, there were still significant disparities between urban and rural areas within countries, further highlighting the multifaceted nature of the global digital divide. It is not simply a matter of whether someone has access to the internet but

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also includes factors such as the quality of access, the skills needed to use digital technologies, and the benefits people derive from using them. Hindman (2000) established that a number of other factors contribute to the global digital divide, namely socio-economic status, gender, race, ethnicity, and geographic location, aligning with studies conducted by Bagchi (2005), Chinn and Fairlie (2007) and Cruz-Jesus et al. (2018), which found that low-income people from minority groups and underserved communities were most likely to lack access to ICTs and that the digital divide was more pronounced in rural areas where access to broadband internet is often limited.

The United Nations Educational, Scientific and Cultural Organization (UNESCO) (2020) report estimated that nearly 3.6 billion people remain unconnected to the internet, with an estimate of about 4.1 billion people online, about 53.6% of the global population, which they correlated to underserved communities, stating that the remaining unconnected majority of the world's population found it the most difficult to connect to the internet, due to geographical disparities as they are commonly based in low-density or low-income areas that are not as profitable for large businesses to provide service and build infrastructure. This has led to a slower growth rate of new people connecting to the internet.

According to the ITU (2022b), by 2010, mobile-cellular subscriptions had a global penetration rate of 77%, with 68.5% in developing countries. In contrast, worldwide internet usage stood at 29%, equivalent to 2 billion users. However, significant disparities persisted, particularly in underdeveloped countries, where internet usage was merely 5.5%, totalling 46 million users. Broadband penetration was even lower, with only 0.4% mobile broadband subscriptions, accounting for 3 million subscriptions.

On a global scale, data indicate that except for the upper-middle-income group, the percentage of individuals owning a mobile phone exceeds that of internet users across all regions and income groups. In 2022, approximately 73% of the population aged ten and above owned a mobile phone, which is seven percentage points higher than the percentage of internet users. However, this gap is narrowing as the

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growth in internet usage has outpaced the growth of mobile phone ownership in the past three years (ITU, 2022a).

The COVID-19 pandemic has further perpetuated the disparities in access to high-speed and online participation as some organisations and educational institutes shifted towards remote working, learning and communication activities. The ITU (2022a) highlights the access gap, stating that mobile broadband (3G or above) is the primary and often the only way to connect to the internet in most developing countries.

Literature has shown that there are significant disparities in internet access between developed and developing countries, as well as within countries, particularly between urban and rural areas. Efforts to bridge the divide focus on improving access, affordability, digital skills, and overall benefits of digital technologies. The COVID-19 pandemic has also highlighted the need to address this divide as remote activities and e-learning have become more prevalent. However, progress is being made to reduce the divide and ensure equitable digital participation.

2.4.2 Regional digital divide – Africa

The African continent has emerged as a focal point in discussions surrounding the global digital divide as it lags the rest of the world in terms of key indicators of the information society, particularly internet subscriptions. It has emerged as a prominent example in discussions on the digital divide. This can be attributed to Africa being the least developed region globally in terms of income, education, and overall quality of life (Bornman, 2016). Additionally, Africa is the continent most impacted by poverty and underdevelopment, which contribute to its lag in key information society indicators, including internet subscriptions (ITU, 2017).

Within sub-Saharan Africa, South Africa is often regarded as one of the most information integrated societies due to widespread mobile phone ownership, among other things. However, while ICT access has been emphasised (Bornman, 2016), Chen and Wellman (2004) examined the disparities within and between countries, offering valuable insights into the dynamics of the African digital divide, focusing on

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the variations in internet access and usage across different regions within the African continent. Doong and Ho (2012) argue that ICT infrastructure, access to internet and smartphones, and usage patterns of people in underserved communities had a significant role in shaping the digital divide in Africa.

The figure below depicts the digital divide in relation to access within the African region. The statistics on the graph and analysis thereof further align with the findings of Chinn and Fairlie (2007) and Cruz-Jesus et al. (2018) pertaining to socio-economic status, gender, race, ethnicity, geographic location, and other relevant factors as influential contributors to the African digital divide.

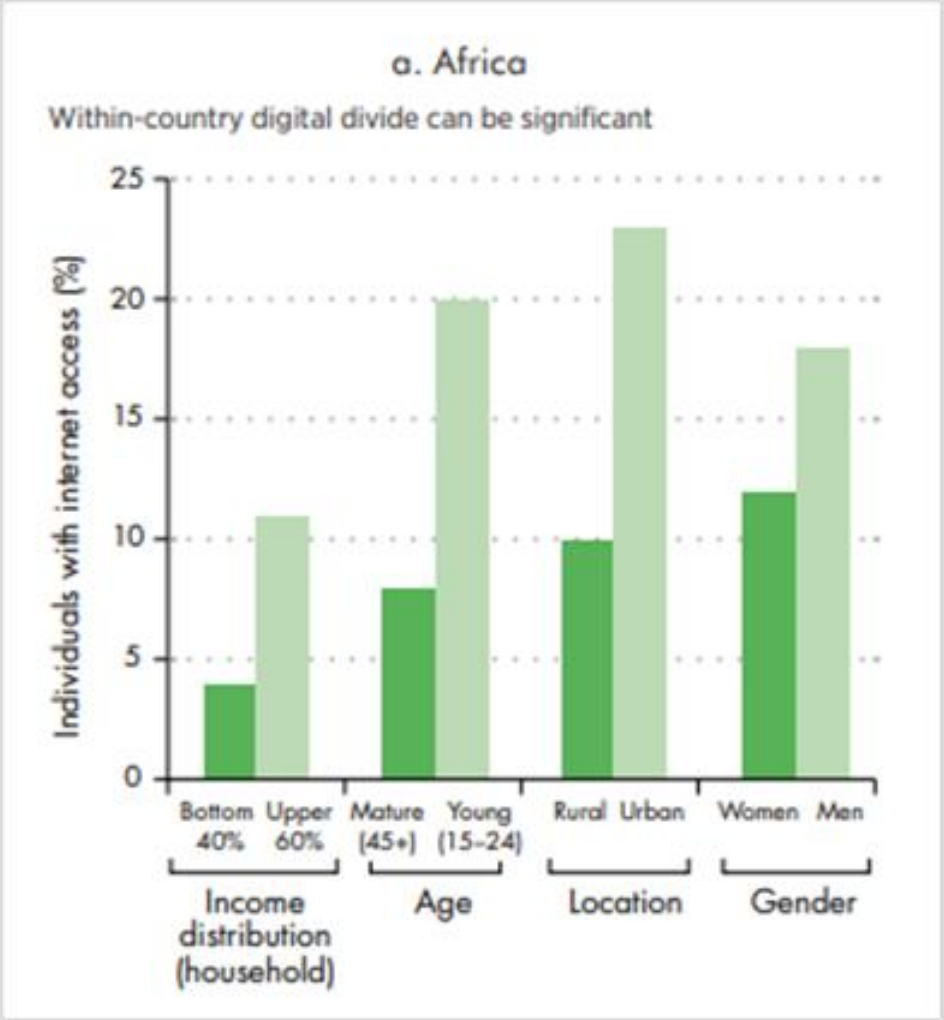

Figure 2: *Digital access in Africa (World Bank, 2016, p. 35)*

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Efforts are underway to bridge the digital divide in Africa through collaborative initiatives involving the government and private sector. Africa's Digital Transformation Strategy emphasises the importance of updating education curricula to meet the evolving demands of the digital economy and society. Integrating digital skills into school curriculums not only benefits children by fostering resilience and critical thinking, but should also be extended to educators (UNESCO, 2020).

According to a report by ICASA (2023), the national population coverage for 3G in South Africa reached 100% in 2022, while the coverage for 4G/LTE stood at 98%. Furthermore, the national coverage for 5G reached 20% during the same period, indicating efforts to improve network coverage and infrastructure. Various research studies have been conducted on efforts to bridge Africa's regional digital divide. Literature has also emphasised the importance of addressing disparities in digital access and usage throughout the continent (Fuchs & Horak, 2008; Munga, 2022) .

According to research, socio-economic challenges, educational gaps, and infrastructure limitations impede digital inclusion in Africa (Ombogo, 2023). Therefore, targeted measures such as improving network coverage and encouraging collaboration between the government, mobile service providers, the private sector, and educational institutions could help to solve these issues (Anrijs et al., 2023; Fuchs & Horak, 2008; Lembani et al., 2020). By tackling these issues, the African region can bridge the digital divide and enable its people to fully engage in the digital economy and society.

2.5 ANALYTICAL FRAMEWORK

In this section we explore the Resources Appropriation Theory (RAT) as our theoretical framework to examine the complexities of the digital divide. RAT offers a sociological perspective that goes beyond the conventional focus on access to ICTs and highlights the significance of how individuals utilise and derive benefits from these technologies.

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2.5.1 Theoretical framework

Early research on the digital divide focused on physical access to ICTs, such as computers and the internet. However, more recent research has focused on the second-level divide, which refers to the skills and knowledge necessary to use ICTs effectively. Prior to 2005, research on the digital divide was primarily descriptive and lacked theoretical foundations, ignoring the effects of access and usage. Van Dijk (2006) argues that research was primarily descriptive and did not adequately explain the causes or effects of the digital divide and that the focus was primarily on demographics, such as income, education, age, gender, and ethnicity; it lacked theory.

In the field of social and communication science, the stages of access were addressed using technology acceptance theories. Technology acceptance theories, such as the technological acceptance model and the theory of planned behaviour, focused only on factors like motivation, attitudes, perceived usefulness, ease of use, and subjective norms that influence individuals' intention to access digital technologies. Once acceptance reaches the decision-making stage, adoption theories, like diffusion of innovation, were effected (Van Dijk, 2017).

Jan van Dijk has developed a comprehensive framework for analysing access in the context of the digital divide called the Resources Appropriation Theory (RAT). RAT argues that the digital divide is not just about access to information and communication technologies. It is also about how people use ICTs and how they benefit from them (Van Dijk, 2005, 2017). He further expanded on the theory stating that RAT was adapted from two established theoretical frameworks: structuration theory and acceptance theory. The below is the diagrammatic version of the RAT framework;

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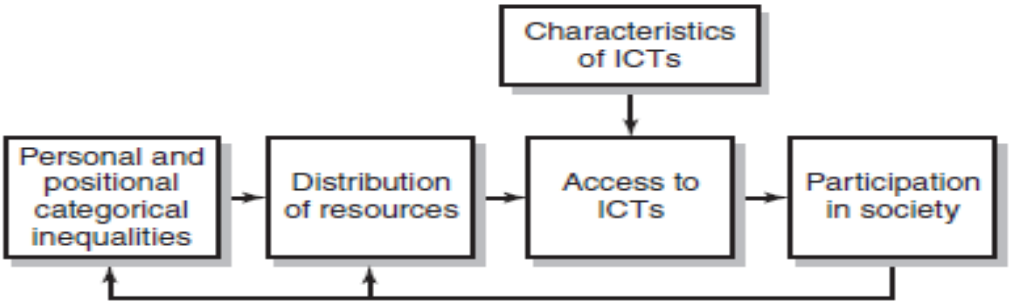

Figure 3:*Causal model of resources and appropriation theory (Van Dijk,2005, p.15)*

Van Dijk's framework is broad enough to encompass the different approaches to digital divide research. It is also backed by a particular theory, which gives it a strong foundation. This makes it a useful tool for understanding a holistic examination of various dimensions of the digital divide and its implications. Van Dijk (2017) also refers to it as the theory of the diffusion, acceptance, and adoption of new technologies. Core concepts of the RAT were derived and summarised as follows:

i. Categorical inequalities in society perpetuate an uneven distribution of resources, including digital technologies.
ii. The characteristics of digital technologies contribute to unequal access among individuals.
iii. Unequal access to digital technologies results in differential participation in society.
iv. Unequal participation in society reinforces categorical inequalities and perpetuates the unequal distribution of resources.

RAT framework acknowledges that the characteristics of technologies play a role in unequal access and recognises that this unequal access leads to societal disparities in participation, which perpetuate existing disparities in education, employment, health, and smartphone adoption, further widening the gap between privileged and underserved communities.

By utilising this framework, researchers can explore the complex aspects of access and its intersection with social, economic, and cultural factors. It offers a solid basis

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for understanding and addressing the complexities of the digital divide in underserved communities.

2.6 Conclusion of Literature Review

In conclusion, the study aimed to shed light on the factors that contribute to the digital divide in underserved communities, focusing on affordability, infrastructure limitations, network coverage, digital skills, and the benefits associated with smartphone ownership. By incorporating the RAT as a theoretical framework, the study sought to provide a comprehensive understanding of the complexities surrounding the digital divide and the implications thereof in underserved communities. The affordability assessment also uncovered individuals' financial constraints in purchasing smartphones, mobile data, and airtime, highlighting the barriers that hindered access to digital technologies. In addition, the infrastructure limitations were also assessed to determine the availability and quality of telecommunication infrastructure, including base stations and the quality of broadband connectivity, which directly impacted on the accessibility and usability of digital technologies.

The study evaluated digital literacy skills to understand individuals' proficiency in accessing the internet, navigating smartphones, and utilising digital resources effectively. The knowledge gap within underserved communities and its influence on digital inclusion was explored through this evaluation. Moreover, the perceived benefits associated with smartphone access and usage were investigated to reveal the advantages individuals perceived, such as enhanced communication, access to information, advanced educational opportunities, and economic empowerment. The benefits were understood to provide insights into the potential impact of smartphone adoption in bridging the digital divide and promoting digital inclusion in underserved communities.

The study aimed to contribute to the existing knowledge on the digital divide by integrating the research questions and adopting the RAT. The findings will inform policymakers, community organisations, network service operators and the

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government about the underlying factors contributing to the digital divide and provide recommendations for interventions and strategies to promote digital equity in underserved communities. Ultimately, addressing these issues can foster a more inclusive and equitable digital society for all despite the geographical habitats of individuals.

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CHAPTER 3: RESEARCH METHODOLOGY

This section describes the research process that was employed for the study. It provides data on the research approach, research design and the sampling methods of the study. The population that the research targeted is also detailed in this section, as well as the research instruments that were used to collect and analyse the data.

The chapter focuses on the methodologies that were used to examine the impact of smartphone ownership and the digital divide in underserved communities.

3.1 Research Paradigm

The study employed the interpretivist research paradigm, motivated by Creswell (2018) work, which highlights the subjective aspect of social phenomena and the significance of comprehending individuals' lived experiences and interpretations within specific contexts.

The study utilised the interpretive tradition, mainly qualitative approaches recommended by researchers such as Creswell (2018), to explore the nuanced perspectives and behaviours surrounding smartphone ownership and digital inclusion in rural Mpumalanga, South Africa.

By employing in-depth interviews as the primary data collection method, the study aimed to gain insight into the transformative potential of smartphones in enhancing social equity and economic empowerment within these communities, aligning with the interpretivist approach to qualitative studies.

3.2 Research Approach

Creswell (2018) defines qualitative research as an approach used to explore and understand individuals’ or communities’ experiences and their social or human problems. This approach allows researchers to gain valuable insights and a deeper understanding of the multifaceted issues surrounding access, usage, skills, and benefits associated with smartphone ownership in underserved communities.

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The qualitative approach was chosen for this study to enable a detailed exploration of individuals' experiences, opinions, and behaviours within underserved communities. Unlike the quantitative approach that focuses on measuring and quantifying data, the qualitative approach emphasises understanding the meaning behind people's experiences and actions through their own words (Creswell et al., 2007), which will be relevant for this research study as it will enable better understanding of underlying factors, barriers, and challenges specific to these communities. Patton (2014) argues the existence of interpretivism philosophy in qualitative research, highlighting that researchers must be aware of their biases when conducting research as this might influence the manner in which they present the collected data.

The qualitative approach offers the flexibility to adapt research methods to the specific research question and context (Creswell, 2018) and is a valuable tool for understanding the digital divide in underserved communities. Opting for this approach aided to develop comprehensive solutions to the multifaceted issues surrounding access, usage, skills, and benefits associated with smartphone ownership.

3.3 Research Design

The generic qualitative design, which is also referred to as the basic qualitative research or exploratory qualitative research, is defined as the design for a flexible and adaptable approach that aims to explore and understand phenomena in specific contexts used in qualitative research (Creswell, 2018).

This study adapted this design as underserved communities have unique socio-cultural, economic, and geographic characteristics that influence the digital divide (Anrijs et al., 2023; Hindman, 2000). The generic qualitative design emphasises understanding the contextual factors specific to the individuals. The research aimed to assess how socio-economic disparities, cultural norms, geographical limitations, and community resources shape the digital divide and smartphone usage within underserved communities.

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Creswell et al. (2007) and Creswell (2018) highlight the characteristics of the generic qualitative design, emphasising both its advantages and disadvantages that researchers should consider. The advantages of the generic qualitative design include flexibility, which allows the researcher to tailor their approach to suit their specific research study's needs. It also offers the potential for a deep understanding of participants' perspectives and experiences, enabling rich and detailed insights. Additionally, the generic qualitative design encourages creativity and innovation in the research process, allowing for unique and nuanced exploration of the phenomenon.

However, the generic qualitative design is not without its disadvantages. One limitation is the lack of structure, which could present challenges in managing the research process (Creswell, 2018). The researcher had to navigate through a more fluid and dynamic approach, which required additional planning and organisation. Another concern is subjectivity, as the interpretation and analysis in qualitative research are influenced by the researcher's perspective. This subjectivity may limit the generalisability of the findings to other populations, emphasising the context-specific nature of the research. Finally, the generic qualitative design can be time-consuming and labour-intensive due to the in-depth nature of data collection and analysis, requiring a substantial commitment of resources and effort (Creswell et al., 2007; Creswell, 2018).

3.4 Data Collection Methods

The primary method of data collection used in the study was in-depth interviews. This method was preferred as it allows exploring personal experiences and perceptions where participants cannot be directly observed (Creswell, 2018). It allows participants to provide historical data, which enrich the depth of the study's findings, ensuring that relevant topics are explored thoroughly and allowing the researcher to maintain control over the line of questioning. However, the disadvantage of using in-depth interviews is that the data gathered are filtered through the views and interpretations of the interviewees, which could potentially

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introduce bias. Furthermore, the researcher's presence during interviews can influence participant responses, leading to socially desirable answers or altered perceptions. Additionally, not all participants can equally articulate or be perceptive, which could impact on the depth and quality of the data collected (Creswell, 2018).

Through in-depth interviews, the research sought to explore the complexities of individual narratives, discover specific barriers faced by participants, and explore the perceived impact of smartphone ownership and internet usage on their lives. The in-depth interviews provided a platform for participants to express their thoughts, emotions, and attitudes regarding smartphone ownership and the internet, allowing for an exploration of challenges such as limited access to affordable devices, inadequate internet infrastructure, and low digital literacy.

3.5 Population and sample

3.5.1 Population

The research study focused on rural population due to the specific dynamics and challenges associated with the digital divide in rural areas. Rural areas often face distinct challenges in terms of access to technology, including smartphones and the internet (Hindman, 2000). Evidence from literature has a direct correlation to the fact that rural areas typically have poor and limited infrastructure, such as internet connectivity and network coverage, which can create barriers to smartphone ownership and internet access (Tewathia et al., 2020). Furthermore, factors such as geographical remoteness, socio-economic disparities, and inadequate digital literacy resources can further perpetuate the digital divide in rural communities (Thomä, 2023).

Investigating the rural population was expected to provide a more in-depth understanding of the potential benefits and opportunities that smartphone ownership and internet connection might offer underserved communities by assessing how digital technologies might assist rural communities to bridge gaps in education, health care, agriculture, entrepreneurship, and social connectivity.

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3.5.2 Sample and sampling method

The study employed purposive sampling, and the sample was young Black people in the rural communities of Nkomazi and the Bushbuckridge district in Mpumalanga, aged between 18 to 35 years, with minimal higher education exposure and limited access to technology. The sample size was informed by literature derived from Creswell (2018), who recommends a sample size of 8 to 16 participants for qualitative research studies, arguing that it is a sufficient sample size to achieve data saturation, which is the point at which no new information is being generated from the data. The targeted sample size was 10 participants. However, saturation was reached at eight interviews with participants.

3.6 The Research Instrument

The research instrument that was used for the study was an interview guide. The researcher conducted telephone interviews using a semi-structured questionnaire. The questions were prepared in advance. However, additional data were requested from the participants for further clarity.

The interview guide was segmented into three themes, as described in the following sections.

3.6.1 Demographics

The first theme served as the icebreaker section of our research, providing an entry point for the researcher to collect personal data from the participants. This initial segment was designed to establish rapport and build trust between the researcher and the participants, fostering an environment conducive to open and candid dialogue. Through carefully crafted questions, participants were encouraged to share personal anecdotes, experiences, and perspectives, setting the tone for a deeper exploration of the research topic. The icebreaker section facilitated data collection by engaging participants in discussions about their backgrounds, interests, and life experiences. It helped the research process, allowing participants

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to feel valued and heard. This section laid the foundation for subsequent thematic discussions, creating a comfortable place for participants to express themselves and contribute meaningfully to the research.

3.6.2 Access and barriers

The theme of access and barriers explored the availability, affordability, and reliability of smartphones and internet services for participants. It also investigated the specific challenges and barriers that participants face about accessing and utilising these technologies. The factors contributing to these challenges and barriers, such as socio-economic status, location, and educational background, were also explored. Finally, the theme assessed how these challenges and barriers impact on the participants' lives.

3.6.3 Usage patterns and benefits

The theme of usage patterns and benefits examined how participants use smartphones and the internet and the perceived benefits and opportunities associated with their use. The theme explored how these technologies impact on participants' daily lives, social connections, educational opportunities, economic prospects, and well-being. It also identified the specific benefits and opportunities that participants derive from using these technologies and explored how these benefits and opportunities vary depending on participants' circumstances.

3.7 Procedure for Data Collection

Young Black individuals aged between 18 and 35 years residing in underserved communities were the focus of our recruitment. The researcher worked alongside community leaders to identify potential participants and received referrals from previously interviewed individuals. After explaining the study, participants gave consent by reading and signing informed consent forms. Subsequently, data collection started with in-depth interviews conducted via telephone due to various participants' constraints, such as limited data access and unfamiliarity with online

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platforms like Teams. The interviews were recorded to ensure comprehensive documentation. The audio recordings were then transcribed, with translations provided from vernacular languages to English. All data, including audio recordings, were meticulously saved, and participants' identities were protected through pseudonyms.

3.8 Data Analysis Strategies and Interpretation

For this research study, a thematic analysis approach was used for data analysis. Patton (2014) defines this approach as analysing, identifying, and interpreting themes derived from the collected data. The data analysis process for the study was inductive, allowing themes to emerge from the data. The following steps were taken: (1) familiarisation with the data, (2) generation of initial codes from data, (3) search for potential themes based on the initial codes, (4) review of the initial themes, (5) definition of the themes, and (6) production of an analysis report. The sequence is explained below.

3.9 Quality Assurance

3.9.1 Transferability

In alignment with qualitative research principles, this study placed a premium on transferability rather than generalisability. As underscored by Creswell (2018), transferability pertains to the extent to which research findings can be extrapolated to other contexts. Specifically, this research focused on the applicability of its findings to rural communities grappling with similar challenges surrounding smartphone ownership and internet access. The aim was not to provide universal truths, but to explain how individuals experience a particular environment. Consequently, the transferability of this study hinges on thoroughly considering various contextual factors, encompassing cultural norms, social dynamics, economic conditions, and infrastructural disparities. By conscientiously acknowledging and accounting for these multifaceted influences, this research

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provides insights and recommendations that resonate with and inform analogous contexts. Ultimately, this contributes to the broader discourse on digital inclusion and equitable access to technology in underserved communities.

3.9.2 Credibility

Creswell (2018) affirms that credibility is an important aspect of any research study. He defines credibility as the believability and trustworthiness of the findings and conclusions of a study. This ensures that the findings are accurate, rigorous, and dependable. The researcher used transparent and systematic analysis processes and took into account participants' perspectives to ensure that the research study established the credibility of its conclusions about the digital divide in underserved communities.

3.9.3 Dependability

Dependability is the consistency and stability of the findings of a study over time and under different circumstances. In qualitative research, dependability is established by ensuring that the study's processes and procedures are reliable and can be replicated (Creswell, 2018). The researcher diligently documented the process, used clear and consistent methods, and provided detailed information about the data collection and analysis procedures.

3.10 Ethical Considerations

- The participants were informed about the purpose of the study and their participation in it before engaging in the research.
- Participants were not placed under any form of duress to partake in the research; they gave consent and signed a consent form.
- All participants’ details are kept confidential and anonymous.
- Participants were treated with respect throughout the interview process.

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CHAPTER 4: FINDINGS OF THE STUDY

This section of the research report presents the findings collected from the sample of young Black people in underserved communities in the Mpumalanga rural areas within the Nkomazi and Bushbuckridge districts. The findings are presented via thematic analysis to address the research questions in Chapter 1 of the report. The findings are categorised into three main sections, where the first section presents the background overview of the participants, the second section presents and analyses emergent themes, followed by the last section of the chapter, which links thematic analysis with the study propositions to reach a conclusion.

4.1 Background Overview of the Participants

A sample of eight (8) participants' profiles has informed that the age distribution amongst the surveyed individuals is diverse, ranging from 22 to 34 years, with the majority falling within the range of 22 to 33 years of age, suggesting a broad representation of young adults within this South African demographic. Additionally, gender presentation indicated that the participants had a balanced distribution between males and females. This was needed to capture a holistic view of the digital divide experiences and perspectives within these underserved communities. Moreover, educational backgrounds varied among participants, encompassing a range of qualifications such as a diploma in journalism, being a full-time student, higher certificate N3, matric, and N6 (in progress). Analysing such participants' diversity helped to analyse their responses about technological accessibility and barriers and their usage patterns and benefits simultaneously. Regarding the employment status, the analysis showed diverse statuses, including permanent, part-time DJ, temporarily employed, and not employed categories. Such employment status diversity among young Black adults can be deemed a range of economic situations and employment opportunities within the communities under consideration.

Subsequently, all interviewed participants reported ownership of smartphones (Yes = 8) and internet accessibility (Yes = 8), further indicating their widespread use.

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Results showed internet access primarily through mobile data, which presented fewer opportunities for digital engagement via Wi-Fi and routers in these communities. While Android was identified as the most preferred operating system, the presence of iOS users also emphasised the need for flexible digital strategies to address the digital divide. These findings implied that despite the diversity of young adults in these districts, the presence of mobile devices, including Wi-Fi and routers, should also be regarded as key for internet accessibility among these users to embrace inclusiveness.

4.2 Emergent Themes

The research aimed to explore the digital divide in underserved communities in rural Mpumalanga, focusing on the transformative impact of smartphone ownership and internet usage. The research investigated the factors contributing to accessibility and barriers to technology amongst young Black people in the two districts of Mpumalanga. The study addressed the research questions as stipulated below:

- To examine the digital divide in underserved communities in South Africa and the role of smartphones in promoting digital inclusion and enhancing the quality of life.
- To explore the correlation between pricing and accessibility of smartphones with the digital divide.
- To analyse the perceived benefits associated with smartphone usage and access, contributing to digital inclusion, social equity, and economic empowerment in underserved communities.

The following six themes have emerged from the study findings:

- Experience with accessibility.
- Challenges encountered in accessing and utilising smartphones and the internet.
- Role of government and network service providers in enabling accessibility.

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- Primary usage of smartphones and the internet in daily life.
- Benefits of smartphone ownership and internet accessibility.
- The impact of smartphones and the internet on individuals' lives

4.2.1 Experience with accessibility

One of the key themes that emerged from the participants' interviews was their experience with accessibility to smartphones and the internet in their communities. In their responses, some participants reported their enjoyment experience relative to the ease of access to smartphones and the internet.

> *"In my community, especially where I'm from, KwaMhlushwa, is full of youth and vibrant people and people that are lover of things. So we have more internet access because most of them have smartphones." P2*

> *"Our access is fine; we use our phones and buy data to access the internet; some people also have wireless routers." P4*

> *"We have access to smartphones and internet because most of us have smartphones." P5*

> *"They are accessible; for instance, we can get and buy data from the local spaza shops and then access the internet through our phones if you have the right phone that has internet." P7*

The other participants, however, mentioned how they face significant challenges in accessing smartphones and the internet, such as network issues, affordability, and limited digital literacy in access. Understanding these dynamics is crucial for devising inclusive strategies that address underserved communities' diverse needs and barriers, ensuring equitable access to digital resources and opportunities.

> *"I can say it is hard sometimes because we have issues with the network whereby we will not have a network for days, meaning we cannot be able to access the internet the way we would like to." P3*

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> *“When we do have the funds and need to buy a smartphone, they are accessible; however, they are very expensive.” P6*

> *“With regards to smartphones, the majority of people do not have them; I think because not many people are working, there is poverty.” P8.*

The participants' experiences with smartphones and internet accessibility in their communities revealed a varied landscape, as not every young Black person had the same experience with smartphones and the internet. P1 alluded to the growth of internet access through smartphones in their village but with network issues and theft-related disruptions to an MTN tower nearby, citing that:

> *“Let me tell you about the village one. There is more access to the internet via the phone than Wi-Fi. I think many people have not picked up to the idea of having to connect everybody in the house though Wi-Fis, but it's growing.” P1*

Likewise, P2, from a youth-centric community, emphasised abundant internet access, particularly through smartphones and their community library offering free internet to the community. P5 noted adequate smartphone and internet access, attributing the prevalence of Android phones to their affordability as many people in the community have no permanent jobs needed for other high-cost operating system devices.

> *“Most people have and use Android phones because they are cheaper devices compared to iPhones. Kids also have cellphones these days, so I can say our access to smartphones and the internet is adequate in our community.” P5*

P7 mentioned that she has accessible data purchases but highlighted the limitations and disparities of accessing data-intensive platforms like TikTok due to cost and affordability.

> *“However, I do not think everyone has the same access to the internet, for example most people love TikTok now, and they really cannot access it as*

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much as they want to because it consumes and requires many data of which most people cannot afford to buy data daily." P7

In contrast, P3 highlighted that there are people in their area who do not have smartphones, therefore having to rely on internet cafes to access the internet. In addition, P4 also described a mix of smartphone and 2G device usage, with internet cafes playing a crucial role in accessing online resources.

> *"We also have internet cafes in our area where most people go to if they want to have access to the internet as some people don't have smartphones." P3*

> *"People in my community mostly have smartphones but smartphones, but they also have these small phones (2G devices), mostly Nokias, which they use just to make calls. The smartphones they use for WhatsApp, Facebook and if they want to research something in the internet they go to the internet cafes and do their research there." P4*

Participants acknowledged smartphone accessibility but pointed out the high cost of high-end devices, limited availability of Wi-Fi and fibre, and limited smartphone ownership in their communities, citing poverty as a significant barrier. Therefore, based on the first theme, for a more comprehensive understanding of the participants' experience, four critical areas are identified and discussed below in detail.

Affordability and Availability of Smartphones and internet

Smartphones

Participants expressed varying experiences regarding the affordability and availability of smartphones, thus shaping their experiences. P1 shared that the affordability of smartphones is not a problem in their district due to the availability of budget-friendly brands like Oppo. They also noted that this is a positive shift in making smartphones accessible, dismissing affordability concerns in this context. However, P2 highlighted the varying affordability of smartphones based on

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preferences and individual backgrounds. According to their perspective, affordability is a subjective phenomenon that should be addressed differently for each individual based on their needs and preferences and their ability to buy it based on their demographic background. They stated:

> *"In terms of the smartphones, I think that depends on what you want because I can tell you now that, as I've said before, KwaMhlushwa is made up of youth mostly, and you know, those people who love things and the only device that they want is an iOS and you know that Apple is expensive. So, it is a matter of affordability and your background whether can you afford what you want."* P2

P7 substantiated that.

> *"It is entirely up to the person's preference on the type of smartphone that they want, either standard grade or high grade it is up to the person and what they can afford*." P7

Internet Services

All the participants consistently highlighted the issue of expensive data in their communities, indicating a shared concern about the affordability of internet services. P2 presented a contrast between buying small data bundles daily and investing in a monthly Wi-Fi plan, intending to highlight the economic advantages of the latter. P3, P4, and P6 connected the affordability of internet services directly to unemployment, reinforcing the idea that financial constraints limit access to both smartphones and data. P7 also alluded to expensive data, highlighting that not everyone can afford it, particularly the larger bundles. Likewise, P8 discussed affordability issues beyond smartphones for internet-related challenges. They stated that the challenges during load shedding significantly impacted on the ability to use phones for schoolwork. The network's instability during such times also adds a layer of difficulty. According to them,

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“Sometimes I cannot even browse the net, even just use my phone. It’s a problem. The stability of the network becomes a bit of a challenge as well.” *P8*

Reliability of internet Connectivity

The second aspect shaping their experiences of and accessibility of smartphones and internet services in their areas was related to the reliability of internet connectivity. The eight participants' responses revealed a range of experiences with positive and negative sentiments. In their discussions, P1, P2, P4, and P5 generally expressed their positive sentiments about the reliability of internet connectivity. They described it as “reasonably okay, satisfactory, or even the best”, emphasising that the connectivity is generally reliable. Their views were as follows:

“It is reliable, fairly okay and satisfactory. I mean, if they could improve it, that is welcome also, but it is never a case where there is no network.” P1

“Currently, it is reliable, but before, it was very unstable because we did not have a tower. Now, they have installed a tower for us. So, like if you have money to buy data, you will not have a problem unless there's load shedding.” P5

The views mentioned above by P5 have, however, highlighted that load shedding emerges as a common challenge affecting internet reliability. This issue is consistent across participants and highlights the network's vulnerability during power outages. P2, P3, P6, P7, and P8 also mentioned that the internet becomes very bad during load shedding, disrupting calls and browsing. In addition, P6 introduced an interesting aspect by noting that connectivity is worse for those staying closer to the mountains. This finding suggested potential geographical variations in network coverage and stability in the two districts of Mpumalanga, indicating that some areas within the community may face more challenges than others. This view is shared in the extract below.

“I am not sure how bad the other networks were, but the one that I use, which is Vodacom, was very bad. It is also bad for some of us that stay

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closer to the mountains; you need to move around the house and the yard to get stable connectivity as some parts have better network than others." P6

Furthermore, P6 shared their experience of the period in the previous year when connectivity was exceptionally bad, lasting for over three days. It raises generally prevailing concerns among the youth in their community about intermittent and prolonged periods of unreliability, impacting on the ability to access the internet and make calls.

Participant 8 also raised concerns about unexplained network outages that are not necessarily related to load shedding or electricity issues. The difficulty in pinpointing the cause of such disruptions suggests potential technical challenges or infrastructure issues that may need attention. They expressed their view as given below:

"Sometimes we do not even know why there is no network, and when you call, they will just tell you that a technician is coming to solve the problem." *P8*

Factors Affecting Reliability of Internet Access

Due to the diverse perspectives identified about the reliability of internet connectivity within underserved communities, the participants were also asked about the factors that affect internet reliability. Multiple participants highlighted several factors influencing the reliability of internet connectivity in their communities; load shedding emerged as a predominant challenge, impacting on both the internet and the quality of service from a network quality perspective.

Adverse weather conditions, geographical challenges, precisely the distance from the towers, and vandalism were identified as additional factors affecting connectivity. The multifaceted impact of load shedding on various aspects of telecommunication services, including voice calls, was emphasised. Such concerning experiences of participants are expressed in the extracts stated below.

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"If there is bad weather or rain and also load-shedding." P4

"It also becomes worse when the thieves vandalise it, and it is because of these thieves that we as the community will not have good things as they also see an opportunity for them to steal. also when there is load shedding, we struggle a lot especially with voice calls, you not get hold of people also as you are directly diverted to voice mail." P6

Suggestions for Improving Accessibility

To address the challenges affecting their accessibility experiences, participants offered diverse suggestions to enhance access to smartphones and the internet in their community. One recurring theme from the responses of P1 and P5 was the need for more affordable smartphones, with some participants highlighting the positive impact of cheaper models.

"Okay, when it comes to smartphones, maybe if they can be lesser (cheaper), and since they are building a mall for us, maybe it is going to be better we will not have to spend too much to go to town." P5

Additionally, improving internet connectivity was emphasised, with a call for stronger signals to prevent connection issues, especially those related to neighbouring countries, as expressed by P1 in her extract.

"With the internet, I think we just need a stronger signal because you are, like I said, you wake up and you're connected to Swaziland, you drive, you connected to Mozambique, you know. So maybe they could make ours stronger to be able to stick to the signal here in South Africa all the time." P1

4.2.2 Challenges encountered in accessing and utilising smartphones and the internet

The second theme emerging from the participants' responses was related to the range of challenges and the most significant challenge affecting their accessibility

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and use of smartphones and internet services as young Black participants. The sample of eight participants reported different challenges encountered.

Load shedding

During the data collection process, it was observed that load shedding significantly affected the usage of smartphones and internet services for seven out of eight participants. Load shedding caused electricity supply disruptions, affecting their ability to charge their smartphones and use internet services. This obstacle is a significant challenge for individuals who rely on their smartphones and internet services for work, education, and daily communication.

> *"The most challenge on the internet is related to network not being available, it is even worse when there is no electricity, we are unable to use our data or access the internet and also can't make calls."* P6

> *"The challenges that we are currently facing due to electricity, when there is load shedding, we are unable to use our data or the internet."* P7

> *"Electricity is a challenge; for instance, during load-shedding, there are times when I want maybe to do my schoolwork (I have 2 phones, and I use the other one hotspot maybe on my laptop), and I would find that it does not have a network at all. It is a struggle; I can't do my schoolwork." P8*

Proximity and Distance Problems in Rural Areas

Specifically, P5 shed light on the rural challenges, where travelling long distances to town is required to purchase desired smartphones due to limited local availability, thus also increasing the costs required to access or own a smartphone.

> *"So if you need to have access to buy a certain smartphone, you need to travel 100 km to get that smartphone. That limits us sometimes to have the type of phone that you like because transport going to town it's expensive, because you will need to have R300 to go town."* P5

Unaffordable Cost of Smartphones and Internet

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The interview results have further shown that affordability is also a concern for people in these communities, with financial constraints limiting the choice of phones and ways of accessing the internet. The participants highlighted and alluded that individuals cannot afford the price of data and smartphones, even the cheaper ones. This finding can be analysed from the extracts of the participants given below.

> *"And I also think some people struggle to keep up with the data fees, because now you have to buy the data, because not most of them do not have the uncapped plans, and they are having to constantly buy the data. That is also another challenge as data is very expensive; everyone is constantly complaining about the cost of data." P1*

> *"Some cannot afford smartphones. Most houses around my area have wireless connection and Wi-Fi in their houses as data is very expensive, so they have to find an easy way to access the internet. My neighbours and us, we are using the same service provider, and we are on the uncapped option; we pay R500 per month, so I think the main barrier that we have is affordability." P2*

> *"I do have a challenge when it comes to the internet because sometimes I do not have money to buy data. I cannot afford to buy data every day." P5*

> *"From a data perspective, I can say that it is very expensive across most of the networks that we use like Vodacom and the others." P6*

> *"With the internet access, the challenge is affordability; they don't all afford to use the internet access and also, accessing digital devices such as phones laptops really expensive for most people in our area." P8*

Participant 7 reinforced the notion of expensive data as a barrier, adding that the layby smartphone options at retailers make them more accessible, but affordability remains an issue, as quoted below:

> *"Another challenge is that data is very expensive; therefore not everyone can afford them due to a lack of money, and it's also challenging to buy the*

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bigger/monthly/weekly bundles due to affordability; with regards to the smartphones, I think they have made it easier for us to be able to access and buy them, for example, you can layby whatever phone that you want in most of the retailers like Pep, etc." P7

Prevailing Unemployment

Participant 6 elaborated on the economic challenges faced by the majority who are unemployed and engaged in sporadic jobs, making high-end smartphones unaffordable. Similarly, P3 and P4 attributed the accessibility issue of smartphones to unemployment prevailing among the youth in their districts, emphasising the financial constraints that limit access to smartphones. One of the participants shared their view:

"No one cannot be happy to have a smartphone. Everyone else wants it; it's just the lack of employment and money." P3

However, the overall analysis of the challenges-related findings has significant implications in understanding the affordability issues attributed as the most significant challenge in buying both smartphones and data bundles impacting on the ability of individuals, particularly those in underserved communities, to stay connected.

4.2.3 Role of Government and network service providers in enabling accessibility

A third theme emerged from the interviews, which was related to the role of the government and network service providers in enabling access to smartphones and the internet. Participants consistently expressed the need for government intervention to make internet services more affordable and accessible. The shared insights generated ideas, such as providing free or limited-access internet in public places like libraries or community centres, were also highlighted by the participants, and they also suggested that the government could subsidise data costs, particularly for essential activities such as job applications and education.

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Role of Government

Participant 1 emphasised the crucial role of government in understanding the need for collaboration and subsidies, as they cited the high cost of data, especially in comparison to neighbouring countries. In their extract, they added:

> *"I think they could all work together and subsidise us;the government could subsidise and help, you know, with the cost of data because, oh, my goodness, it is a lot. I recently travelled to Swaziland, and you know, the amount that you would buy data that side compared to this side (SA) their data there is cheaper." P1*

P4 and P5 highlighted the importance of addressing load shedding, while P5 and P7 also alluded to the interest rates and their impact in impeding affordable smartphones. These findings have significant implications for understanding the broader role of government and network service providers in addressing the infrastructure and economic hurdles affecting the accessibility of the internet and smartphones among community members. These findings were expressed in the following extracts:

> *"There just must not be load shedding."* P4

> *"Okay, so I think if maybe, for the government, when it comes to internet connectivity, I think if they could stop load shedding, that will help maybe when it comes to internet connectivity, plus if the interest rates could lessen, maybe the smartphones would not be so expensive." P5*

> *"Cost of living is very high, and over the past year, we experienced many price increases in everything, and I do not think none of us were expecting it." P7*

P4 further advocated for job opportunities and reduced data prices, in their view.

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“They can start by creating jobs in the community and employ the community members; this will enable the people to afford the internet and smartphones.” P4

P7 specifically provided a contradictory perspective for enhancing accessibility to smartphones and internet services, not limiting the solution to free accessibility, but increasing people's income to enhance their affordability. According to them,

“The government has also tried to assist those that are unemployed with the monthly R350 funding; however, I think they can do better if they can create job opportunities for people to be employed.” P7

Role of Network Service Providers

The participants' responses also informed the balanced approach needed by the government and network service providers (NSPs) to help the community members increase their accessibility to the internet. Participants advocated for collaboration between NSPs and the government to implement subsidies and reduce data prices to improve affordability. The participants highlighted the potential of NSPs to work jointly with the government in installing crucial internet infrastructures within communities, ensuring fair and accessible services for everyone.

Participant 2, a university student, suggested a model similar to university-provided student data, proposing government-funded internet installations accessible to all community members.

“So, I am getting data every month from Vodacom through the university, so what I think can be done in the community because now mostly we need to be connected, it must also be fair enough because we know the data is expensive. I think the government can subsidise or make it cheaper.” P2

P7 also highlighted the significance of the student-funded bundles, stating that

“They also need to continue with student bundles. The data prices may not be reduced to old prices, but they can find other ways of making them

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cheaper because we need to have access to the internet for us to be able to apply for jobs. Some need it to apply for school, and without data, nothing that you can do." P7

P3, P6 and P8 focused on much simpler solutions for broader and free accessibility for everyone, granting access in communal places like libraries and computer centres. They stated that:

"I cannot say they must buy everyone a smartphone; I think they must grant access to everyone in places like the library or a computer centre in a particular community where everyone can go there." P3

"Maybe the government and the service provider must work together and also include representatives from our communities to try and come up with solutions to our current challenges of not having free internet access. Right now, we cannot apply for jobs or learnerships because we don't have internet or data." P6

"Maybe they can provide it, like I said, wireless and fibre connectivity to all areas; whether it's a suburb or an informal settlement, they must just provide it. They must also provide the ADSL to the community for free, because nowadays, everything, even schoolwork, they all require the internet, people no longer rely on going to books." P8

The participants strongly believed that collaboration is a much-needed effort from all stakeholders, urging collaboration between the government and service providers for comprehensive digital inclusion; their views are shared in the extracts below.

"So maybe if they could work together and we then get some get a bit of subsidy, and they also should lower the prices of data, that would help." P1

"They also need to collaborate and also try to have the same prices as service providers and also come up with ways of making data affordable." P4

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"Maybe the government and the service provider must work together and also include representatives from our communities to try and come up with solutions to our current challenges of not having free internet access." P6

4.2.4 Primary usage of smartphones and the internet in daily life

The fourth emerging theme focused on the main activities that users engage in everyday using smartphones and the internet. This theme was important for comprehending the usage patterns essential for understanding the digital gap phenomena in these communities. Their responses indicated that participants generally use smartphones for four aspects: communication, social networking, job searches, and staying updated on news and entertainment.

Communication

Five out of eight participants shared various ways they use smartphones for communication. P1 highlighted the importance of smartphones in work-related communication and social interactions. P3 emphasised the role of WhatsApp in both work communication and completing assessments. P4 primarily reported using phone calls, WhatsApp, and social media for communication.

"I use it a lot for work. You know, my work revolves around knowing what goes on anywhere and everywhere. So, I use it for work. And most of the time, it could be social media." P1

"I use my smartphone to access the internet and I usually go for WhatsApp because its where we communicate even here at work we use WhatsApp for communication." P3

"I usually use my cellphone to make phone calls and access WhatsApp, Facebook, TikTok. WhatsApp is for communicating with friends, Facebook and TikTok I learn how to braid and learn new hair trends." P4

P7 however relies on WhatsApp for communication and connecting with friends and family that is far, and P8 uses WhatsApp for chatting and school-related tasks.

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“I mostly use to check for jobs on the internet and Facebook, and for communication especially with people that stay far from me through WhatsApp calls or video’s.” P7

“I use it to chat with people, to do my schoolwork to join my online classes.” P8

Social Networking

Likewise, five of the participants demonstrated active involvement in social networking via their smartphones. P1 mentioned using social media platforms to stay updated on the news and engage in social interactions. P2 shared that they use social media platforms like Twitter, Facebook, Instagram, and YouTube. P4 utilises social media platforms such as WhatsApp, Facebook, and TikTok. P5 further incorporated the smartphone into social networking, including job applications, while P6 primarily uses Facebook, WhatsApp, TikTok, and the internet for various social purposes.

“I get updated with what's happening around the world via social media like Twitter Facebook, Instagram, or even on YouTube.” P2

“I usually use my cellphone to make phone calls, access WhatsApp , Facebook, TikTok that's all.” P4

“I use my smartphone for social networks. I also use it to apply for jobs.” P5

“I hardly make calls; I mostly use Facebook and WhatsApp. I also use the internet via chrome to search for jobs, plus TikTok.” P6

Job Searches

The extracts have also reported that the smartphone is crucial in participants' job search activities. From the interview extracts of P3, P5, P6 and P7 it can be depicted that they rely on their smartphones for job applications and browsing the internet for job-related activities. They stated that:

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"I also use it when I go to work websites, to complete assessments and apply for work." P3

"I also use it to apply for jobs, use it for applications." P5

"To search for jobs, to learn new tips for interviews, to update my CV and for self-improvement as well." P6

"Okay, I use the internet to access Facebook to check and search for job opportunities, there's a lot of groups that post available vacancies from different companies. I can also apply for jobs online using the internet." P7

These findings have informed that the usage of smartphones is also necessary for bridging the knowledge and education gap in the underserved communities.

Staying Updated on News and Entertainment

Moreover, participants also shared their usage of smartphones to stay informed and entertained. P1 stays updated with news and social interactions through social media. P2 relies on various social media platforms to stay informed about global news. P5 uses the smartphone to stay updated on news and entertainment. P7 depends on the internet for job searches and staying informed through platforms like TikTok and YouTube. P8 stays updated on news and entertainment while engaging in various activities on the smartphone.

"So I use it for work. And most of the time, it could be social media, because that's where everybody is and that's where the news are." P1

"If I want to read news or see what's happening, I go to Twitter or LinkedIn, and News 24." P2

"I also use it to stay updated about the news in our country and everywhere else in the world. The internet helps me to keep updated and know what's happening around the world." P5

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> *"Okay, I use the internet to access Facebook to check and search for job opportunities, there's a lot of groups that post available vacancies from different companies. I can also apply for jobs online using the internet. I also use WhatsApp a lot as most people now prefer using it."* P7

The overall diversity in participants' activities further reflected the multifaceted role of smartphones and the internet in meeting various daily needs.

4.2.5 Benefits of Smartphone Ownership and internet Accessibility

The fifth theme extracted from the interview findings was related to the benefits of owning a smartphone and accessing internet services in the community. These findings can be discussed under two principal aspects: benefits associated with personal development, and benefits related to educational and employment opportunities.

Personal Development Benefits

Participants highlighted various personal development benefits and opportunities resulting from smartphone ownership and internet access. P1 emphasised the transformative impact, citing instances where individuals secured employment and showcased their talents through smartphones,

> *"With smartphones we've seen life changing, you get access to information, like I said, and you put yourself out there for people, to see, recognise you and how to get your services. So a lot of people have gotten employment, a lot of people have gotten gigs, we've got artists that showcase their work using their smartphones making life more accessible."* P1

Similarly, P2 shared a personal experience of winning a competition discovered through internet scrolling, from which one can depict the role of smartphones in staying updated and receiving important notifications daily.

> *"They are so many so just to make one example, while scrolling on the internet and on Facebook in fact I saw another competition then I entered*

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that competition then I won, but if I didn't have a smartphone or access to the internet to see that I wouldn't have known about this." P2

P4 mentioned them benefiting from the internet to gain more skills and learn new trends for their home-based hair business, citing that:

"Yes, bettering my braiding and plating skills and keeping up with new trends and learning new hairstyles." P4

Educational and Employment Opportunities Benefits

Regarding the educational and employment opportunities associated with using smartphones, participants highlighted the practical aspects, such as applying for work and school and completing assessments with the aid of the internet. Some also expressed regular findings of opportunities like learnerships, short courses, and jobs through smartphone and internet use. Similarly, P7 attributed current employment to smartphone and internet usage, as they saw and applied for vacancies online, leveraging WhatsApp for communication during the application process. They shared their experiences as cited below:

"We usually get links or sites where they say you can apply for work, right, then if you go there you put your application and also even when I was applying to school I used the internet and my application was approved and when I need to do assessments I used the internet and passed. Without the internet it was going to be hard." P3

"I also get more job opportunities on the internet." P5

"Where I'm currently employed it was through my phone and the internet, I saw vacancies that were posted online, I applied and was also able to communicate with someone that I knew worked there via WhatsApp for them to assist me with the application process. So I am one of the people that can say that they have benefitted from the internet or the smartphone." P7

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> *"Yes, I have benefited. I find a lot of opportunities like learnerships there, short courses and jobs."* P8

While P4 found value in enhancing braiding and plaiting skills and staying current with trends, P5 acknowledged the continuous information flow, communication with friends and family, and increased job opportunities facilitated by internet use.

On the contrary, P6 noted a digital divide, with older community members struggling to understand and use the internet effectively, indicating challenges in educational accessibility, stating that:

> *"However, we also have a lot of old people in our community (age 46 and above) and they don't know what the internet is and how they can use it, most of them use these small phones (2G devices)."* P6

These findings imply that participants use smartphones and internet connectivity for personal and professional development to enhance their careers and growth. Both public and private stakeholders must consider these multidimensional benefits of smartphone ownership and internet accessibility to address the challenges and barriers these young Black people encounter, thereby highlighting a need to resolve the factors contributing to the digital divide among them.

4.2.6 The impact of smartphones and the internet on individuals' lives

Under this theme, through the interviews, we explored the impact of smartphones and the internet on participants' daily lives. The participants discussed positive and challenging aspects, revealing insights into social connectivity, education, economic opportunities, social engagement, coping strategies, family connections, and more.

Social and Family Connections

Social connectivity emerged as the primary impact observed by participants, with two out of eight emphasising the positive influence of smartphones and the internet on their social connections. P1 highlighted the global connectivity, emotional support, and exposure to opportunities facilitated by smartphones. Similarly, P5

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appreciated the convenience of communication, citing the effectiveness of video calls and group platforms in fostering interactions without needing a physical presence.

Moreover, participants highlighted the impact of smartphones on social connections, mainly through various social media platforms. They described how smartphones enable engagement with fans, the sharing of music, promotion of events, and creative self-expression. Furthermore, participants shared personal stories highlighting smartphones' versatile role in fostering family connections and supporting educational pursuits. This comprehensive exploration reveals a cohesive theme centred around the profound influence of smartphones on diverse aspects of social connectivity.

> *"I mean, you may be depressed here and be counselled by a person in Cape Town and they make you feel better you know. It does expose people to different people that could help them also economically."* P1

> *"It has impacted my social connections very good because nowadays you don't have to go far to talk to someone, you can just call them maybe via WhatsApp video call, you can call them using a phone call maybe. So it's very much helping."* P5

Economic Prospects and Opportunities

In this aspect, participants highlighted the effects of smartphones and the internet concerning economic prospects and opportunities. P1 shared examples of individuals securing employment and earning income through exposure on platforms like TikTok. P4 and P7 also attributed their current employment and improved life to smartphone and internet usage. Similarly, P8 emphasised the convenience of smartphones, enabling tasks like submitting assignments, registering for courses, and purchasing items from the comfort of one's home.

P4 and P5's responses also highlighted the economic effects of smartphones and the internet for social connections. They have highlighted using devices to attract clients through online platforms like Facebook, expanding customer reach, and

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utilising social media for advertising work. Participants highlighted how smartphones have enabled them and others to create job opportunities, showcase talents, and earn a living. These findings have substantiated the use of smartphones' economic impact and employment opportunities.

> *"I'm able to share my posters everything, and my gig guide through social media and helps to get insights on how people are feeling about my music, how people are feeling about me, Yeah …"* P2

Access to Information and Education

Participants discussed the importance of internet access for acquiring information for personal and academic use, learning new skills, and acting as a personal development and well-being tool. Participants shared stories about using smartphones for family connections and educational purposes. From the interviews, the participants also shared insights on the high dependency on the internet and smartphones for access to information.

> *"For WhatsApp to communicate with friends, Facebook and Tik Tok I learn how to braid and learn new hair trends"* P4

> *" I also use it to apply for jobs use it for applications and I also use it to stay updated about the news in our country and everywhere else in the world. The internet helps me to keep updated and know what's happening around the world."* P5

> *"To search for jobs, to learn new tips for interviews, to update my CV and for self-improvement as well."* P6

> *"Okay, I use the internet to access Facebook to check and search for job opportunities, there's a lot of groups that post available vacancies from different companies. I can also apply for jobs online using the internet." P7*

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4.3 Linking Themes and Research Questions

For ease of reference, the table below presents a condensed overview of the research objectives, research propositions, and research themes.

Table 4.1: Overview of research objectives, research questions and research themes

Research Questions	Research Themes
Research Questions 1 and 2	Theme 1: Experience with accessibility Theme 2: Challenges encountered in accessing and utilising smartphones and the internet Theme 3: Role of Government and network service providers in enabling accessibility
Research Questions 1 and 3	Theme 4: Primary usage of smartphones and the internet in daily life Theme 5: Benefits of smartphone ownership and internet accessibility Theme 6: The impact of smartphones and the internet on individuals' lives

4.4 Conclusion

The overall thematic analysis highlighted the digital divide amongst the young Black community in the chosen districts of Mpumalanga due to prevailing barriers affecting the accessibility of smartphones and internet services in these districts. There was a general agreement among the participants in line with research questions, that the level of digital access and usage in underserved communities influence their ability

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to build social and economic capital. The participants, with ease and convenience in accessibility to these devices, are in a better position to use them for diverse activities spanning work, social networking, job searches, and information consumption.

However, those affected adversely by the pricing and availability of smartphones are the prominent participants in the first and second levels of the digital divide in underserved communities were also highlighted. The people living in rural areas are experiencing proximity issues, and they want to buy smartphones or purchase data bundles due to the lack of infrastructure and economic opportunities in their areas, even if they can afford them. The underserved people can leverage the benefits of these technologies, ranging from job creation, music careers, coping mechanisms, business expansion, family connections, emotional well-being, and global awareness.

Finally, the thematic analysis has stressed the role of government and service providers in addressing barriers such as high data costs, with a focus on how technology may affect the quality of life via limited social interactions.

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CHAPTER 5: DISCUSSION OF THE FINDINGS

5.1 Introduction

In this section of the report, we critically discuss similarities and differences in the findings of different participants, as presented in the previous chapter. Stemming from the thematic analysis, emerging themes were uncovered and outlined by the research questions. The research questions sought to unravel the complex relationship between internet and smartphone accessibility, perceived benefits, and how they contribute to the digital, social, and economic disparities in the underserved communities of rural Mpumalanga.

For ease of reference, the research questions and the emergent themes are repeated, as follows:

5.1.1 Research questions

1. How does the pricing and availability of smartphones drive the digital divide in underserved communities?
2. What are the perceived benefits associated with smartphone access and usage in underserved communities?
3. How do the perceived benefits of smartphone accessibility and use contribute to digital inclusion, social equity, and economic empowerment in underserved communities?

5.1.2 Emerged themes

- Experience with accessibility.
- Challenges encountered in accessing and utilising smartphones and the internet.
- Role of government and network service providers in enabling accessibility.
- Primary usage of smartphones and the internet in daily life.
- Benefits of smartphone ownership and internet accessibility.

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- The impact of smartphones and the internet on individuals' lives.

5.2 Theme 1: Experience with Accessibility

Individuals experience ‘accessibility’ as the first level of the digital divide, which refers to the physical and financial ability to connect to the internet and use information and communication technologies (Van Dijk, 2005). Under this theme, two main categories highlighted the differences between the primary data findings and the literature review findings. These were related to (1) accessibility concerned with just access to technology physically and financially, and (2) accessibility concerned with skills and knowledge required to access and use technologies and digital tools. The views of the primary data on young Black people in the two districts of Mpumalanga differed from the opinions of literature review researchers and experts to a certain extent.

5.2.1 Physical and financial accessibility

The participants highlighted several physical and financial aspects concerned with accessibility to smartphone devices and the internet. According to them, accessibility refers to when individuals have access to smartphones, internet networks, wireless routers, finance to purchase the right phone, free-of-cost abundance of internet in community libraries, the presence of nearby internet cafes, and limited disparities to data-intensive platforms like TikTok. Similarly, the literature also pointed out the importance of infrastructure and physical and financial resources for bridging the gap between the digital divide among different people. According to Graves et al. (2021), the "digital divide" has been associated with obstacles in the built environment, such as limited access to broadband and other social determinants.

However, the research studies also emphasised the correlation between socio-economic factors and physical accessibility to technologies. According to them, factors like income levels, age, level of education, and socio-economic status also contribute significantly to inequalities that drive accessibility to digital tools (Lutz,

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2019; Van Dijk, 2017). These literature findings were also aligned with the participants' demographic profiles, indicating that out of eight young Black people, most were undergraduates, i.e. currently either in matric, Grade 11, N3, or N6, indicating high school or colleges. None specified their educational category as N7 or above university level. Similarly, four participants reported being unemployed, and two confirmed temporarily employed categories. Thus, the research findings are compatible with the literature on the role of physical and financial resource availability as a catalyst for a high or low digital divide in underserved communities.

5.2.2 Importance of Digital Skills and Literacy

In contrast, none of the primary research participants discussed the importance of digital skills and competencies to increase their accessibility to smartphones and the internet. Comparing this to literature findings, there were differences in how accessibility to smartphones and the internet was considered. Besides considering the physical and financial aspects of accessibility, the literature also highlighted the interconnectivity between the skills and knowledge required to use technologies and digital tools and devices (Bornman, 2016). Acquisition of digital skills and literacy was identified as essential for participation in the digital world, which forms the core of accessibility among individuals. The literature did acknowledge that despite individuals having access to physical and financial resources for purchasing digital tools, the absence of digital skills and literacy makes them disadvantaged in various facets of their lives (Correa et al., 2020; Lembani et al., 2020; Ogbo et al., 2021).

The findings from the literature could be extended for the discussion on the role of education and employment, specifically in enhancing the opportunities to acquire digital skills and literacy among people in underserved communities, thereby enhancing their accessibility to digital tools in all aspects, not limited to physical and financial ones. Enhancing one's digital abilities and literacy could result in a high level of education and qualification, increasing the likelihood of securing a permanent job and improving one's financial capacity to acquire and utilise smartphones and data packages according to one's requirements and preferences.

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5.3 Theme 2: Challenges Encountered in Accessing and Utilising Smartphones and the Internet

Accessibility and utilisation of smartphones and the internet are mainly obstructed by the presence of barriers and challenges encountered by people in underserved communities. The participants and researchers in the literature have substantiated similar views on this theme, as aligned under the RAT (Van Dijk, 2017). Only three of the four categories are discussed under this theme, having met the criteria due to extensive agreement between literature experts and participants.

5.3.1 Categorical inequalities

Participants were vocal about the prevailing unemployment and economic challenges faced by the people in underserved communities. They mentioned how the unemployment prevailing among the youth in their districts limited their access to and use of smartphones. The literature has also reported that the lack of economic capacity and job opportunities affects the accessibility to smartphones and internet services among the broader population in sub-Saharan Africa (Fuchs & Horak, 2008). It further added that economic disparities, unemployment, and high cost of living impact significantly on the affordability of smartphones and the internet, emerging as a pervasive barrier to accessibility to digital tools (Ogbo et al., 2021). Similarly, Lembani et al. (2020) argue that issues such as education, income, and economic disparities between urban and rural regions impede the complete integration of ICTs. A lack of electricity due to load shedding and prolonged power outages in the underserved areas was also identified as another factor by the participants, contributing to categorical inequalities shaping the lack of accessibility in using smartphones and the internet in these areas.

5.3.2 Characteristics of digital technologies

Research has alluded that most developing countries cannot provide all citizens with the same level of access to digital technologies, thus depriving them of meaningful opportunities to use digital technology and computer networks (Freiman et al.,

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2018). Likewise, both the participants and the literature mention the unaffordable cost of smartphones and the internet due to financial constraints, limiting the choice of phones for people in their communities. The high costs of smartphones and data are attributed as the significant barriers challenging accessibility and usage. The same point was contended by Holden and Tilahun (2021), stating that by reducing access costs and broadening opportunities, digital tools such as smartphones and the internet are indispensable for empowering marginalised groups, including women in underserved communities.

However, the literature added another characteristic of the digital divide, i.e. using smartphones and the internet requires various skills and knowledge to use these digital technologies effectively. These included basic computer skills, information literacy, communication skills, collaboration skills, and problem-solving skills (Tewathia et al., 2020; Van Deursen & Helsper, 2015; Van Dijk, 2017). Due to such characteristics, only some individuals with access to digital tools can use them effectively without any challenge or barrier affecting their usage.

5.3.3 Unequal access to digital technologies

The urban-rural divide was also identified as one of the factors preserving unequal access to digital technologies, i.e. the digital divide due to barriers posed by geographic isolation (Hindman, 2000). Participants were also equally vocal about the proximity and distance problems in rural areas, as even if they could afford high-cost smartphones due to limited local availability, they must travel long distances to town. While smartphones have been promoted as a cheaper means to access the internet compared to laptops or computers, studies have shown that internet usage through computers allows for more diverse uses such as work activities, information-seeking, and content creation (Correa et al., 2020). As a result, this perpetuates digital inequality.

The participants of the study also brought to light the issue of unstable internet services, which was attributed to a lack of network coverage and insufficient network towers, stating that this issue was particularly prevalent in rural areas as opposed

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to urban areas, where network coverage and internet access seemed to be more stable and reliable. Similarly, literature has also reported a need to make the internet a more inclusive and equitable space for everyone, especially for those in underserved communities (Giebel, 2013), to eliminate inequitable accessibility to these digital tools.

During the discussion on this topic, it was noted that certain communities which are underserved, face obstacles that prevent them from accessing and using smartphones and the internet. These barriers are often linked to economic challenges and the need for digital skills. Additionally, the findings highlighted the urban-rural gap as a significant factor in creating unequal access to digital tools.

5.4 Theme 3: Role of Government and Network Service Providers in Enabling Accessibility

The role of both government and NSPs emerged as pivotal in enabling accessibility for individuals in underserved communities. Literature and participant perspectives highlighted the significance of public-private partnerships in this context. The participants emphasised the importance of government initiatives and infrastructure development in fostering digital accessibility. From providing reliable electricity to establishing telecommunication networks, government interventions were instrumental in bridging the digital divide in rural areas. Similarly, NSPs were crucial in expanding connectivity and improving access to digital technologies.

5.4.1 Public -private partnerships

The one recurring theme that emerged from literature review and participant discussions was the emphasis on public-private partnerships. These collaborative ventures between government entities and private sector stakeholders were essential for addressing the unique challenges that underserved communities face. By merging resources and expertise, public-private partnerships have the potential to drive innovation and expand infrastructure.

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Public and private partnerships collectively help individuals to reduce the digital gap and social isolation, specifically among the people at lower levels of the economic pyramid (Baishya & Samalia, 2020). In this regard, the third theme from the interviews in Chapter 4 highlighted the importance of government and NSPs in facilitating access to smartphones and the internet. Young Black participants stressed the need for government intervention to improve affordability, suggesting strategies like subsidising data costs and providing free or limited-access internet in public places. They also emphasised collaboration between the government and service providers to address infrastructure and economic barriers, advocating for reduced data prices and job creation. Additionally, participants proposed models such as government-funded internet installations and communal access points to enhance accessibility for all community members. There was a strong call for stakeholder collaboration to achieve comprehensive digital inclusion.

A potential gap was identified in comparing these findings to the literature reviewed in Chapter 2. Literature did report the role of government and network providers in enabling accessibility generally by acknowledging the efforts underway in Africa to bridge the digital divide through collaboration between governments and the private sector. However, it did not specifically suggest ways to bridge barriers in underserved communities. The Digital Transformation Strategy emphasised updating education curricula to include digital skills for students and educators. At the same time, there was a discussion on how, in South Africa, significant progress has been made in network coverage, with 100% coverage for 3G, 98% for 4G/LTE, and 20% for 5G (ICASA, 2023; UNESCO, 2020).

The collaboration between government and NSPs is pivotal in advancing digital inclusion for underserved communities. Public-private partnerships offer a promising avenue for bridging the digital divide, through strategies like subsidising data costs and updating educational curricula. Such collaborations pave the way for sustainable solutions and meaningful societal impact.

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5.5 Theme 4: Primary Usage of Smartphones and the Internet in Daily Life

The differences in the primary usage of smartphones and the internet in the daily lives of individuals in underserved communities are shaped by the disparities they face (Correa et al., 2020). Within this theme, two categories were identified as meeting at least one of these criteria: skills, motivation and opportunities (Tewathia et al., 2020).

5.5.1 Digital skills

Participants in the interviews highlighted four main activities for which they primarily use the internet and smartphones, such as communication, social networking, job searches, and staying updated on news and entertainment. Participants did confirm that the use of smartphones and the internet was helpful for them in increasing their accessibility to job facilities, applying for positions and expanding their businesses. Comparing this to the literature, there was a recognition of the correlation between the usage and digital skills the individuals possess. According to Tewathia et al. (2020), the higher a person has levels of digital skills and literacy, the more likely their interaction and participation in the digital realm. Furthermore, Freiman et al. (2018) state that education is at the heart of the internet and digital divide, which correlated with the participants' feedback about the limited educational resources and the lack of understanding of some of the terminology used on their mobile devices and the NSPs. In addition, the researcher also experienced challenges during the data collection process due to language barriers, as most participants needed more basic literacy skills. Thus, most of the interviews had to be conducted in their native languages.

The literature also reported that the use of digital technologies by individuals is dependent upon the higher and better quality of education they have acquired, guiding them to better perform in digital skills relatively and participate in society and the economy to benefit themselves as well as others (Fuchs & Horak, 2008; Lembani et al., 2020). Participants also observed that smartphones were

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instrumental for individuals in creating jobs, specifically for artists and individuals showcasing their talents online via digital marketing and communications.

5.5.2 Motivation

Another category under the usage theme showed a correlation between motivation, self-efficacy, and usage of digital technologies (Ogbo et al., 2021). However, primary research participants did not discuss this category prominently in the responses, yet their primary usage of the internet and smartphones for educational courses search, job search, and staying updated were congruent with the literature findings, where in literature it has been supported that individuals can be driven by diverse motivations, including a thirst for knowledge, the need for social connection, and aspirations for personal and professional growth through education and enhanced employment opportunities (Ogbo et al., 2021).

5.5.3 Opportunities

Similarly, in the third category, both the participants and the literature substantiated the use of the internet and smartphones to leverage the opportunity provided in accessing information online, communicating with others, maintaining social networks, learning new things, searching for job opportunities, and completing the tasks (Ogbo et al., 2021).

The three categories under this theme have highlighted the conclusive findings indicating that both public and private stakeholders should work on increasing motivation and self-efficacy, bridging the opportunities gap, and helping with skills deficiency to improve the primary usage of smartphones and internet services among individuals in the underserved community. Otherwise, even with the accessibility of technologies, these individuals would be unable to utilise these for economic and individual prospects necessary for overcoming the current digital divide.

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5.6 Theme 5: Benefits of Smartphone Ownership and Internet Accessibility

The third level of the digital divide is related to the benefits of using digital technologies for people in underserved communities (Van Deursen & Helsper, 2015). Both the expert researchers in literature and participants confirmed the benefits of the internet to be expanded for discussion and equal accessibility to critical information and resources.

5.6.1 Equal accessibility to critical information and resources for equal benefits

Participants shared their experiences of benefits associated with using smartphones and internet services in terms of personal development benefits and educational and employment opportunities benefits. In conjunction with the primary findings, the participants confirmed that the benefits associated with digital technologies can only be experienced when, despite notable digital inclusion, there is equal accessibility to critical information and resources needed for differential internet use (Tewathia et al., 2020). The literature also recognises the complex challenges that individuals face due to a lack of access to critical information and resources, creating barriers to their integration into the information society. The literature did substantiate that to leverage the benefits of technologies for positive social and economic consequences, there must be support and opportunities for integration for people from all socio-economic backgrounds (Bornman, 2016). Equal support and opportunities for integration will ultimately bridge the gap between differential internet use and the various repercussions creating the digital divide among people (Tewathia et al., 2020).

The theme concluded that for both the personal and professional benefits, ensuring equal accessibility to critical information and resources, physical, financial and skills, are paramount for leveraging the benefits of digital technologies for positive social and economic outcomes, as supported by both expert literature and participant testimonies.

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Equal accessibility to critical information and resources means that individuals in underserved communities should have the same opportunities as those in more affluent and urban areas to access and utilise digital technologies effectively, including not only physical access to devices and internet connectivity, but also financial access to afford these resources and skills access to develop the necessary digital literacy and competencies. By addressing these three dimensions of accessibility, underserved communities could reap both personal and professional benefits from digital technologies.

On a personal level, equal access will enable them to stay informed, connected, and engaged with their communities, fostering social inclusion and a sense of belonging. Moreover, access to educational resources and online learning opportunities could empower individuals to pursue personal growth and skills development, enhancing their overall quality of life. From a professional perspective, equal access to digital technologies would open up many opportunities for economic advancement. Individuals could use the internet and smartphones for job searches, online entrepreneurship, and skill-building to enhance their employability and entrepreneurial ventures. The individuals would benefit by increasing their earning potential and financial stability and contribute to the overall economic development of underserved communities.

Literature and participant testimonies underline the transformative potential of bridging the digital divide. By ensuring equal accessibility to critical information and resources, underserved communities could harness the full potential of digital technologies to address socioeconomic disparities, foster inclusive growth, and build more resilient and thriving communities. Thus, efforts to promote digital inclusion must prioritise initiatives that address barriers to accessibility and empower individuals with the tools and skills needed to navigate and thrive in the digital age.

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5.7 Theme 6: The Impact of Smartphones and the Internet on Individuals' Lives

This last theme was related to the impact of smartphones and the internet on people's lives. The literature and participants highlighted the gaps in access, usage, and benefits that emphasised the unequal distribution of technological resources and infrastructure necessary for a further extension of discussion.

5.7.1 Unequal distribution of technological resources and infrastructure leads to differential impacts

Literature has reported that unequal distribution of technological resources and infrastructure can substantially impact on individuals' access to connectivity, information, and participation in the digital sphere (Lythreatis et al., 2022). Similar impacts were highlighted by the participants in terms of social connectivity, education, economic opportunities, social engagement, coping strategies, family connections, and more, reflecting how unequal distribution of resources affects the participants' differential impacts. Earlier research has also indicated that smartphones could enhance communication, foster network development, and provide social support, consequently boosting social capital and reinforcing community resilience (Arceneaux, 2005; Dixon et al., 2014; Tsetsi & Rains, 2017). However, there is a need to view global usage and access disparity dimensions to assess the quality of these impacts for individuals (Anrijs et al., 2023).

The conclusive findings of the theme underline the importance of considering not only the initial level of the digital divide, which pertains to access to digital technologies in underserved communities, but also the subsequent levels related to usage and impacts. While access to technology is a crucial starting point, it is insufficient to address the complex socio-economic challenges that underserved communities face.

By examining usage patterns and the impacts of technology adoption, the researcher gained a deeper understanding of how individuals within underserved

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communities interact with digital tools and how these tools contribute to positive socio-economic outcomes. This nuanced perspective revealed that more than merely providing access to technology is needed to guarantee its effective utilisation or realise its potential benefits. Moreover, the findings suggest that the disparities observed in technology access often indicate broader societal inequalities, including disparities in education, income, and infrastructure. These underlying factors can exacerbate digital divides by limiting individuals' ability to fully acquire the necessary skills and resources to engage with digital technologies.

Therefore, efforts to bridge the digital divide must extend beyond addressing access issues to encompass strategies that promote meaningful usage and maximise the positive impacts of technology adoption. This requires targeted interventions to improve digital literacy, foster digital skills development, and create opportunities for socio-economic empowerment through technology. Addressing the digital divide in underserved communities requires a comprehensive and multidimensional approach considering access, usage, and impacts within the broader context of socio-economic inequalities. Digital inclusion can only truly be enhanced and digital inequality reduced by bridging the gap between these three levels, paving the way for more equitable and inclusive societies.

5.8 Summary of the Conclusive Findings across all Themes

The conclusive findings across all themes offer a rich tapestry of insights into the digital landscape as experienced by young Black participants, contextualised within the broader discourse of existing literature. Firstly, the alignment between research findings and established literature emphasises the enduring challenges surrounding physical and financial accessibility to digital technologies. This convergence emphasises the persistent barriers that underserved communities face in obtaining and affording the necessary tools for digital engagement. Additionally, recognising the importance of public-private partnerships reflects a growing consensus on the collaborative efforts needed to bridge the digital divide effectively. Such partnerships could leverage resources and expertise from both sectors to address systemic inequalities and promote digital inclusion.

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Secondly, the divergence from existing literature emphasising the significance of digital skills and literacy and motivation highlights nuanced perspectives that may have needed to be noticed or were understated in previous studies. The emphasis on these factors underscores their pivotal role in shaping individuals' ability and willingness to engage meaningfully with digital technologies. By recognising the importance of digital skills and motivation, interventions can be tailored to address these specific needs, enhancing digital empowerment and agency among young Black participants.

Thirdly, extending the literature across various categories deepens our understanding of the multifaceted nature of the digital divide. The identification of categorical inequalities highlights the intersectionality of factors such as race, gender, and socio-economic status, which compound disparities in digital access and usage. Moreover, the delineation of digital technologies' characteristics sheds light on digital tools' diverse functionalities and affordances, which may impact on their accessibility and usability among different demographic groups.

Furthermore, the acknowledgment of unequal access to digital technologies underscores the unequal distribution of resources and infrastructure, further perpetuating disparities in digital inclusion. By elucidating these dynamics, interventions could be targeted toward addressing structural barriers and promoting equitable access to digital resources and opportunities. Finally, the imperative of equal accessibility to critical information and resources for equitable benefits highlights the ethical and social dimensions of digital inclusion. Interventions could foster more significant equity and social cohesion by ensuring that all individuals have access to the information and resources necessary for meaningful participation in the digital age.

The synthesis of research findings and literature highlights the complex and interconnected nature of the digital divide. By addressing issues of accessibility, skills development, and motivation in a holistic and nuanced manner, stakeholders can work towards creating more inclusive digital ecosystems that empower young Black individuals to thrive in an increasingly digital world.

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CHAPTER 6: CONCLUSIONS AND RECOMMENDATIONS

6.1 Conclusions

This section consolidates the diverse components of the research, shaping the final conceptual model and providing insights into addressing the three main research questions.

6.1.1 Conclusion pertaining to RQ1

The first research question of the study was drafted to inquire about the role of pricing and availability of smartphones in driving the digital divide in underserved communities. The study results emphasised the crucial role played by the cost and accessibility of smartphones in perpetuating the digital divide within underserved communities and concluded that there is correlation between pricing and accessibility of smartphones and the digital divide.

Most people cannot afford the price of smartphones, affecting their accessibility and usage of these technological devices. In the study, accessibility was identified as the first and foremost important level of the digital divide. Access to education and employment in enhancing digital skills and literacy among underserved populations is indispensable, improving overall accessibility to digital tools beyond physical and financial aspects. In this regard, literature has indicated that the cost of access is prohibitive for the societies of marginalised people based on their socio-demographic factors. Amidst the high cost of access, South Africa's population also continues to experience a brain drain of high-calibre skills associated with technologies and tools.

About the pricing of smartphones and high-cost internet services not being affordable for most people in underserved communities, the study stressed the effects of economic challenges like high unemployment and the expensive cost of smartphones and internet services as significant barriers to access and use by the underserved communities. Additionally, the issue of load shedding worsens the

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situation in these communities. The current study critically highlighted the role of the gap between urban and rural areas in accelerating the effects of prices, as rural communities are facing extra difficulties due to distance and lack of internet access. While many travel to other areas for access and use, many of the underserved people cannot access even high-cost devices and services by travelling to urban areas.

In addition to pricing, the availability of the internet is also a significant contributor to the current digital divide in the country. The primary research participants have also concluded that factors affecting the population's reliability on the internet connection affect the availability of the internet for them. The study reported on a range of factors such as load shedding, bad internet connectivity, network outages, vandalism, adverse weather conditions, geographical challenges, and their experience and perception of digital equality. Literature has confirmed that skilled and talented individuals prefer to move to other areas due to the lack of opportunities to utilise these digital technologies in their home areas. The research findings have suggested that affordability and availability are both needed to enhance accessibility to digital tools and to bridge the digital divide. The study has suggested that specific initiatives can help promote education and employment opportunities to bridge the digital divide effectively.

At present, there is the highest inequality rating within the underserved communities of Africa across the globe. Therefore, there is a need for differential development policies for infrastructure barriers to address inequality barriers, specifically in non-urban areas, in terms of pricing and availability. Therefore, the study has highlighted that addressing these issues requires efforts to reduce economic barriers, specifically the pricing of devices and affordability, improving digital literacy, and bridging the urban-rural gap for fair access to digital tools.

6.1.2 Conclusion pertaining to RQ2

The study findings shed light on the perceived benefits associated with smartphone access and usage in underserved communities. Participants extensively utilised

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smartphones for various purposes, including communication, social networking, job searches, and staying updated with current events. In underserved communities, smartphone and internet use vary based on digital skills and opportunities disparities. So, there were differences in the benefits of digital devices and technologies for people. Participants shared that they primarily use these technologies for communication, social networking, job searches, and staying updated, emphasising their role in job opportunities and business expansion. These findings reaffirm that higher digital literacy enhances usage and participation in society and the economy. The study concluded that there are visible opportunities provided by internet access and smartphones, such as accessing information, learning, and job searching for people in underserved black communities. However, digital skills were reported as a driving force for digital engagement, including knowledge acquisition and professional growth.

However, these benefits can be extended via motivation, recognised as a critical factor for promoting extensive primary usage of digital technologies among underserved communities. On the contrary, the study reported the presence of motivational barriers preventing underserved people from engaging in digital technologies. This suggests that benefits are based on users' perceptions. There are non-users of technology in underserved communities who perceive that technology is not for them, and there are also ones who perceive that they lack needed support for its adoption and use. Some are also not using it as they perceive it as too complicated besides others who find it unaffordable.

The research concluded that equal access to critical information and resources for underserved communities is indispensable to benefit from digital technologies fully. The study's literature researchers and participants have emphasised the positive impact of smartphones and the internet on personal development, education, and employment opportunities. However, they highlight that these benefits can only be realised when there is equitable access to necessary resources. Addressing this issue requires providing support and opportunities for integration across all socioeconomic backgrounds. By ensuring equal access to information and

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resources, we can bridge the gap in internet usage and its associated benefits, ultimately fostering greater inclusivity and equality in the digital realm.

6.1.3 Conclusion pertaining to RQ3

The research findings underlined the critical role of smartphone accessibility in contributing to digital inclusion, social equity, and economic empowerment within underserved communities. The research concluded that the critical role of unequal distribution of technological resources and infrastructure leads to differential impacts and perceived benefits of these smartphones and internet services for the people in the underserved areas of Mpumalanga, South Africa. Some people use smartphones and internet services for social connectivity, social engagement, and family connections only, perhaps due to a lack of digital skills or factors deficiency. In contrast, others have sufficient digital skills and factors that use them for education and economic opportunities. The need is to identify the factors shaping these differential impacts of technologies for the participants. This has suggested that the factors behind the differential impacts affect perceived benefits and digital inclusion for everyone, such as legal policies, individual capabilities, human resources for technology dispersion, localisation, technology characteristics, and collaboration and integration among the industries.

Exclusive reliance on mobile devices and their accessibility does not always result in a comprehensive digital inclusion process, as it tends to correlate with lower skill levels and a narrower range of internet activities compared to individuals who also utilise computers. In this regard, the research has concluded that without closing the divide between the three levels of digital disparity, such as access, use, and benefits, underserved communities will struggle to improve the socio-demographic factors necessary for bridging the digital divide. Bridging this gap is essential for enhancing digital inclusion, reducing digital inequality, and fostering socio-economic development. Hence, the overall study has answered the research questions by indicating that the role of smartphones is critical in promoting digital inclusion and enhancing the quality of life, as is seen from the extent to which underserved people have started improving their lives. However, the study has summarised differences

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in the perceived benefits and impacts of smartphone usage and access, calling for much effort from the public and private sectors to improve digital inclusion, social equity, and economic empowerment in underserved communities.

The research highlighted that public-private partnerships are essential in addressing the identified physical, financial, and skills gap affecting access and usage of digital tools. This has informed the critical role of policy shifts in bridging the digital divide. Government investments, contributions from technology and telecommunications industry stakeholders, and support from development partners have facilitated the acquisition of mobile technology infrastructure in African nations, thereby narrowing the coverage gap. The current study's findings have suggested that these stakeholders must address the two types of connectivity gaps: a coverage gap and a usage gap. The policy needs to address the factors affecting access and usage of technologies for the people living in an area uncovered by mobile broadband and the factors affecting access and usage of technologies for those living in an area with internet coverage. However, they are not using it for specific reasons, including their socio-demographics.

Hence, the conclusions on the three main research questions above have established that a range of barriers need to be considered by public and private stakeholders for bridging the digital divide as per the categorisation of the barriers given by the Resources and Appropriation Theory. This is the time the stakeholders should collaboratively work towards reducing the main barriers to digital inclusion in Mpumalanga, categorised into categorical inequalities, characteristics of digital technologies, and unequal access to digital technologies instead of relying on the traditional categorisation considered by most researchers, such as physical barriers and financial barriers.

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6.2 Research Implications

The current research findings have significant implications for public and private stakeholder groups and people in underserved communities. The study has informed that the persistence of socio-demographic challenges and digital exclusion in underserved communities generates the urgent need for action by both government and service providers. Without interventions, these communities will continue to face barriers to accessing education, health care, and employment opportunities, further prolonging cycles of poverty and marginalisation.

Government initiatives are essential to improve digital infrastructure, with investments directed towards expanding internet coverage and providing subsidised or free access to low-income households. Additionally, comprehensive digital literacy training programmes must be implemented to empower residents with skills needed to navigate the digital landscape effectively.

The study findings have also implied the role of the collaboration between government and service providers as paramount in addressing the digital divide. Service providers should be incentivised to offer affordable and accessible digital services, while government policies could encourage the development of digital skills and entrepreneurship opportunities in underserved areas. Additionally, community-led initiatives also play a crucial role, requiring support from both government and service providers to foster digital inclusion at the grassroots level. Moreover, regular assessments of digital inclusion efforts are necessary to ensure their effectiveness and adapt strategies to address emerging challenges. Considering the recommendations given, it should be noted that by working together, government and service providers could bridge the digital gap and create more equitable opportunities for all members of society.

6.3 Research Limitations

Three research limitations for the study have been identified, as stipulated below:

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- The research focused on the rural area of Mpumalanga, South Africa, a community of underserved people in the country. The exclusion of the affluent communities and other age groups did limit a deeper understanding of the study.
- The research sample was also limited to eight participants, young Black people. It excluded the affluent community in Mpumalanga and people from other age groups.
- Due to the expansiveness of the digital divide topic, the study was only limited to levels of the digital divide in Van Dijk's (2005) selected theoretical framework.

6.4 Suggestions for Further Research

Based on the identified limitations, future research investigations should aim to address the digital divide comprehensively by focusing on a more diverse population group, including individuals from rural communities. By examining urban and rural populations, researchers could better understand the nuanced differences in digital access, skills, and usage between these two settings, thus providing a more comprehensive picture of the digital divide.

Additionally, while the research utilised a qualitative approach and involved interviews with a sample size of eight individuals, future research efforts should aim to overcome these limitations. Conducting quantitative surveys with a larger and more representative sample size would allow for a more rigorous examination of digital disparities. It is also vital to ensure that research includes perspectives from both underserved and advantaged populations to capture the full spectrum of experiences and perceptions regarding digital access and usage.

Furthermore, future research could explore additional factors contributing to the digital divide, such as socio-economic status, educational attainment, and geographical location. By examining these intersecting factors, researchers could gain deeper insights into digital inequality's complex dynamics and develop more targeted interventions to address these disparities.

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In summary, future research efforts should strive for inclusivity, rigour, and depth in exploring the digital divide across diverse populations and contexts. By employing a combination of qualitative and quantitative methodologies and considering a wide range of factors, researchers can contribute to a more nuanced understanding of digital inequality and inform evidence-based strategies for promoting digital inclusion and equity.

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Appendix A: Interview guide and Participant's demographics

Interview Guide

Topic: ***Exploring the digital divide in underserved communities in rural Mpumalanga, South Africa.***

1. DEMOGRAPHIC INFORMATION	
Please specify your age	
Please specify your gender	
What is your highest level of education?	
Employment status	
Do you have a smartphone?	
Do you have internet access?	
How do you access the internet? Mobile, fibre, internet café….	
2. ACCESS AND BARRIERS	
2.1 How would you describe your access to smartphones and internet services in your community? 2.2 What are the main barriers or challenges you face in accessing and utilising smartphones and the internet? 2.3 Have you encountered any issues related to the affordability or availability smartphones and internet services? If yes, please explain. 2.4 How reliable is the internet connectivity in your area? 2.5 What are specific factors that affect its reliability? 2.6 In your opinion, what could be done to improve access to smartphones and the internet in your community? 2.7 What is the role of the government and network service provider in enabling access?	

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3. USAGE PATTERNS AND BENEFITS

3.1 How do you typically use your smartphone and the internet in your daily life?
3.2 What activities or purposes do you primarily use them for?
3.3 Can you share any specific benefits or opportunities you have experienced through smartphone ownership and internet access?
3.4 How have smartphones and the internet impacted your social connections, educational opportunities, and economic prospects?
3.5 Are there any specific examples or stories you can share about how smartphones and the internet have improved your overall well-being or quality of life?
3.6 In your view, what are the most significant advantages of owning a smartphone and having access to the internet?

Participants Demographics								
Participant's Name	lease specify your ag	Gender	Highest level of education	Employment Status	Do you have a smartphone?	Operating System	Do you have internet access?	How do you access the internet? Mobile, fibre, intenet café....
P1	32	Female	Diploma - Journalism	Permanent	Yes	IOS	Yes	Mobile and router
P2	28	Male	Full time Student and Part time DJ	Part time DJ	Yes	IOS and Android	Yes	Mobile / Wifi
P3	22	Female	Higher Certificate N3	Temporary Employed	Yes	Android	Yes	Mobile
P4	22	Female	Matric	Not employed	Yes	Android	Yes	Mobile
P5	33	Female	N6 -in progress	Not employed	Yes	Android	Yes	Mobile
P6	24	Male	Matric	Not employed	Yes	Android	Yes	Mobile
P7	34	Female	Grade 11	Temporary Employed	Yes	Android	Yes	Mobile
P8	23	Female	Full time student	Not employed	Yes	Android	Yes	Mobile

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Appendix B: Research Consent Form

Title of the research project: ***Exploring the digital divide in underserved communities in rural Mpumalanga, South Africa .***

I have read the accompanying information sheet relating to the research on exploring the digital divide in underserved communities in rural Mpumalanga research interviews.

1. The purposes of this research has been explained to me and what will be required of me, and any questions I had have been answered to my satisfaction.
   Yes
   No
2. I agree to the arrangements described in the information sheet in so far as they relate to my participation.
   Yes
   No
3. I understand that my participation is entirely voluntary, that I have the right to withdraw from this project at any time, and that this will be without detriment.
   Yes
   No
4. I grant permission for my interview(s) to be audio-recorded and for the research data to be used in the process of completing the research project.
   Yes
   No
5. I have received a copy of this Consent form and the accompanying Information sheet.
   Yes
   No
6. I am aged 18 or over.
   Yes
   No

Please sign bottom of page, scan it from your phone and email: 2380455@students.wits.ac.za / WhatsApp it to / 0829974314 – within 3 working days.

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PS. A follow-up call will be made to prospective participants who have not replied within 3 working days.

Name of participant: .....

Cell number: .....

Signed: .....

Date: .....

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Appendix C: Participation Form

Dear Sir/Madam,

Topic: Exploring the digital divide in underserved communities in rural Mpumalanga, South Africa.

My name is Linda Shandukani and I am a master's student in Digital Business Master of Management at Wits University in Johannesburg. As part of my studies, I have to undertake a research project. The research topic is "**Exploring the digital divide in underserved communities in rural Mpumalanga, South Africa"**. The study seeks to investigate how the potential of smartphone adoption and usage can improve lives of people in underserved communities and bridge the digital divide.

As part of this project, I would like to invite you to participate in a research interview. If you decide to participate in this research study, interview will take around 60 minutes. The interview will take place at any location convenient for you.

During the research activity, I will need to ask some of the personal information about you, including highest qualification, your age, income grade and your employment status.

If you decide to take part in the research study, it should be because you want to volunteer, and there will be no direct benefits or compensation for participating in the research study. The collected data will be kept safe, treated with utmost confidentiality, and used for academic purposes only. The research findings on request will be shared with you.

If you have any questions during or afterwards about this research study, feel free to contact me or my supervisor on the details listed below. If you have any concerns or complaints about the ethical procedures of this research study, you are welcome to contact the University Human Research Ethics Committee (Non-Medical), telephone +27(0) 11 717 1408, email Hhrecnon-medical@wits.ac.za

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I would greatly appreciate your participation in this research study.

Yours sincerely,

Linda Shandukani

Researcher: Linda Shandukani, email 2380455@students@wits.ac.za

Supervisor: Miss Ayanda Magida, email ayanda.magida@wits.ac.za

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Appendix D: Ethics Clearance Certificate



Graduate School of Business Administration
University of the Witwatersrand, Johannesburg

Wits Business School

Wits Business School Ethics Committee
Constituted under the University Human Research Ethics Committee (Non-Medical)

Ethics Clearance Certificate

Ethics protocol number: WBS/DB2380455/722
This certificate is only valid with a legitimate ethics protocol number and signed by the Researcher (below).

Project title	Exploring the digital divide in underserved communities in rural Mpumalanga, South Africa
Investigator / Researcher	Ms Linda Shandukani
Nature of Project	MM (Digital Business)
Decision of the Committee	Approved, provided stakeholders and participants are guaranteed confidentialty.
Issue Date of Certificate	9/13/2023
Expiry date	Date of submission of the project / research report
Chairperson	Dr Pius Oba ☎ +27 11 717 3976 +27 82 733 6587 pius.oba@wits.ac.za

Declaration by Researcher

One copy must be signed by the Researcher and returned to the Chairperson of the Wits Business School Ethics Committee.

I fully understand the conditions under which I am authorized to carry out the abovementioned research and I guarantee to ensure compliance with these conditions. Should any departure to be contemplated from the research procedure as approved I undertake to resubmit the protocol to the Committee.

Signature

28/09/2023
Date:

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Appendix E: Editor's Declaration

l 'Avenir Consulting

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T/a l'Avenir Consulting
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E-mail: monicabo@lantic.net

TO WHOM IT MAY CONCERN

This serves to confirm that I have edited and proofread the research report entitled

Exploring the digital divide in underserved communities in rural Mpumalanga

prepared by Ms Linda Shandukani, submitted to the Faculty of Commerce, Law and Management, University of the Witwatersrand, in partial fulfilment of the requirements for the degree of Master of Management in the field of Digital Business, according to the specifications of the University, where available, and the latest standards for language editing and technical (computer-based) layout.

Editing was restricted to language usage and spelling, consistency, formatting and the style of referencing. No structural writing of any content was undertaken.

As an editor I am not responsible for detecting any content that may constitute plagiarism.

To the best of my knowledge, all references have been provided in the prescribed format.

I am not accountable for any changes made to this dissertation by the author or any other party after the date of my edit.

(Electronically signed – actual signature withheld for security reasons)
MONICA BOTHA
26 February 2024

Sole Proprietor: Monica Botha

Business Planning Corporate Systems Engineering Corporate Document Standards
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