



WBS Wits
Business
School

Sculpting global leaders

Digital banking penetration in underserved communities in South Africa

Ntokozo Mdluli

1966767

**A research article 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 Business Administration**

Johannesburg, 2022

Protocol number: WBS/BA1966767/356

March 2022

DECLARATION

I, Ntokozo Mdluli, declare that this research article is my own work except as indicated in the references and acknowledgements. It is submitted in partial fulfilment of the requirements for the degree of Master of Business Administration in the Graduate School of Business Administration, University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination in this or any other university.



Ntokozo Sthembela Mdluli

Signed at Johannesburg

On the 31st day of March 2022

ACKNOWLEDGEMENTS

I would like to express my heartfelt gratitude to everyone who helped make this dissertation a reality. This research project would not have been possible without the support of the following people:

- Mandisa, my wife, for the love, understanding, and support. Thank you to my children, Zelwande and Kwande, for keeping me motivated to work harder.
- To my family and friends for the never-ending support and encouragement
- I would like to acknowledge and thank my supervisor, Dr. Jacques Totowa, for making this work possible. His advice and guidance got me through the writing of my research project.
- My parents for their unconditional and endless support and providing me the encouragement to do well.
- A special thank you to my uncle, Dr Bongi Mdluli, who has always inspired and motivated me to succeed throughout my life, Thank You Sir!

Lastly, I humbly extend my thanks to all my Wits Business School colleagues who have been instrumental in this journey.

SUPPLEMENTARY INFORMATION

Nominated journal:	African Finance Journal
Supervisor:	Dr Jacques Totowa
Word count:	20795
Supplementary files:	Research questionnaire Statistical analysis Ethics documentation

ABSTRACT

Author: Ntokozo Mdluli

Supervisor Dr. Jacques Totowa

Thesis title: Digital banking penetration in underserved communities in South Africa

This purpose of this research paper is to investigate the impact that the closing of bank branches and the influence of digital banking as an alternative has on the banking population in underserved communities. For the purposes of the study, these communities are those that face barriers and challenges in gaining access to and using resources. Access to electricity, problems with broadband infrastructure or internet connectivity, employment, language, and literacy are just a few of the issues. With the rapid rate of bank branch closures globally and in South Africa, which are due to a variety of factors such as operational cost savings for banking institutions, looting unrest that resulted in property destruction, and the rate of digitalization, underserved communities are at risk of becoming financially excluded. The study sought to answer four research questions. Understanding the factors that influence underserved communities' banking activities, investigating the impact of traditional banking channel closures such as bank branches on underserved communities, determining whether the traditional banking channel closures result in financial exclusion of underserved communities, and making recommendations to banking institutions on how to lessen the impact of traditional banking channel closures. As part of the study, the researcher used a quantitative research approach, distributing a questionnaire to 179 members of underserved communities across South Africa. The key findings of the research showed that the results for two out of four hypotheses were statistically significant. We were able to show that the closure of bank branches increases the use of digital banking in underserved communities and may result in financial exclusion of people in underserved communities. In contrast to the literature review findings, we discovered that bank branches have no influence or impact on the community in underserved areas, and that issues with electricity and internet connectivity, a lack of digital literacy, and security concerns do not prevent underserved communities from using digital banking.

Keywords: Digital banking, financial exclusion, underserved communities, digital divide, digital finance, banking institutions, digital literacy

TABLE OF CONTENTS

DECLARATION	iii
ACKNOWLEDGEMENTS	iv
Supplementary information	v
Abstract	vi
Table of contents	vii
List of tables	xi
List of figures	xiii
Definition of key terms and concepts	xiv
1 INTRODUCTION TO THE RESEARCH.....	1
1.1 Purpose of Study	1
1.2 Background	1
1.3 Research problem	2
1.4 Problem Statement	2
1.5 Research Question.....	3
1.5.1 Research questions	3
1.6 Research Objectives	4
1.6.1 Research objectives	4
1.6.2 Hypotheses define for the study	4
1.7 Significance of Study	5
2 LITERATURE REVIEW.....	6
2.1 Introduction	6

2.2 Theoretical Framework	7
2.2.1 Technology Acceptance Model Theory	7
2.2.2 Stakeholder Theory.....	8
2.3 Bank Branch Closures.....	9
2.4 Digital Banking	10
2.4.1 Benefits of digital banking in underserved communities	11
2.4.2 Challenges of digital banking in underserved communities.....	12
2.5 Financial Exclusion	15
2.6 Conclusion.....	15
3 RESEARCH STRATEGY, DESIGN AND METHODOLOGY	17
3.1 Introduction	17
3.2 Research Strategy	17
3.2.1 Qualitative research methodologies.....	17
3.2.2 Quantitative research methodologies.....	18
3.3 Research Design.....	18
3.4 Research Procedure and Methods	19
3.4.1 Research data and information collection instruments(s).....	19
3.4.2 Research Target Population and Selection of Respondents.....	21
3.5 Data Analysis.....	22
3.5.1 Descriptive Statistics.....	22
3.5.2 Inferential Statistics	23
3.6 Research Strengths – Reliability and Validity Measures Applied	25
3.7 Research Weaknesses – Technical and Administrative Limitations	25

3.8 Ethical Considerations.....	25
4 DATA ANALYSIS AND PRESENTATION OF RESULTS	26
4.1 Introduction	26
4.2 Participation Rate	26
4.3 Demographical Data	26
4.3.1 The gender distribution of respondents.....	27
4.3.2 The age distribution of the respondents	27
4.3.3 Province of residence distribution of the respondents	27
4.3.4 Employment status distribution of the respondents	28
4.3.5 Monthly income distribution of the respondents	29
4.4 Descriptive Statistics	29
4.4.1 Descriptive statistics for traditional banking questions	29
4.4.2 Descriptive statistics for digital banking accessibility questions.....	32
4.4.3 Descriptive statistics for digital banking knowledge and utilization questions..	33
4.5 Hypothesis testing	37
4.5.1 Hypothesis H1.....	37
4.5.2 Hypothesis H2.....	40
4.5.3 Hypothesis H3.....	42
4.5.4 Hypothesis H4.....	46
5 DISCUSSION OF RESEARCH FINDINGS	49
5.1 Introduction	49
5.2 Research Objectives for the Study	49

5.3 Main Results from the Study	50
5.3.1 Demographical results	50
5.3.2 Analysis of research question 1	50
5.3.3 Analysis of research question 2	52
5.3.4 Analysis of research question 3	54
5.3.5 Analysis of research question 4	55
5.4 Conclusion.....	56
6 SUMMARY, CONCLUSIONS, LIMITATIONS, AND RECOMMENDATIONS	57
6.1 Introduction	57
6.2 Summary.....	57
6.3 Conclusion.....	58
6.3.1 Research Objective 1	58
6.3.2 Research Objective 2	59
6.3.3 Research Objective 3	60
6.3.4 Main Research Objective.....	60
6.4 Limitations.....	61
6.5 Recommendations	61
References	63
Appendices.....	68
Appendix 1.1: Data Collection Instrument(S).....	69
Appendix 1.2: Statistical Analysis	74
Appendix 1.3: Ethics Documentation	79

LIST OF TABLES

Table 4.1: The gender distribution of respondents	27
Table 4.2: The age distribution of respondents.....	27
Table 4.3: Province of residence distribution of respondents.....	28
Table 4.4: Employment status distribution of respondents.....	28
Table 4.5: Monthly income distribution of respondents.....	29
Table 4.6: Descriptive statistics for traditional banking questions	30
Table 4.7: Descriptive statistics for digital banking accessibility questions	32
Table 4.8: Descriptive statistics for digital banking knowledge and utilization questions.....	33
Table 4.9: Descriptive statistics for digital banking utilization limitations questions.....	35
Table 4.10: Frequency, Mean, and Standard Deviation for confidence level and difficulty to use digital banking	36
Table 4.11: Respondents monthly visits to their bank branch.....	38
Table 4.12: Respondents main activities at their bank branch.....	38
Table 4.13 Bank branch closures in respondents' community	39
Table 4.14: The influence of bank branch closers on the communities in underserved areas.	39
Table 4.15: Bank branch closures in underserved communities.....	40
Table 4.16: Digital Banking due to Bank branch closures in underserved communities	41
Table 4.17: Respondent's adoption of digital banking due to bank branch closures in underserved communities	41

Table 4.18: Descriptive statistics for electricity and broadband connectivity issues and security concern.....	43
Table 4.19: Frequency, Mean, and Standard Deviation for confidence level and difficulty to use digital banking	43
Table 4.20: Binary logistic regression predicting the factor of influence to the use of digital banking.....	45
Table 4.21: Potential financial exclusion criteria	47
Table 4.22: Candidate for financial exclusion criteria.....	47
Table 4.23: The influence of bank branch closures on financial exclusion in underserved communities.....	48

LIST OF FIGURES

Figure 2.1: Original Technology Acceptance Model	7
Figure 2.2: The Stakeholder Model	8
Figure 2.3: British bank branch closures since 2015	9
Figure 5.1: Number of respondents that experienced bank branch closures	51
Figure 5.2: Use of digital banking due to bank branch closure	53

DEFINITION OF KEY TERMS AND CONCEPTS

- **Digital Banking**, E-Banking, digital financial service, Digital finance, Electronic Banking are used interchangeably and refer to the ability to perform banking activities using either smart devices such as smart cell phones or tablets, computers such as laptops and desktops to access banking platforms and applications
- **Financial Exclusion** refers to population of the economy that are unable to perform banking activities
- **Underserved communities** refer to the population that reside in areas that have insufficient or lack infrastructure, particularly ICT to enable them to connect to the internet.
- **Digital divide** refers to the segregation of communities that have the technical knowledge to operate devices to enable digital banking and those who are not. Digital divide refers to the disparities among people - such as those living in developed and developing world - concerning access to and the use of information and communication technologies (ICT).
- **Digital finance** is financial services offered using cellphones, computers, the internet, or cards connected to a secure digital payment system (Ozili, 2018). According to Manyika et al., (2016), McKinsey defines digital finance as financial services supplied via cell phones, the internet, or cards..
- **Banking institutions** for the purpose of this study are referred to as those organisations that provide financial services to customers such as ABSA, FNB, Standard Bank, Capitec and Nedbank.
- **Digital literacy** refers an individual's aptitude, skills and ability to use digital applications

1 INTRODUCTION TO THE RESEARCH

1.1 Purpose of Study

The purpose of the study is to assess the impact of bank closures due to digital banking has had on the banking population in underserved communities (The population that reside in areas that have insufficient or lack infrastructure, particularly ICT to enable them to connect to the internet).

1.2 Background

The advancements in technology in the world of today have been significant and aligned with the changing times. It has seen uptake in many industries allowing them to be more productive and ultimately more profitable. One of the purposes of technology from an organization perspective is to make the lives of its consumers easier by providing convenience (Collier & Kimes, 2013). In the past few years, the retail banking sector has seen a significant reduction of traditional banking channels with the closure of the bank branches (Tarrant, 2019). This reduction can be attributed to the fast-paced progress of technological advancements introduced by the financial institutions for the banking convenience of their customers (BusinessTech, 2020). The majority of these improvements demand clients to transact and perform banking activities from the comfort of their own homes using banking applications on digital devices such as mobile phones and computers (laptops and desktop machines). Through digital banking, financial institutions are providing their products and services to their customers to enhance financial inclusion. However, it appears that people in disadvantaged areas may be at risk of financial exclusion due to various issues that may hinder their adoption of digital banking technology. According to Ghosh (2021), a group in the United States expects that all branches will be obsolete by 2034, despite other research indicating that a hybrid banking model with both digital and smart branch channels may exist. The adoption of digital banking by the urban elite or digitally affluent has been met with enthusiasm since their culture (fast-paced, always seeking improvement) is more adaptable and sensitive to digital technology, and they have a greater level of digital literacy than poorer rural areas.

Consumers who come from underserved communities (rural and township) are the most affected by digital banking. In impoverished regions, low digital and computer literacy skills are a source of concern, as they may lead to fear and inability to use digital banking. (Lubbe, 2005). The lack of cellular infrastructure in many underserved areas, particularly in the rural communities, are one of the impeding factors to the successful adoption of digital banking (Ramavhona & Mokwena, 2016). Due to the widespread usage of social media apps like WhatsApp and Facebook, other underserved areas, such as townships, have a more digitally educated populace. Due to the high rate of unemployment in South Africa, a possible issue of the affordability of digital devices and the high cost of data may be present. Digital banking offers numerous advantages to customers, including the availability of banking applications on mobile and computer devices. However, the concerns arise from the necessity to cater to poor underserved areas with a high unemployment rate that may consist of people with low technological literacy in order to ensure that eliminating traditional banking channels does not create additional challenges for these communities, leading to financial exclusion. The impact of digital banking on clients in underserved regions, particularly those in rural and township areas with limited ICT infrastructure, is explored in this article.

1.3 Research problem

The introduction of digital banking has resulted in a reduction of banking channels such as bank branches. This necessitates the need for people in underserved communities to jump on the bandwagon of digital banking for them not to be left out. Given the challenges of digital illiteracy, affordability of smart devices and data and a lack in internet infrastructure or intermittent connectivity issues there is a threat of possible financial exclusion in this digital banking upheaval.

1.4 Problem Statement

The introduction of digital banking results in the reduction of ATMs and bank branches in underserved communities which may lead to the financial exclusion of poor and digitally illiterate banking customers. Due to the closure of banks, the combination of poor internet infrastructure, the cost of banking devices and data as well as security concerns about transacting online, persons in underserved communities may be at risk of financial exclusion. This resulted in the following problems:

- Smart Device and Data Affordability
- Lack of Internet Infrastructure
- Digital / Technology Illiteracy
- Digital Banking Security Concerns

The aim of this research is to investigate the effect of the closure of bank branches due to digitization on the rural poor.

1.5 Research Question

The main research question defined for the study is:

“How are customers in underserved communities affected by the introduction of digital banking and the closure of traditional banking channels such as bank branches?”

In order to help answer this main research question, it was subdivided into four research questions.

1.5.1 Research questions

- Does the closure of bank branches influence the community in underserved areas?
- Does the closure of bank branches increase the use of digital banking in underserved communities?
- Are issues with electricity and broadband, as well as a lack of digital literacy and security concerns, preventing underserved communities from adopting digital banking?
- Does the closure of bank branches result in the financial exclusion of people in underserved communities?

1.6 Research Objectives

The main research objective defines for the study is:

“To investigate how banking customers in underserved communities are affected by the introduction of digital banking and the closure of traditional banking channels such as bank branches.”

To achieve this the main research question was subdivided into four research objectives.

1.6.1 Research objectives

- To develop an understanding of the factors that influence the banking activities of underserved communities
- To investigate the influence of the closure of traditional banking channels such as bank branches on underserved communities
- To determine whether the closure of traditional banking channels, such as bank branches, results in the financial exclusion of underserved communities.
- To make recommendations to banking institutions on how to lessen the impact of the closure of traditional banking channels such as bank branches on underserved communities.

1.6.2 Hypotheses define for the study

The following hypotheses are defined for this study:

- Hypothesis 1: The closure of bank branches has an influence on the community in underserved areas.
- Hypothesis 2: The closure of bank branches increases the use of digital banking in underserved communities.
- Hypothesis 3: Electricity and broadband issues as well as a lack of digital literacy and security concerns prevent underserved communities from adopting digital banking.

- Hypothesis 4: The closure of bank branches results in the financial exclusion of people in underserved communities.

1.7 Significance of Study

This study contributes to research material and how banks can use the study as guidance to cater to underserved communities in banking by ensuring that they are not excluded while remaining digitally transformative. The research study will serve as the foundation for understanding the digitalization challenges that underserved communities face.

The findings of this study can help banking institutions better understand the complexities of underserved communities in terms of digital adoption and transformation. This allows banking and private institutions to better serve these communities, which may eventually allow them to reach a larger audience.

2 LITERATURE REVIEW

2.1 Introduction

The incredible advances in digital technology have completely changed the way banks work. Since the dawn of the digital age, the business environment has been disrupted, with novel and unique ways of doing business emerging. Banks in South Africa are constantly seeking ways to keep abreast with technology. The operations of banks are constantly changing as technological advances and shifting purchaser preferences reshape how they conduct business, what remedies they offer, and how they interact.

Advancements in the 4th industrial revolution such as robotics, biometrics and artificial intelligence are on the verge of becoming the norm, challenging traditional assumptions on how to engage with and deliver banking products and services (Coetzee, 2018). In recent years, financial institutions have come up with various efforts to utilize technology in lowering the expenses of serving its customers, especially those in the low balances and in the low-income bracket (Lobenhofer et al., 2003). The introduction of digital or electronic banking has seen an increase in bank branch closure in the past few years. In this study, the term "digital banking" refers to customers' use of banking applications on their mobile phones or computer devices to conduct banking activities.

According to a McKinsey report by Dallerup (2018) the United States has seen a significant reduction of over 10000 bank branches since the financial crisis of the late 2000s. The closing of branches presents a possible problem for customers, particularly those in underserved or poor communities. According to Wentzel, Diatha and Yadavalli (2016) people and specific groups are unable to access financial services infrastructure because of the closure of the bank's branches. Wentzel et al., further adds that the individuals and organizations risk being shut out of the official financial services system if alternative suppliers are not available.

2.2 Theoretical Framework

The Technology Acceptance Model (TAM) and Stakeholder theories are the two theories that currently underpin this research. The TAM is an information-systems theory that explains how people embrace and use technology (Urhiewhu and Emojorho, 2015). Stakeholder Theory, according to Freeman (2015) is defined as a way of looking at capitalism that emphasizes the interconnected relationships that exist between a company and its stakeholders.

2.2.1 Technology Acceptance Model Theory

The TAM model claims that when customers are presented with new technology, a range of factors impact their decision on how and when to use it (Urhiewhu & Emojorho, 2015).

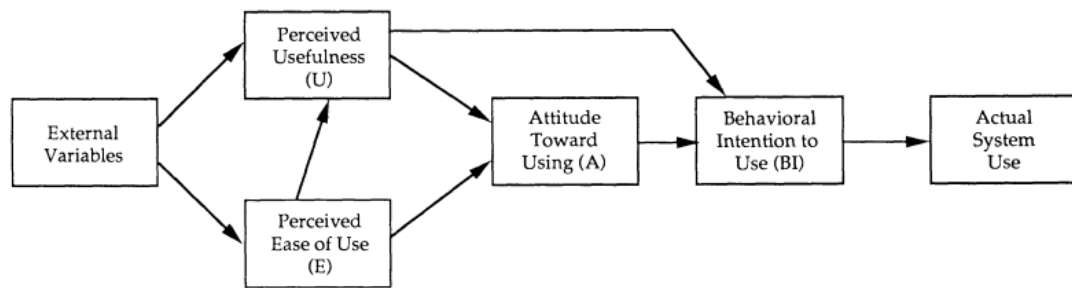


Figure 2.1: Original Technology Acceptance Model

Source: Davis, Bagozzi and Warshaw, (1989)

According to Masrom (2007, p. 3), “perceived usefulness” in TAM refers to the user's belief that utilizing the technology will enhance their work performance, whereas “perceived ease of use” relates to how simple the user believes using the technology will be. Each of these is thought to influence the “attitude toward using” the technology, however “perceived ease of use” is also thought to influence “perceived usefulness and attitude toward using”. Finally, one's “attitude toward using” the technology influences one's “behavioural intention to use” it (Masrom, 2007, p. 3).

In relation to this study, the TAM theory refers to digital banking platforms' perceived ease of use and utility. According to Hosein's (2009) study on internet banking adoption rates among community banks, he discovered that in order for consumers to use internet banking, banks must first attract their attention, and that consumers are unlikely to consider internet banking unless they have high internet accessibility.

Furthermore, Hosein found that the consumer does an assessment on whether it is convenient for them to conduct their banking through the internet, their usability of the internet banking application and their perceived competency in using the internet and banking application. Underserved community members may benefit from digital banking if they recognize the potential and convenience of using banking applications and are not restricted by broadband accessibility.

2.2.2 Stakeholder Theory

Stakeholder theory is instrumental as it provides a framework for investigating the relationships between stakeholder management practice and the attainment of various corporate performance goals (Donaldson & Preston).

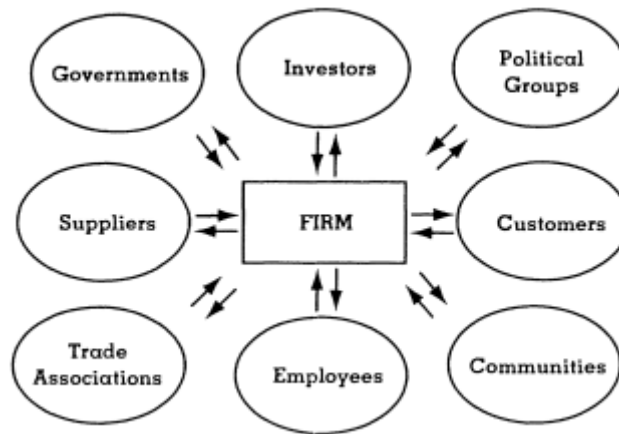


Figure 2.2: The Stakeholder Model

Source: Donaldson, and Preston (1995)

According to Donaldson and Preston (1995), individuals or groups who reasonably participate in an organisation do so in order to acquire benefits, and there is no presumptive priority of one set of interests and benefits over another. As a result, the arrows connecting the firm and its essential stakeholders run in both directions. All stakeholder relationships are the same size and shape, and they are all the same distance from the middle of the firm's "black box." (Donaldson & Preston, 1995, p. 69)

In relation to this study, people in rural and township communities are considered stakeholders of financial institutions under the Stakeholder Theory, and it is in these institutions' best interests to provide alternate banking channels to their consumers due to branch closures in order to avoid financial exclusion and improve profitability.

2.3 Bank Branch Closures

Since January 2015, banks and building societies in the United Kingdom have closed or announced the closure of 4,299 branches, at an average of 50 per month (Which Money Team, 2021).

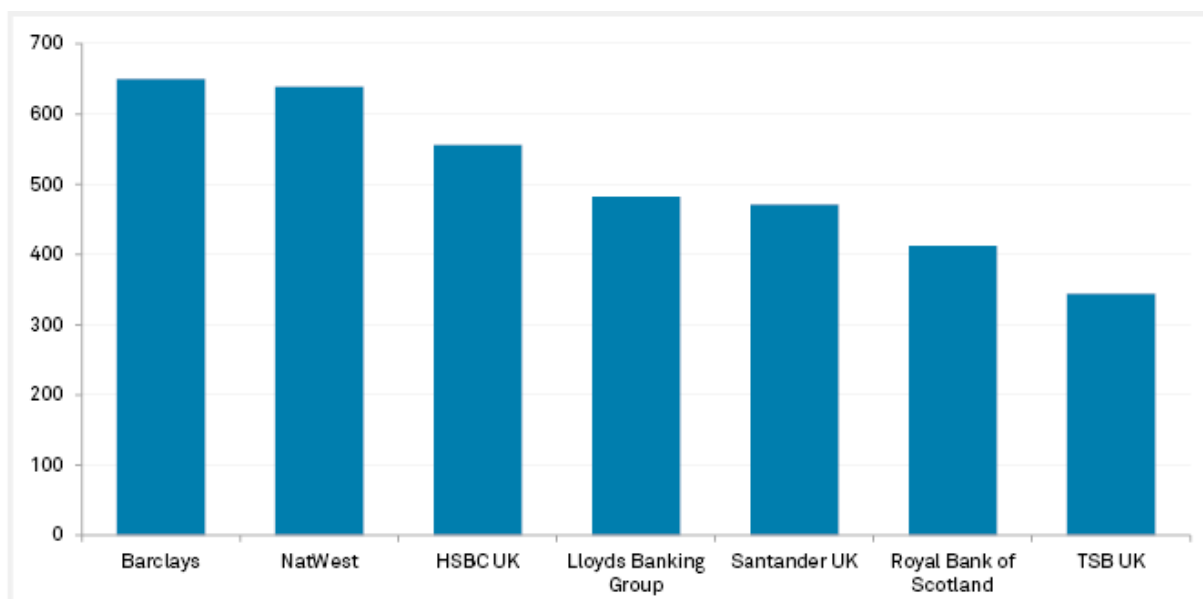


Figure 2.3: British bank branch closures since 2015

Source: Rees (2021)

The accelerated rate at which banks across the world are closing branches in the past few years has been alarming. According to a survey conducted by The Economist Intelligence Unit (EIU) that incorporated data from 300 global banking executives, it was found that 65 Percent of bankers believe the branch-based model will be phased out within the next five years (Marous, 2021). According to Rees (2021) the closure of branches can be attributed to the growth in digital banking as the main driver in reducing costs. According to Tarrant (2019), the big four banks in South Africa – Absa, FNB, Nedbank, and Standard Bank – closed 695 branches in the early part of this decade.

According to a research report by PricewaterhouseCoopers (2020), the migration to digital and mobile banking systems prior to the Covid-19 epidemic resulted in unusually high quantities of banking transactions performed through lower-cost digital channels across all customer categories in 2020.

Bank branches had also been closed as a result of the looting unrest, which prompted many banks to close over 300 bank branches and ATMs (Mchunu, 2021). While the physical branch network's size, breadth, and design will evolve, the major banks acknowledge that physical branches will continue to play a significant, albeit varied, role in their overall channel and distribution strategies in the future (Price Waterhouse Coopers, 2020). Given the benefits of branch closure in terms of operational costs, banks must also consider the important role that branches serve in communities.

2.4 Digital Banking

The introduction of digital technology into the banking industry has resulted in a radical shift in the financial sector, resulting in what is today known as Digital Banking. According to Haralayya (2021), digital banking is the computerization of traditional banking services that allows bank customers to access banking products and services through online or electronic platforms, eventually eliminating the need for a customer to visit the branch. Digital banking is a service that enables clients to perform banking activities using a computer connected to the internet (Al-Shbiel & Ahmad, 2016). The introduction of internet technology has benefited a wide range of companies and organizations. In the last few years, a number of advancements in banking technology have occurred, and these advances have had a substantial impact on the success of financial institutions. The widespread adoption of digital or electronic banking by banks has allowed for the design of delivery channels from a consumer perspective rather than just from an efficiency standpoint (Masocha et al., 2011).

Srinivas and Ross (2018) performed a global digital banking consumer survey to investigate the digital banking behaviours and preferences of 17100 consumers from 17 countries and found that digital channels were used more frequently for transactional activities than bank offices and ATMs. The majority of respondents in the same poll favoured traditional channels such as bank branches to handle complicated (transactional and lending products) and advisory services (Srinivas and Ross, 2018).

According to a proprietary global survey, branches remain the most popular channel for opening accounts, and branch happiness is a greater predictor of total fulfilment compared to mobile and computer channels (Srinivas & Wadhvani, 2019). This emphasizes the need of both branches and internet banking in meeting the needs of various consumers.

2.4.1 Benefits of digital banking in underserved communities

Governments, providers of digital finance, users of financial services, and the economy all benefit from financial inclusion and digital finance, with expanded access to finance for the impoverished, lower costs for banks and Fintech providers with respect to financial intermediation, and improved aggregate spending for governments (Ozili, 2018). Given that roughly half of the world's population owns a mobile phone, this may result in increased financial inclusion, the supply of financial services to non-financial sectors, and the extension of basic services to consumers (World Bank, 2014). Digital finance, according to Lyman and Lauer (2015), has the ability to provide poor people in developing nations with affordable, secure, and convenient financial services.

Millions of impoverished clients throughout the world can benefit from latest developments in the availability and the accessibility of digital financial services, which can assist individuals in making the shift from cash to formal digital banking services on secure digital platforms (Ozili, 2018). The capacity to access banking services at any time and from any location is a big draw for technology-based banking as customers benefit not only from the convenience, but also from the huge decrease in time and effort required (Sardana & Singhanian, 2018). ATMs and digital or internet banking, according to Beatson et al. (2007), are examples of self-service technologies. In a study done by Collier & Kimes (2013) it was found that self-service technologies (SST) were shown to be beneficial in reducing labor costs while giving clients with additional channel options.

Collier & Kimes' study also found that the convenience of SST had a considerable favorable effect on perceived accuracy, speed, and exploration inclinations. This is significant because it emphasizes the ease with which customers in low-income communities to use self-service technologies such as digital banking once it is implemented and uptake is high. Some of the benefits of digital banking identified by Pankomera & Greunen (2018) include accessibility and convenience, reduced handling of cash, promotion of financial inclusion, reduced inequality and poverty and reduced inequality and poverty.

2.4.2 Challenges of digital banking in underserved communities

According to Masocha et al. (2011) many experts suggest that inadequate internet penetration, customer inflexibility to new technologies, low educational levels and computer literacy are all barriers to widespread acceptance and constructive usage of internet services in rural areas. The study focuses on three challenges to impoverished areas adopting digital banking: Low digital literacy, a lack of or problems with internet infrastructure, and the cost of smart devices and computers.

2.4.2.1 Digital Literacy

Digital literacy refers to a person's capacity to comprehend and apply information offered in a variety of formats via computers from a variety of sources, as well as their ability to do tasks efficiently in a digital environment (University of Illinois, 2014). As banks use ICT to improve and broaden their services, it's important to remember that not everyone in South Africa is tech-savvy.

South Africa, which has a relatively high illiteracy rate on the continent, faces the possibility of the majority of its poor people being excluded from these innovative services because they are unfamiliar with new banking procedures (Maumbe, 2006). Through digital literacy, rural and township populations may have equal access to education, employment, and resources. Apart from that, it equips people with the knowledge and skills they need to make the best decisions, making digital literacy an excellent tool for achieving Digital Inclusion (Ranavade, 2019). While digital innovation has the ability to improve financial accessibility, it also has the potential to exclude consumers with low digital and financial literacy Centre of Excellence in Financial Services (2017).

According to four studies conducted by Ammar & Ahmed (2016), Bankole & Cloete (2011), Hinson (2011) and Mlitwa & Tshetsha (2012) as cited in Pankomera & Van Greunen (2018) which looked at Ghana, Nigeria, Sudan, and South Africa, found that increased levels of digital illiteracy constituted a barrier to using mobile banking services. Many people at the bottom of the pyramid are unable to fully completely understand mobile financial services due to significant levels of illiteracy in several areas of Africa, especially in rural areas. The study also found that digitally literate persons are more likely to understand the concept of mobile banking and have an awareness and clarity regarding basic mobile banking services.

2.4.2.2 Poor ICT infrastructure

The internet has evolved into one of the world's most essential and vital infrastructures, and digital technology, also known as information and communications technologies (ICTs) in a broader sense, has significantly impacted our daily lives and the way we do business around the world. In the current information era, (ICT) plays a critical role in the political, social, and economic spheres (Chisango & Marongwe, 2021).

According to Corrigan (2020), information and communication technology (ICT) improves job efficiency, allows for decentralized labor, and helps enterprises in remote regions to participate in global value chains. Although digital banking is regarded as a low-cost method of reaching clients, a multitude of reasons, including poor internet penetration, limit its accessibility (Sohail & Shanmugham, 2002, as cited in Maumbe, 2006). ICTs are said to enable developing countries to gain access to global markets and create conditions that enhance economic growth (Adera et al., 2014).

The majority of underserved communities in South Africa have insufficient and unreliable infrastructure services. Although infrastructure quality can have a favourable impact on a country's economic performance, delayed infrastructure development, such as a lack of internet connectivity, may stifle economic progress. ICT provides a ray of hope for marginalized groups seeking to increase their access to finance at the lowest feasible cost. Improved financial capital flow to the poor has political and equity appeal, as it aids in the development of a more inclusive and socially integrated economy (Maumbe, 2006).

Inadequate broadband infrastructure is the most significant impediment for those at the bottom of the pyramid's adoption of mobile banking, according to findings from six research conducted in Zimbabwe, Ghana, Nigeria, Rwanda, South Africa and Sudan (Ammar & Ahmed, 2016; Asongu, 2018; Hinson, 2011; Mago & Chitokwindo, 2014; Mlitwa & Tshetsha, 2012; Shrivastava, 2010, as cited in Pankomera & Van Greunen, 2018). Many have limited access to financial and banking services via mobile devices in rural locations due to poor cellular network coverage. When executing mobile banking transactions in remote areas, mobile signals often have a detrimental impact on communication quality (Pankomera & Van Greunen, 2018).

2.4.2.3 Affordability

According to the statistics agency, South Africa's unemployment rate grew to 32.6 percent in the first quarter of 2021, up from 32.5 percent in the fourth quarter of 2020 (Reuters, 2021). Poverty is acknowledged to be a rural phenomenon, according to Seretse et al. (2018), regardless of society being more urbanised. Poverty is a significant issue, according to (Chukwumah, 2017; Hinson, 2011; Mago & Chitokwindo, 2014; Tchouassi, 2012, as cited in Pankomera & Van Greunen, 2018), because the absence of a frequent income brings about difficulty for those at the bottom of the pyramid to register an account.

Some of the banks require a consumer to make an initial deposit before creating an account, and once the account is open, there are transaction fees. The majority of South Africans cannot afford communications services, with 36% indicating that the cost of a smart device is the key reason for not being online, 15% claiming that the Internet is too expensive, and 47% citing the cost of data as the reason they limit their use (Gillwald et al., 2018).

2.4.2.4 Security Concerns

The internet has brought many benefits to those who use it, but it has also raised many questions for those who do not. Many banking customers, particularly those who are not well educated on the benefits, are hesitant to adopt online banking. Trust and security concerns are among the reasons why many people are hesitant to use digital banking.

According to a study conducted by Tarhini et al., (2015) on the adoption of online banking in Nigeria, it was discovered that security was a major influencing factor on people's proclivity to use online banking and that they did not believe that online banking kept their finances safe due to previous events of internet fraud such as credit card scams.

In another study on the adoption of internet banking by Australian consumers conducted by Sathye (1999), security concerns and lack of awareness about Internet banking and its benefits stood out as the main obstacle to non-adoption of online banking in Australia. Regardless of the benefits of online banking, security is still a global issue that must be addressed and improved in order to increase banking customers' adoption of digital banking.

2.5 Financial Exclusion

Locational factors such as rural dwelling, poor infrastructure, and travel distance; economic factors such as income inequality, unemployment, account operating costs and fees; and social biases such as age, gender, literacy, and language barriers all contribute to limited access to financial services or financial exclusion in emerging economies (Sarma & Pais, 2008; Dermiguc-Kunt & Klapper, 2012; Chopra & Wright, 2011, as cited in David-West et al., 2019). Digital financial inclusion, according to the CGAP, is defined as “digital access to, and use of, formal financial services by the excluded and underserved population” (Lyman & Lauer, 2015).

Due to the anticipated advantages of digital finance and financial inclusion, governments in several developed countries have used ultimatums to coerce, businesses, bank account holders and individuals to use digital financial services by imposing daily cash withdrawal limits and levying hefty fees for cash withdrawals in excess of a particular amount (Ozili, 2018). In a study conducted by Wentzel et al. (2016) that looked into the elements that influence financial exclusion at the bottom of the South African pyramid, found that the most significant factors were primary source of income, education level, age, home language (those who are not English proficient) and the number of dependents (dependent on money transfers). Interestingly this study also revealed that residing in the rural locations as opposed to an urban location insignificantly contributed to financial exclusion (Wentzel et al., 2016).

The result by Wentzel, Diatha and Yadavalli’s study that educational achievement is most closely linked to financial exclusion also suggests a possible solution to the problem of financial exclusion. The purpose of availing financial services through digital platforms is to help emerging nations in reducing poverty and attainment of their financial inclusion goals (United Nations, 2016, as cited in Ozili, 2018). Individuals and organizations who have a dependable digital platform to access funds in their bank accounts and conduct financial transactions can benefit from digital financial inclusion (Lyman & Lauer, 2015).

2.6 Conclusion

Digital finance has proven to be the appropriate approach to making banking services inexpensive, convenient, and secure for low-income consumers in Africa, with more and more institutions adopting digital solutions and achieving rapid development.

The introduction of digital banking has seen the increased rate at which bank branches are closing. This is a benefit to the bank as it significantly reduces operational costs and ultimately increases profits. However, various challenges such as poor ICT infrastructure, low or no digital literacy and affordability as a result of poverty in underserved communities are barriers to the successful adoption of digital banking.

Some of the benefits of digital banking that were highlighted include convenience and accessibility, reduced handling of cash, promotion of financial inclusion, reduced inequality and poverty and reduced inequality and poverty. The object of the research is to bring to the fore the issues brought about by digital banking which include the closing of bank branches that ultimately may result in financial exclusion due to the challenges of adoption brought about by barriers highlighted in the research.

3 RESEARCH STRATEGY, DESIGN AND METHODOLOGY

3.1 Introduction

Research methodology is a systematic approach to problem solving that examines how research should be carried out, including the methods used by researchers to describe, explain, and predict occurrences (Rajasekar, 2013). The following paragraphs describe the methods that will be used in this research.

3.2 Research Strategy

In research, quantitative and qualitative research methodologies are two major strategies to research design that are frequently utilized. Qualitative research methods are those that fall within the category of ethnography (Newman & Ridenour, 1998). “Case studies”, “grounded theory”, “field studies”, “naturalistic inquiry”, “document studies”, “interview studies”, “observational studies”, and “descriptive studies” are examples of qualitative research approaches observed by a qualitative researcher (Newman & Ridenour, 1998, p. 9). Quantitative research methods are empirical or statistical studies in which data is coded according to scientific “piori operational and standardised definitions”. (Newman & Ridenour, 1998, p. 10).

3.2.1 Qualitative research methodologies

Qualitative research methodologies, according to Lincoln & Guba (1985), are more natural because the researcher is forced to interpret the data and develop a final verdict based on his observations. According to Newman & Ridenour further (1998), only one subject, one case, or one unit is frequently the focus of inquiry in a qualitative design over a long period of time. According to Mason (1996), key aspects of research design must be followed by qualitative researchers, such as integrating research questions to methodological techniques, addressing issues of analysis and data collecting as integrated, and being explicit about the research's goals.

3.2.2 Quantitative research methodologies

According to Goertzen (2017), quantitative research methods are concerned with gathering and examining data sets that can be represented quantitatively. One of the main objectives is to create accurate and reliable measurements that can be analysed statistically. Quantitative research is very effective at answering the “what” or “how” of a situation because it focuses on data that can be measured (Goertzen, 2017, p. 12). Quantitative research is divided into several types, namely survey, correlational, experimental, and causal-comparative research, all of which have their own characteristics (Sukamolson, 2007). According to Sukamolson (2007), in quantitative research, science-based sampling and questionnaire design can be used to measure population characteristics with statistical precision in survey research.

For this research, a quantitative methodology was used. A questionnaire with mostly closed-ended and scale questions was distributed to a group of random participants who live or have lived in communities considered underserved by the respondents as part of the survey.

3.3 Research Design

A research design, according to Vosloo (2014) focuses on the final product and all of the steps involved in getting there as it can be thought of as a functional plan that connects various research methodologies and procedures in order to collect a trustworthy and legitimate body of data for empirically grounded analysis, conclusions, and theory building.

According to Kidder & Selltiz (1981), research design is the “arrangement of conditions or collection and analysis of data in a manner that aims to combine relevance to the research purpose with economy in procedure”. The research design includes thinking about the best way to collect data in order to give a meaningful and accurate test of your thesis, and one that can show causality if necessary (Jankowicz, 2000). A cross-sectional descriptive research design will be used in this study.

This design according to Hair, Bush & Ortinau (2010) includes processes that collect raw data and generate data construction that depicts the existing features of a specific target group using methodical approaches and actions. The goal of a cross-sectional study is to be descriptive, and it usually takes the form of a survey (Levin, 2006). Levin adds that such studies are occasionally used to look at the relationships between risk factors and the desired outcome.

The study used an online survey generated by survey and report generation software and was distributed to respondents via email and WhatsApp. The survey aided in determining the impact of bank branch closure in the community and the respondents' feelings toward digital banking as a banking channel.

3.4 Research Procedure and Methods

The following section is concerned with the description of the research procedure and methods. We discussed the data and information collection instruments, the target population and respondent selection, ethical considerations during research data collection, data and information processing and analysis, and a description of the survey respondents in this section.

3.4.1 Research data and information collection instruments(s)

The collection of data is an essential step in research, and the instrument used to collect data is determined by the type of data the researcher intends to collect, quantitative or qualitative, and how they intend on collecting it. There are various techniques for gathering primary data, specifically in surveys and descriptive data, such as the "observation method", "interview method", "through questionnaires", "through schedules", and "other methods" (Kothari, 2004, p. 96)

As part of the data collection process, the researcher used structured questionnaires distributed via an online survey platform to multiple respondents. The questionnaire is provided as Appendix 1.1.

3.4.1.1 Questionnaire Design and Administration

According to Krosnick (2018), a questionnaire is the heart of a survey. It allows for the collection of quantitative data in a standardized manner, resulting in data that is internally reliable and consistent for analysis (Roopa & Rani, 2012). Questionnaires are one of several data collection methods for gathering relevant and useful information. Structured and unstructured questionnaires are the two types of questionnaires. According to Archaya (2010), structured questionnaires have pre-coded questions with skip patterns to ensure that the question sequence is followed.

They are primarily used in most of the quantitative data collection and have usage benefits such as fewer discrepancies, ease of administration and data management, and provide consistent answers (Archarya, 2010). Unstructured or nonstructured questionnaires on the other hand contain open-ended and ambiguous opinion-type questions where respondents may answer using their own words (Malhotra, 2006).

To avoid bias, each participant was asked to respond to an identical list of mixed questions. The survey began with a question about whether the participant lives or has previously lived in an underserved community, as well as whether they have a bank account. Following these questions, another was asked to determine whether the respondent used the internet and/or their mobile phone for banking. If the respondent said yes to the questions, they were then asked about the effects of branch closures and their experience with online and mobile banking. The questionnaire contained mostly closed-ended questions with the option to specify other if their desired response was not included as an option.

3.4.1.2 Questionnaire Structure

The questionnaire was divided into four sections, with data presented in the format shown below:

- **Demographic Data:** This section comprised of questions relating to the respondent's province and area of residence, age, gender, employment status and monthly income range.
- **Traditional Banking:** This section included questions about the respondent's current banking habits, frequency of banking, and whether there had been any branch closures in their area.
- **Digital Banking Accessibility:** This section included questions designed to determine whether respondents had the ability or means to access digital banking. This included inquiries about the possession of digital banking devices, as well as issues with internet and electricity in the respondent's area of residence.
- **Digital Banking:** This section included questions aimed at determining how much the respondent understood about digital banking, whether they use it, their experience with it, and their reservations about it.

3.4.2 Research Target Population and Selection of Respondents

3.4.2.1 Research Target Population

The target population, according to Banerjee & Chaudhury (2010) refers to any inferences that are drawn from a sample and that apply only to the defined population from which the sample was derived. A survey's population is the complete collection of units for which response data will be used to draw conclusions and as a result, the survey's target population identifies the units to which the survey's findings are intended to be generalized (Lavrakas, 2008). This research was based on a cross-sectional survey of individual customers of South Africa's major retail banks namely (ABSA, Capitec, First National Bank, Nedbank, Standard Bank) who live or have lived in an underserved community. The target population for the study included both male and female respondents aged 18 to 64 years old who lived in underserved communities across all provinces of South Africa and met the criteria of having a bank account with one of the aforementioned retail banks. The banks were chosen based on their ability to provide banking customers with digital banking services. The research was conducted in South African communities that the respondents considered to be underserved. The participants from these communities were fundamental to the research as they were able to provide insights into the impact that they have experienced, if any, of the closure of bank branches in their communities.

3.4.2.2 Research Sampling for Target Population

Sampling is a technique used by researchers to select a small number of representative items or people from a pre-defined population to function as participants for observation or experimentation in accordance with the study's objectives (Sharma, 2017).

The various types of sampling techniques include probability, non-probability, and mixed probability techniques. According to Sharma (2017), probability or random sampling refers to any sampling scheme in which the odds of selecting each individual to be included in the sample are equal, whereas non-probability sampling is solely based on the researcher's own discretion. Purposive or deliberate sampling is one of the most commonly used sampling procedures; it groups participants based on pre-determined criteria relevant to a specific research question. (Jawale, 2012). Purposive sample sizes are frequently calculated based on theoretical saturation and are thus most effective when data review and analysis are carried out concurrently with data collection (Mack, 2005).

This study employed purposive sampling as the sample required participants that lived in underserved communities and had a bank account with one of the major retail banking institutions. The questionnaire was only conducted and distributed to respondents that met the criteria of having a bank account and being a resident of the communities who were considered underserved.

Participants were also chosen from the above-mentioned quotas using convenience sampling. According to Hair et al. (2010), this sampling strategy is used because it allows the researcher to reach out to respondents who are immediately willing to participate in the study. Respondents in the study who had access to email and/or WhatsApp were given the option of receiving the questionnaire by email or WhatsApp.

The email and WhatsApp outlined the steps required for the respondent to complete the survey, as well as disclaimers regarding confidentiality and remuneration. Respondents were informed that they were not going to be remunerated for their involvement in the study and that confidentiality was assured for all respondents.

3.5 Data Analysis

The data analysis section provided answers to the fundamental questions posed in the problem description. After all the questionnaires had been completed, the data for the full analysis of the impact of branch closures and the use of digital banking were collected, collated, analysed, compared, contrasted, and synthesized. For the analysis, we conducted descriptive and inferential statistics to get a clearer understanding of the data.

3.5.1 Descriptive Statistics

Simply put, descriptive statistics are the “numerical procedures or graphical techniques” that are “used to organize and describe the characteristics or factors of a given sample” (Fisher & Marshall, 2009, p. 93). According to Fisher and Marshall (2009), descriptive statistics seek to “describe the midpoint” of a range of scores, known as the “measure of central tendency”, as well as the range of scores known as the “dispersion or variance”. For this research study, descriptive statistics were used to summarise quantitative data collected from respondents through questionnaires. According to Sutanapong & Louangrath (2015), the mean, median, mode, variance, and standard deviation are common descriptions of descriptive statistics.

The mean and standard deviation of the data collected from the questionnaires were calculated statistically to describe some of the distribution of the data:

The Mean: The mean is the standard component of statistics; its value is calculated by adding all of the values in a data set and dividing them by the number of items (Livingston, 2004). Livingston adds that outliers have a significant impact on the mean, but the mean does provide a central value that represents the overall set of numbers.

Standard Deviation: The standard deviation of a normal distribution refers to the data dispersion and is indicative of how well the mean represents the sample data. (Lee et al., 2015). According to Lee et al., (2015), a data set's values are said to follow a normal distribution when they are evenly distributed around one representative value.

3.5.2 Inferential Statistics

Inferential statistics also known as sampling statistics, are concerned with two types of problems i.e., estimating the population parameters and testing statistical hypotheses (Kothari, 2004). They are extremely useful for a wide range of applications, experiments, and studies (Marshall & Jonker, 2011). Inferential statistics encompass all methods that enable researchers to investigate in-depth relationships among variables (Barnes & Lewin, 2005).

They offer a very effective method of asking questions about numerical data. According to Barnes and Lewin (2005), there are three main approaches to inferential statistics i.e., exploring differences, investigating the nature and extent of relationships, and classifying and forecasting. There are two types of inferential statistical procedures: parametric and non-parametric.

The principles of a normal curve underpin the fundamentals of parametric statistics, as a result, in order to use parametric statistics, the data should be normally distributed and at the interval level (Barnes & Lewin, 2005). Non-parametric techniques are used to analyse category variables, whether nominal or ordinal, since the mean and standard deviation cannot be determined, according to Barnes and Lewin (2005).

3.5.2.1 Logistic regression

According to Hosmer et al. (2013), the goal of logistic regression, like any other statistical model-building technique, is to find the best-fitting model to identify and describe relationships between dependent and independent variables. Logistic regression allows for the study of dichotomous levels, i.e., outcomes with two mutually exclusive values, but it also allows for the use of categorical predictors and the adjustment of a number of predictors (LaValley, 2008). According to Field (2009), logistic regression is used because categorical or dichotomous outcome variables violate the assumption of linearity in normal regression. The logistic regression test was used in this study to see if there were any relationships between the various dichotomous variables that were observed, as this could help answer some of the research questions about how digital banking affects underserved communities.

3.5.2.2 Chi Square

The Chi-square (X^2) test is a nonparametric statistical technique used to detect whether two or more sample categorisations are independent or not (Zibran, 2007). According to McHugh (2013) the Chi-square is one of the most useful statistics for hypothesis testing when the variables are nominal, and it can offer additional data on the significance of any differences observed and on the categories that account for any found differences.

For this study a Chi-square test for independence was used to explore the relationship between the bank branch closure as the dependent variable and the different selected independent or predictor variables. Where some of the questions were not answered, the N was specified accordingly.

$$X^2 (\text{degrees of freedom, } N = \text{sample size}) = \text{Chi-square statistic value, } p = p \text{ value}$$

$$X^2 \text{ significance at } p < 0.05 \text{ level}$$

In the cases where one or more of the cells count in the 2×2 table was less than five the Fisher's Exact test was used, as an alternative to the Chi-square test for independence, to determine whether there is a significant association between two categorical variables.

3.6 Research Strengths – Reliability and Validity Measures Applied

Reliability is concerned with the extent to which one's findings can be replicated, implying that the more occasions a study's results can be reproduced, the more reliable the mechanism is (Merriam, 1995). According to De Vos & Fouche (2015), reliability refers to the extent to which independent administration of the same instrument produces the same results under similar settings. For results to be valid, the same findings must be obtained under similar circumstances. Content validity is defined by Bowling (2017) as the extent to which the instrument's content appears to completely explore the scope it is designed to measure. According to Kimberlin and Winterstein (2008), validity is the scope to which interpretations of test results are justified, which is determined by the specific use the test is intended to meet. The questionnaire that was developed ensured validity of the research as the questions were aligned to the literature review. To guarantee consistency, participants were given the same set of questions.

3.7 Research Weaknesses – Technical and Administrative Limitations

Study limitations according to Ross and Zaidi (2019) are weaknesses in a research design that can affect the research's results and assumptions. Presenting study limitations is also an ethical component of scientific investigation because it ensures disclosure of both the study and the scholars, as well as transferability and reproducibility methods. The study focused solely on internet and cell phone banking, which are subsets of the digital banking services that banks provide to their consumers. This selection was made based on the fact that these two digital banking services were the most popular among customers. In addition, the research was restricted only to customers that had a bank account with either ABSA, Capitec, First National Bank, Nedbank or Standard Bank.

3.8 Ethical Considerations

The study's findings will be presented honestly, and confidentiality and anonymity will be provided to ensure more open, truthful, and honest responses from respondents, making the study more important and relevant. Before their admission to participate in this study, the participants will be informed of the complete nature of the investigation. All input will be treated with strict confidentiality, and no information will be presented in a way that might be used to link any individual to specific responses.

4 DATA ANALYSIS AND PRESENTATION OF RESULTS

4.1 Introduction

This chapter is a data analysis and presentation of survey results that aims to address the main research question and sub questions outlined in the first chapter. The data analysis and findings are related to the study's research questions. The data was analysed to investigate and identify the impact and penetration of digital banking in underserved communities, as well as whether this is a direct result of South Africa's recent increase in bank branch closures. The data came from questionnaires filled out by 179 (N = 179) people who live or have lived in underserved communities.

4.2 Participation Rate

Online questionnaires were sent to 302 potential respondents. There was a total of 254 questionnaires were returned. Of these questionnaires seven respondents did not give their consent. 68 respondents indicated that they do not live or have never lived in an underserved community, and some provided no information. With a total of 179 usable questionnaires, this resulted in a response rate of 59 percent. The quantitative research findings are presented in the following section.

4.3 Demographical Data

Respondents who live or have lived in an underserved community provided demographic information such as gender, age, place of residence, employment status, and monthly income range.

4.3.1 The gender distribution of respondents

The gender frequency distribution of the respondents is presented in Table 4.1 below.

Table 4.1: The gender distribution of respondents (N = 179)

	Frequency	Percentage	Cumulative Percentage
Male	109	60.89%	60.9%
Female	68	37.99%	98.9%
Missing data	2	1.12%	100.0%
Total	179	99%	

As presented in Table 4.1 above, we see that majority of the respondents are male (60.89%) followed by the female respondents (37.99%). Based on this information, it is reasonable to anticipate that the results will be predominantly male-oriented.

4.3.2 The age distribution of the respondents

The age distribution of the respondents is presented in Table 4.2 below.

Table 4.2: The age distribution of respondents (N = 179)

	Frequency	Percentage	Cumulative Percentage
18-24 years old	34	19.0%	19.0%
25-34 years old	57	31.8%	50.8%
35-44 years old	56	31.3%	82.1%
45-54 years old	22	12.3%	94.4%
55-64 years old	10	5.6%	100.0%
Total	179	100%	

As shown in Table 4.2, the majority of survey responses (31.8%) came from respondents aged between 25-34 (31.8%) and 34-45 (31.3%), with 57 and 56 responses, respectively. With only 10 respondents, the age group 55-64 (5.6%) had the smallest sample representation (N = 179).

4.3.3 Province of residence distribution of the respondents

Province of residence distribution of the respondents is presented in Table 4.3 below.

Table 4.3: Province of residence distribution of respondents (N = 179)

	Frequency	Percentage	Cumulative Percentage
Eastern Cape	10	5.6%	5.6%
Gauteng and Free State	8	4.5%	10.1%
KZN	42	23.5%	33.5%
Mpumalanga, North West and Western Cape	7	3.9%	37.4%
Missing data	112	62.6%	100.0%
Total	179	100%	

As presented in Table 4.3 above, some of the province of residence categories were combined to ensure that the categories' value was greater than five as required for statistical comparisons. The province of KZN received the most responses from underserved community residents, with a total of 23.5 percent, with Mpumalanga, North West and Western Cape collectively having the least number of responses with 3.9 percent.

4.3.4 Employment status distribution of the respondents

Employment status distribution of the respondents is presented in Table 4.4 below.

Table 4.4: Employment status distribution of respondents (N = 179)

	Frequency	Percentage	Cumulative Percentage
Employed	53	29.6%	29.6%
Self-Employed and Pensioner	7	3.9%	33.5%
Student	19	10.6%	44.1%
Unemployed	13	7.3%	51.4%
Missing data	87	48.6%	100.0%
Total	179	100%	

According to the data shown in Table 4.4, 87 (48.6%) of respondents chose not to disclose their employment status by not answering this question. The survey found that 53 (29.6%) of respondents were employed, 13 (7.3%) were unemployed, and 7 (3.9%) were self-employed or pensioners.

4.3.5 Monthly income distribution of the respondents

Monthly income distribution of the respondents is presented in Table 4.5 below.

Table 4.5: Monthly income distribution of respondents (N = 179)

	Frequency	Percentage	Cumulative Percentage
Less than R 2000	27	15.1%	15.1%
Between R 2000 and R 5000	20	11.2%	26.3%
Between R 5000 and R 10000	10	5.6%	31.8%
Greater than R 10000	101	56.4%	88.3%
Missing data	21	11.7%	100.0%
Total	179	100%	

Table 4.5 above shows a sample of underserved community residents, with a maximum of 101 (56.4%) of respondents reporting a monthly income range above R10000 per month. with at least 9 (5.8%) reporting between R5000 and R10000. **Note:** The above data may appear inconsistent with the employment status distribution data in Table 4.4 due to respondents' ability to decline to answer certain questions.

4.4 Descriptive Statistics

The researcher was able to determine the frequencies and percentages by using descriptive statistics to investigate the impact of the closure of traditional banking channels such as bank branches. Descriptive statistics were used to collect data from related questions about traditional banking, digital banking accessibility, and digital banking knowledge and utilization.

4.4.1 Descriptive statistics for traditional banking questions

The descriptive statistics for the traditional banking questions (Q8-Q15) are presented in Table 4.6 below.

Table 4.6: Descriptive statistics for traditional banking questions (N = 179)

Q8. Do you have Bank Account	Frequency	Percentage	Cumulative Percentage
Yes	172	96.1%	96.1%
No	1	0.6%	96.6%
Missing data	6	3.4%	100.0%
Grand Total	179	100.0%	
Q9. How often do you go to the bank branch in a month?	Frequency	Percentage	Cumulative Percentage
Never	42	23.5%	23.5%
Once a month	61	34.1%	57.5%
Between one and five times a month	37	20.7%	78.2%
More than five times a month	3	1.7%	79.9%
Only when I have no other choice	30	16.8%	96.6%
Missing data	6	3.4%	100.0%
Grand Total	179	100.0%	
Q10. What are the main banking activities that you perform at the bank branch?	Frequency	Percentage	Cumulative Percentage
Money deposits or transfers	103	25.9%	25.9%
Bill Payments	49	12.3%	38.2%
Prepaid services	55	13.8%	52.0%
Enquiries (statements, card renewals etc.)	72	18.1%	70.1%
Cash Withdrawals	102	25.6%	95.7%
Other, please specify:	17	4.3%	100.0%
Grand Total	398	100.0%	
Q11. How far away is the bank branch from your home?	Frequency	Percentage	Cumulative Percentage
Less than 2km's	24	13.4%	13.4%
Between 2km's and 5km's	40	22.3%	35.8%
Greater than 5km's	107	59.8%	95.5%
Missing data	8	4.5%	100.0%
Grand Total	179	100.0%	
Q12. How do you get to the bank branch?	Frequency	Percentage	Cumulative Percentage
I walk to the branch	10	5.6%	5.6%
I use public transportation	85	47.5%	53.1%
I drive to the branch	77	43.0%	96.1%
Missing data	7	3.9%	100.0%
Grand Total	179	100.0%	

Q13. What are some of the bank branch challenges that you experience?	Frequency	Percentage	Cumulative Percentage
Long waiting times	65	36.3%	36.3%
Slow service delivery	29	16.2%	52.5%
Other, please specify:	7	3.9%	56.4%
Missing data	78	43.6%	100.0%
Grand Total	179	100.0%	
Q14. Has there been any bank branches that have closed in your area?	Frequency	Percentage	Cumulative Percentage
Yes	77	43.0%	43.0%
No	95	53.1%	96.1%
Missing data	7	3.9%	100.0%
Grand Total	179	100.0%	
Q15. If yes, what banking alternatives have been available to you? You can select multiple...	Frequency	Percentage	Cumulative Percentage
Internet Banking	18	10.1%	10.1%
Cell phone Banking	33	18.4%	28.5%
ATMs	18	10.1%	38.5%
Other, please specify:	2	1.1%	39.7%
Missing data	108	60.3%	100.0%
Grand Total	179	100.0%	

As presented in Table 4.6, majority of respondents (96.1%) have a South African bank account with only one respondent (0.6%) not having one. This study only looked at responses from respondents who had an account with a South African banking institution.

The two questions (Q9 and Q10) sought to ascertain how frequently respondents visited the bank branch and what activities they engaged in. The majority of respondents went to the bank at least once a month, primarily to make money deposits and transfers, as well as cash withdrawals, while 23.5 percent never went to a bank branch in a month.

For the three questions (Q11, Q12 and Q13) relating to the distance of bank branch from the respondent's residence, the means of getting to the branch and the challenges encountered at the branch, the above Table 4.6 shows that for many of the respondents (59.8%) the distance is greater than 5km's, with many of the respondents (47.5%) using public transportation. The majority of respondents (36.3%) stated that their bank branch's challenge was long wait times.

The two questions (Q14 and Q15) were related to whether a bank branch in the respondent's area of residence had closed and what branching alternatives were available in the event of a closure. The majority of the respondents (53.1%) had not experienced any bank branch closures while among those who had (43%), a total of 28.5 percent considered internet banking and cell phone banking as alternatives that were available to them.

4.4.2 Descriptive statistics for digital banking accessibility questions

The descriptive statistics for digital banking accessibility questions (Q16-Q20) are presented in Table 4.7 below.

Table 4.7: Descriptive statistics for digital banking accessibility questions (N = 179)

Q16. Do you own a computer, laptop or smart cellphone?	Frequency	Percentage	Cumulative Percentage
Yes	163	91.1%	91.1%
No	8	4.5%	95.5%
Missing data	8	4.5%	100.0%
Grand Total	179	100.0%	
Q17. Do you have access to the internet?	Frequency	Percentage	Cumulative Percentage
Yes	74	41.3%	41.3%
No	4	2.2%	43.6%
Missing data	101	56.4%	100.0%
Grand Total	179	100.0%	
Q18. Do you encounter issues with internet connectivity in your area?	Frequency	Percentage	Cumulative Percentage
Yes	120	67.0%	67.0%
No	36	20.1%	87.2%
Missing data	23	12.8%	100.0%
Grand Total	179	100.0%	200.0%
Q19. Do you encounter issues with electricity in your area (excluding national load-shedding)?	Frequency	Percentage	Cumulative Percentage
Yes	128	71.5%	71.5%
No	33	18.4%	89.9%
Missing data	18	10.1%	100.0%
Grand Total	179	100.0%	

Q20. Do you use mobile applications on your smart phone?	Frequency	Percentage	Cumulative Percentage
Yes	75	41.9%	41.9%
No	4	2.2%	44.1%
Missing data	100	55.9%	100.0%
Grand Total	179	100.0%	

Respondents were asked questions about accessibility, as shown in Table 4.7 above. In Q16 and Q17 respondents were asked if they had a computer, laptop or smart cell phone and access to the internet. Many of them (91.1%) did own digital devices and 41.3 percent had internet access. A total of 56.4% of those polled chose not to answer this question.

To determine if accessibility was an issue, two questions (Q18 and Q19) were asked to establish whether respondents encountered issues with internet connectivity or power outages in their community. A majority of 67 percent and 71.5 percent of the respondents respectively, reported problems with online connectivity and electricity. This demonstrates that many underserved communities face internet and electricity connectivity issues.

Q20 asked respondents if they used mobile applications on their smartphone, with some of the respondents (41.9%) affirming and only 2.2 percent denying, while majority of the respondents (55.9%) choosing not to answer

4.4.3 Descriptive statistics for digital banking knowledge and utilization questions

The descriptive statistics for digital banking knowledge and utilization questions (Q22-Q23) are presented in Table 4.8 below.

Table 4.8: Descriptive statistics for digital banking knowledge and utilization questions (N = 179)

Q22. Have you heard of Digital Banking (Internet and Cellphone banking)?	Frequency	Percentage	Cumulative Percentage
Yes	153	85.5%	85.5%
No	11	6.1%	91.6%
Missing data	15	8.4%	100.0%
Grand Total	179	100.0%	

Q23. Do you use Digital Banking (Internet or Cellphone Banking) to do banking?	Frequency	Percentage	Cumulative Percentage
Yes	132	73.7%	73.7%
No	25	14.0%	87.7%
Missing data	22	12.3%	100.0%
Grand Total	179	100.0%	
Q43. Do you use Digital Banking (Internet or Cellphone Banking) as a result of the closing of bank branches in your area? Code	Frequency	Percentage	Cumulative Percentage
No	31	17,3%	17,3%
Yes	35	19,6%	36,9%
Missing data	113	63,1%	100,0%
Grand Total	179	100,0%	
Q27. Do you believe that Digital Banking is secure?	Frequency	Percentage	Cumulative Percentage
Yes	83	46,4%	46,4%
Not Sure	57	31,8%	78,2%
No	14	7,8%	86,0%
Missing data	25	14,0%	100,0%
Grand Total	179	100,0%	
Q28. Do you believe that Digital Banking is convenient and saves you time?	Frequency	Percentage	Cumulative Percentage
Don't Know	7	3,9%	3,9%
Yes	66	36,9%	40,8%
Missing data	106	59,2%	100,0%
Grand Total	179	100,0%	
Q29. Would you recommend Digital Banking to friends and family?	Frequency	Percentage	Cumulative Percentage
Yes	120	67,0%	67,0%
Not Sure	26	14,5%	81,6%
No	8	4,5%	86,0%
Missing data	25	14,0%	100,0%
Grand Total	179	100,0%	
Q45. Which of the below banking options do you prefer?	Frequency	Percentage	Cumulative Percentage
Branch Banking	5	2,8%	2,8%
Digital Banking	38	21,2%	24,0%
Both	29	16,2%	40,2%
Missing data	107	59,8%	100,0%
Grand Total	179	100,0%	

Q44: If no, why do you use digital banking?	Frequency	Percentage	Cumulative Percentage
Convenient and easy to use	46	25,7%	25,7%
To exercise financial control	16	8,9%	34,6%
Improved security	14	7,8%	42,5%
Reduced banking fees	23	12,8%	55,3%
Other Convenient but insecure	1	0,6%	55,9%
Missing data	79	44,1%	100,0%
Grand Total	179	100,0%	

Table 4.8 above contains responses to questions about knowledge and use of digital banking. For the three questions (Q22, Q23, and Q43) relating to respondents' knowledge and use of digital banking, as well as whether the use was as a result of branch closure, the majority of respondents (85.5%) had heard of digital banking, 73.7 percent used it and only 19.6 percent had used digital banking as a result of the closure of a bank branch.

For the four questions (Q27, Q28, Q29, and Q45) about security, convenience, recommendation, and banking preferences, many respondents (46.4%) believed that digital banking is secure, 36.9 percent believed that it is convenient, 67 percent said that they would recommend digital banking to family and friends, and 21.2 percent preferred digital banking over branch banking, though others preferred both. Q44 affirms that majority of respondents (25.7%) use digital banking due to its ease of use and convenience.

Table 4.9: Descriptive statistics for digital banking utilization limitations questions (N = 179)

Q25 What are some of the challenges that you have experienced with Internet or Cellphone Banking?	Frequency	Percentage	Cumulative Percentage
Slow or no internet access)	38	21,2%	21,2%
Fraud or security issues)	18	10,1%	31,3%
Technical challenges)	26	14,5%	45,8%
Haven't experienced any challenges)	9	5,0%	50,8%
Tedious processes when device is lost or stolen	1	0,6%	51,4%
adhoc unavailability of service	1	0,6%	52,0%
Missing data	86	48,0%	100,0%
Grand Total	179	100,0%	

Q26_4 What are some of the reasons or issues that prevent you from using Internet or Cellphone banking?	Frequency	Percentage	Cumulative Percentage
Load shedding / Power cuts	76	27,2%	27,2%
Poor internet connectivity	75	26,9%	54,1%
Security concerns	32	11,5%	65,6%
Data affordability	41	14,7%	80,3%
Do not have a smart phone or computer	3	1,1%	81,4%
Do not trust technology	12	4,3%	85,7%
Prefer human contact	22	7,9%	93,5%
Do not see the need	12	4,3%	97,8%
Do not know how to use digital banking	5	1,8%	99,6%
The slow growth of banks of innovation i.e. I still need to go to a branch for some services	1	0,4%	100,0%
Grand Total	279	155,9%	

Respondents were asked about the limitations of digital banking usage, as shown in Table 4.9 above. In Q25, respondents were asked about the digital banking challenges they had encountered. The majority of the respondents (21,2%) stated that slow or absence of an internet connection was the primary challenge, with technical issues being secondary for some of the respondents (14.5%).

Q26_4 inquired about the reasons or issues that keep respondents from using digital banking. The top four reasons or issues mentioned by respondents were power outages (27,2%), poor online connectivity (26,9%), data affordability (14,7%) and security concerns (11.5%). This indicates that underserved communities are primarily affected by these issues, which may pose a significant barrier to accessing digital banking.

Table 4.10: Frequency, Mean, and Standard Deviation for confidence level and difficulty to use digital banking (N=179)

	N	Missing Values	1	2	3	4	5	Mean	Std
			Not at all confident	Somewhat not confident	Unsure	Somewhat confident	Very confident		
Q21 Please rate your confidence with using computer-based or mobile applications and technology.	179	18	11	16	16	55	63	3,89	0,1
		10,1%	6,1%	8,9%	8,9%	30,7%	35,2%		
	N	Missing Values	Very Easy	Easy	Not that Difficult	Difficult	Very Difficult	Mean	Std
Q24_6 If yes, on a scale from 0 to 10, 0 being very easy and 10 being extremely difficult, how do you find using Digital Banking (Internet and Cellphone Banking)? Code	179	100	29	13	7	10	20	2,73	1,65
		55,9%	16,2%	7,3%	3,9%	5,6%	11,2%		

As reflected in Table 4.10 above, with (Q21), most of the respondents (65.9%) are confident with using computer-based or mobile applications while 23.9 percent are not ($\bar{X} = 3.89$; $SD = 0.1$). This indicates that the majority of respondents from underserved communities are likely to be comfortable using digital banking.

For (Q24_6) when respondents were asked about their experience with using digital banking, most respondents (23.5%) stated that it was easy to use digital banking as opposed to the 16.8 percent that believed it was difficult while 3.9 percent stated that it was not that difficult ($\bar{X} = 2.73$; $SD = 1.65$). This indicates that there are a large number of respondents who are comfortable with digital banking, but there are also a significant number of respondents who are not, based on the small difference in the numbers.

4.5 Hypothesis testing

The purpose of this section is to describe the results of statistical calculations conducted to meet the research objectives of this study. The first research objective was: *“To determine if the closure of bank branches affect the community in underserved areas.”*

4.5.1 Hypothesis H1

Hypothesis **H1₀**: The closure of bank branches does not influence the community in underserved areas.

Hypothesis **H1_A**: The closure of bank branches does influence the community in underserved areas.

The first research objective was: *“To develop an understanding of the factors that influence the banking activities of underserved communities”*

To test this hypothesis a Chi-square test for independence was used to explore the relationship between the effect on the activities that the respondents perform at the bank branch and the closure of bank branches. The results of the descriptive data collected from the respondents from three questions are presented below. **Table 4.11** below presents the descriptive statistic of *question 9* where the respondents were asked how many times, they visited their bank branch during a month.

Table 4.11: Respondents monthly visits to their bank branch (N = 179)

	Frequency	Percentage	Cumulative Percentage	Affected
Between one and five times a month	37	20.67%	20.67%	Yes
More than five times a month	3	1.68%	22.35%	Yes
Once a month	61	34.08%	56.42%	Yes
Only when I have no other choice	30	16.76%	73.18%	Yes
Never	42	23.46%	96.65%	No
Missing data	6	3.35%	100.00%	
Total	179	100%		

As presented in Table 4.11 a total of 73.18 percent of the respondents visited their bank at least one a month while 23.46 percent never visited their bank branch. This means that 73.18 percent of respondents will be affected if their bank should close. Table 4.12 below presents the descriptive statistic of question 10 where the respondents were asked about the main banking activities that they perform at the bank branch.

Table 4.12: Respondents main activities at their bank branch (N = 179)

	Frequency	Percentage	Cumulative Percentage	Affected
Money deposits or transfers	103	25.88%	25.88%	Yes
Cash Withdrawals	102	25.63%	51.51%	Yes
Bill Payments	49	12.31%	63.82%	No
Prepaid services	55	13.82%	77.64%	No
Enquiries (statements, card renewals etc.)	72	18.09%	95.73%	No
Other	17	4.27%	100.00%	No
Total	398	100%		

As presented in Table 4.12 above, a total of 51.51 percent of the respondents perform regular activities with their bank branch in the form of money deposits or transfers and cash withdrawals. This means that 51.51percent of participants will be affected if their bank branch should close. **Table 4.13** below presents the descriptive statistic of *question 14* where the respondents were asked if there have there been any bank branch closers in their community.

Table 4.13 Bank branch closures in respondents' community (N = 179)

	Frequency	Percentage	Cumulative Percentage	Affected
Yes	77	43.02%	43.02%	Yes
No	95	53.07%	96.09%	No
Missing data	7	3.91%	100.00%	
Total	179	100%		

As presented in Table 4.13 above, which shows a total of 43.02% of the respondents that reported bank branch closures in their communities.

A total of 102 respondents were affected by both visiting their bank branch regularly for business and to conduct money deposits, transfers or conduct cash withdrawals. Table 4.14 below presents the results to determine if there is an association between bank branch closures and the effect it might have on the communities in underserved areas.

Table 4.14: The influence of bank branch closers on the communities in underserved areas

Bank branch closures	Conduct business with bank branch		No business with bank branch		Missing Data		p value
	n = 103 (59%)		n = 70 (40.4%)		n = 1 (0.6%)		
	Freq.	%	Freq.	%	Freq.	%	
Yes	45	25.1	32	17.9	1		0.695
No	57	31.8	38	21.2	0	0	

These differences are not significant as a Chi-square test for independence indicated that there is not a significant association between variables *Bank branch closures* with *Conduct business with bank branch* and *No business with bank branch*, $X^2(2, n = 173) = .726, p = .695$. Given the *p value* of 0.695, which is greater than 0.05, the result is statistically insignificant.

Based on this finding, the above null hypothesis is accepted and an alternative hypothesis that states that bank branch closures do not have an effect on the communities in underserved areas is accepted.

4.5.2 Hypothesis H2

Hypothesis **H2₀**: The closure of bank branches does not increase the use of digital banking in underserved communities.

Hypothesis **H2_A**: The closure of bank branches increases the use of digital banking in underserved communities.

The third research objective was: *“To determine whether the closure of bank branches increases the use of digital banking in underserved communities.”*

To test this hypothesis, a Chi-square test for independence was used to investigate the relationship between the closure of a bank branch and people's proclivity to use digital banking as a result. The results of the descriptive data collected from the respondents in response to two questions are shown below. **Table 4.15** below presents the descriptive statistics for *question 14 and question 43* where the respondents were asked if there had been any bank branch closures in their area and whether they used digital banking because of the bank branches closing.

Table 4.15: Bank branch closures in underserved communities (N=179)

Q14. Has there been any bank branches that have closed in your area?	Frequency	Percentage	Cumulative Percentage
Yes	77	43.0%	43.0%
No	95	53.1%	96.1%
Missing data	7	3.9%	100.0%
Grand Total	179	100.0%	

As presented in the Table 4.15 above, where it shows that only 77 (43%) of respondents had encountered bank branch closures in their area, while the majority 95 (53.1%) of the respondents had not experienced any closures of branches. This means that a total of 43 percent of the participants of the survey may be affected by the closures of bank branches in their community.

Table 4.16: Digital Banking due to Bank branch closures in underserved communities (N=179)

Q43. Do you use Digital Banking (Internet or Cellphone Banking) as a result of the closing of bank branches in your area? Code	Frequency	Percentage	Cumulative Percentage
No	31	17,3%	17,3%
Yes	35	19,6%	36,9%
Missing data	113	63,1%	100,0%
Grand Total	179	100,0%	

As presented in the Table 4.16 above, there was 31 (17.3%) of respondents who answered “No” when asked if they had used digital banking as a result of bank branch closures, while 35 (19.6%) of the respondents answered “Yes”. The majority of respondents (63.1 percent) did not respond to this question because of the 63.1 percent, there were those who were excluded from answering due to the preceding question 23 that asked whether respondents used digital banking. This means that only 40 percent of the participants responded to the above question, and majority of those 40 percent use digital banking as a result of branch closures.

A total of 107 respondents did not respond to the question related to the adoption of digital banking due to bank branch closures. However, out of the 75 respondents that said either Yes or No to the question, 35 of those respondents had decided to use digital banking as a result of the bank branch closure. Table 4.17 below presents the results to determine if there is an association between bank branch closures and digital banking adoption as a result of branch closures in underserved areas.

Table 4.17: Respondent’s adoption of digital banking due to bank branch closures in underserved communities

Bank branch closures	Digital Banking due to branch closure (Yes)		Digital Banking due to branch closure (No)		Missing Data		p value
	<i>n = 35(20%)</i>		<i>n = 30(17%)</i>		<i>n = 107(60%)</i>		
	<i>Freq.</i>	<i>%</i>	<i>Freq.</i>	<i>%</i>	<i>Freq.</i>	<i>%</i>	
Yes	23	12.8	12	6.7	42	23.5	0.039
No	12	6.7	18	10.1	65	36.3	

As presented above in Table 4.17, the model is quite significant as a Chi-square test for independence indicated a significant relationship between the *closing of bank branches* and the *respondent's adoption of digital banking due to the bank branch closure* variables, $X^2(4, n = 179) = 10.09, p = .039$. Given the *p value* of 0.000, which is less than 0.05, the result is considered statistically significant

Based on this finding, the above null hypothesis is rejected and a directional alternative hypothesis that states that the closure of bank branches does increase the adoption of digital banking in underserved communities is accepted.

4.5.3 Hypothesis H3

Hypothesis **H3₀**: Electricity and broadband issues as well as a lack of digital literacy and security concerns do not prevent underserved communities from adopting digital banking.

Hypothesis **H3_A**: Electricity and broadband issues as well as a lack of digital literacy and security concerns prevent underserved communities from adopting digital banking.

The first research objective was: *“To develop an understanding of the factors that influence the banking activities of underserved communities”*

To test this hypothesis a Chi-square test for independence and logistic regression was used to determine if a relationship between electricity and broadband issues as well as a lack of digital literacy and security concerns, the effect on the activities that the respondents perform at the bank branch and the closure of bank branches. The results of the descriptive data collected from the respondents from four questions are presented below. **Table 4.18** below presents the descriptive statistic of *question 18 and 19* where the respondents were asked if they encounter electricity and broadband issues and *question 27* where they were asked if they believed that digital banking is secure.

Table 4.18: Descriptive statistics for electricity and broadband connectivity issues and security concern

Q18. Do you encounter issues with internet connectivity in your area?	Frequency	Percentage	Cumulative Percentage
Yes	120	67.0%	67.0%
No	36	20.1%	87.2%
Missing data	23	12.8%	100.0%
Grand Total	179	100.0%	200.0%
Q19. Do you encounter issues with electricity in your area (excluding national load-shedding)?	Frequency	Percentage	Cumulative Percentage
Yes	128	71.5%	71.5%
No	33	18.4%	89.9%
Missing data	18	10.1%	100.0%
Grand Total	179	100.0%	
Q27. Do you believe that Digital Banking is secure?	Frequency	Percentage	Cumulative Percentage
Yes	83	46,4%	46,4%
Not Sure	57	31,8%	78,2%
No	14	7,8%	86,0%
Missing data	25	14,0%	100,0%
Grand Total	179	100,0%	

As shown in Table 4.18 above, a majority of 67 percent and 71.5 percent of the respondents respectively, reported problems with online connectivity and electricity. This demonstrates that many underserved communities face internet and electricity connectivity issues. Many respondents (46.4 %) believed that digital banking is secure, compared to 7.8 percent who did not believe it was secure and 31.8 percent who were unsure.

Table 4.19: Frequency, Mean, and Standard Deviation for confidence level and difficulty to use digital banking

	N	Missing Values	1	2	3	4	5	Mean	Std
			Not at all confident	Somewhat not confident	Unsure	Somewhat confident	Very confident		
Q21 Please rate your confidence with using computer-based or mobile applications and technology.	179	18	11	16	16	55	63	3,89	0,1
		10,1%	6,1%	8,9%	8,9%	30,7%	35,2%		
	N	Missing Values	Very Easy	Easy	Not that Difficult	Difficult	Very Difficult	Mean	Std
Q24_6 If yes, on a scale from 0 to 10, 0 being very easy and 10 being extremely difficult, how do you find using Digital Banking (Internet and Cellphone Banking)? Code	179	100	29	13	7	10	20	2,73	1,65
		55,9%	16,2%	7,3%	3,9%	5,6%	11,2%		

The values presented by Table 4.19 above with majority of the respondents being confident using computer based and mobile application technology and finding it relatively easy to bank online implying that the majority of respondents from underserved communities are likely to be comfortable using digital banking but there are also a significant number of respondents who are not, based on the small difference in the numbers.

4.5.3.1 Logistic regression

Logistic regression was used to determine which factors contribute the most to digital banking adoption in underserved communities. The dependent or response variable used was based on question 23, which asked whether respondents used digital banking for banking purposes. This variable is used as the constant variable against the predictor variables, internet connectivity issues, electricity issues, lack of digital literacy and security concerns which were based on *question 18,19,21,24 and 27* respectively. The dependent variable is dichotomous, with two possible values (6-Yes,7-No).

As shown in Table 4.20 below, the model had 4 independent variables or predictors. The full model containing all the predictors was statistically significant, $X^2 (1, N = 179) = -2.274, p < .005$. This indicated that the model was able to predict the respondents that used digital banking to those that did not. The model explained between 19.2% (Cox and Snell R Square) and 41.5% (Nagelkerke R Square) of the variance in not using digital banking. As shown below in Table 4.x, only one independent variable (Confidence using computer-based or mobile application technology) made a significant statistically significant contribution to the model.

Table 4.20: Binary logistic regression predicting the factor of influence to the use of digital banking

	B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I. for EXP(B)	
							Lower	Upper
Q27. Do you believe that Digital Banking is secure? Code	.247	.366	.456	1	.499	1.281	.625	2.626
Q18 Do you encounter issues with internet connectivity in your area? Code	-16.048	10538.590	.000	1	.999	.000	.000	.
Q19. Do you encounter issues with electricity in your area (excluding national load-shedding)? Code	-17.485	10441.263	.000	1	.999	.000	.000	.
Q21. Code Load Please rate your confidence with using computer-based or mobile applications and technology. Code Load	-1.103	.392	7.910	1	.005	.332	.154	.716
Q24_6. Code Load If yes, on a scale from 0 to 10, 0 being very easy and 10 being extremely difficult, how do you find using Digital Banking (Internet and Cellphone Banking)?	.236	.362	.423	1	.515	1.266	.622	2.575
Constant	200.171	89010.590	.000	1	.998	8.571E+86		

The strongest predictor of respondents not using digital banking to perform banking activities was the variable, Confidence using computer-based or mobile application technology, reporting and Exp(B) or Odds Ratio of .332. This tells us that an increase in confidence may result in a decrease in the odds of not using digital banking. In other words, an increase in confidence to use mobile applications may lead to an increase in the use of digital banking in underserved communities.

4.5.4 Hypothesis H4

Hypothesis **H4₀**: The closure of bank branches does not result in the financial exclusion of people in underserved communities.

Hypothesis **H4_A**: The closure of bank branches results in the financial exclusion of people in underserved communities.

The third research objective was: *“To investigate whether or not the closure of bank branches results in the financial exclusion of people residing in underserved communities”*

To test this hypothesis a Chi-square test for independence was used to determine if a respondent was a potential candidate for financial exclusion due to bank branch closures. Two variables, "Potentially Financially Excluded" and "Is Financially Excluded," were created to determine if a respondent was a potential candidate for financial exclusion due to bank branch closures.

Potentially Financially Excluded

The *Potentially Financially Excluded* variable was created with the data of the following four questions:

- Question 16 - Do you own a computer, laptop or smart cell phone?
- Question 17 - Do you have access to the internet?
- Question 18 - Do you encounter issues with internet connectivity in your area?
- Question 19 - Do you encounter issues with electricity in your area (excluding national load-shedding)?

Table 4.21 below presents the questions and possible answers by respondents that are used as the criteria in the steps to determine if a respondent is a possible candidate for financial exclusion.

Table 4.21: Potential financial exclusion criteria

Questions	Response	Potentially Financially Excluded
Q16: Do you own a computer, laptop or smart cell phone?	No	Yes
Q17: Do you have access to the internet?	No	Yes
Q18: Do you encounter issues with internet connectivity in your area?	Yes	Yes
Q19: Do you encounter issues with electricity in your area (excluding national load-shedding)?	Yes	Yes

As presented in the Table 4.21 above, a respondent may be possibly financially excluded if they do not own a computer, laptop or smart cell phone and do not have access to the internet. If respondents encounter broadband issues and intermittent electricity power outages in their area, they are also a possible candidate for financial exclusion. These respondents are referred to as candidates because they may have other means of transacting digitally, possibly from an area that does not have internet connectivity or intermittent electricity issues.

Is Financially Excluded

The *Is Financially Excluded* variable was created with the resulting data from the *Potentially Financially Excluded* variable, *question 9 and question 14* where the respondents were asked, how many times in a month do they visit the bank branch and if there had there been any bank branch closures in their community

Table 4.22: Candidate for financial exclusion criteria

Criteria	Response	Financially Excluded
Potentially Financially Excluded	Yes	Yes
Q9: How often do you go to the bank branch in a month?	≥ 1	Yes
Q14: Has there been any bank branches that have closed in your area?	Yes	Yes

As presented in Table 4.22 above, respondents may be candidates for financial exclusion if they lack accessibility to smart devices and services that enable digital banking and more so if they visited the bank branch at least once a month and had also been affected by a branch closure in their area.

A total of 118 respondents were considered financial exclusion candidates based on the lack of digital banking accessibility and the number of monthly bank branch visits Table 4.23 below presents the results to determine if there is an association between bank branch closures and the possible financial exclusion impact it might have on the underserved community’s residents.

Table 4.23: The influence of bank branch closures on financial exclusion in underserved communities

Bank branch closures	Financial Exclusion Candidate		Not a Financial Exclusion Candidate		Missing Data		p value
	n = 118 (66%)		n = 54 (30%)		n = 7 (4%)		
	Freq.	%	Freq.	%	Freq.	%	
Yes	57	31.8	20	11.2	0	0	0.000
No	61	34.1	34	19.0	7	3.9	

As presented above in Table 4.23, the model is quite significant as a Chi-square test for independence indicated a significant association between the variables *Bank branch closures* with potential *Financial Exclusion Candidate* and *Not a Financial Exclusion Candidate*, $X^2(2, n = 179) = 15.916, p = .000$. Given the *p value* of .000, which is less than 0.05, the result is statistically significant.

Based on this finding, the null hypothesis stated above is rejected, and a directional alternative hypothesis stating that the closure of bank branches results in the potential financial exclusion of people in underserved communities is accepted.

5 DISCUSSION OF RESEARCH FINDINGS

5.1 Introduction

The previous chapter presented the results of data collected from questionnaires returned by respondents in South African underserved communities. Multiple variables were used to investigate the impact of traditional banking channels such as bank branches closing and the introduction of digital banking.

This chapter interprets the findings and discusses the hypotheses tests in relation to the findings and the research problem. The findings are discussed in light of the literature review presented in the second chapter. Following that, the chapter concludes with a summary of the analysis and findings.

5.2 Research Objectives for the Study

The main research objective defined for the study is:

To investigate how banking customers in underserved communities are affected by the introduction of digital banking and the closure of traditional banking channels such as bank branches.

The sub research objective defined for the study is:

- *Sub Research Objective 1:* To develop an understanding of the factors that influence the banking activities of underserved communities.
- *Sub Research Objective 2:* To investigate the influence of the closure of traditional banking channels such as bank branches on underserved communities.
- *Sub Research Objective 3:* To determine whether the closure of traditional banking channels, such as bank branches, results in the financial exclusion of underserved communities.

- *Sub Research Objective 4:* To make recommendations to banking institutions on how to lessen the impact of the closure of traditional banking channels such as bank branches on underserved communities.

5.3 Main Results from the Study

A brief description of the study's demographic data will be presented, followed by the findings from the literature review and the results of the primary research. Each of the research questions and hypotheses defined in Chapter 1 of the study will present their findings in this section.

5.3.1 Demographical results

The gender distribution of the study's participants included more than 60 percent men, implying that the results were skewed toward men, assuming that men are more likely than women to use digital banking. More than 62 percent of those who took part were between the ages of 25 and 44, indicating that younger people are more likely than older people to use digital banking. The majority of respondents live in KZN, which could be as a result of the researcher sending the survey to a majority of people who reside in KZN. A few of the respondents are unemployed, with the majority working and earning more than R10000 per month, which explains their need for banking.

5.3.2 Analysis of research question 1

Research Question: *“Does the closure of bank branches influence/impact the community in underserved areas?”*

The primary research results in Table 4.11 and Table 4.12 show that a total of 73.18 percent of respondents visited the bank branch and that 51.51 percent did so to make cash deposits, transfers, and withdrawals.

As shown in Figure 4.1 below, the majority of respondents from underserved communities had not experienced a bank branch closure in their area of residence. This means that the results of the research question and hypothesis are based on the 43 percent of respondents who had experienced the bank branch closure.

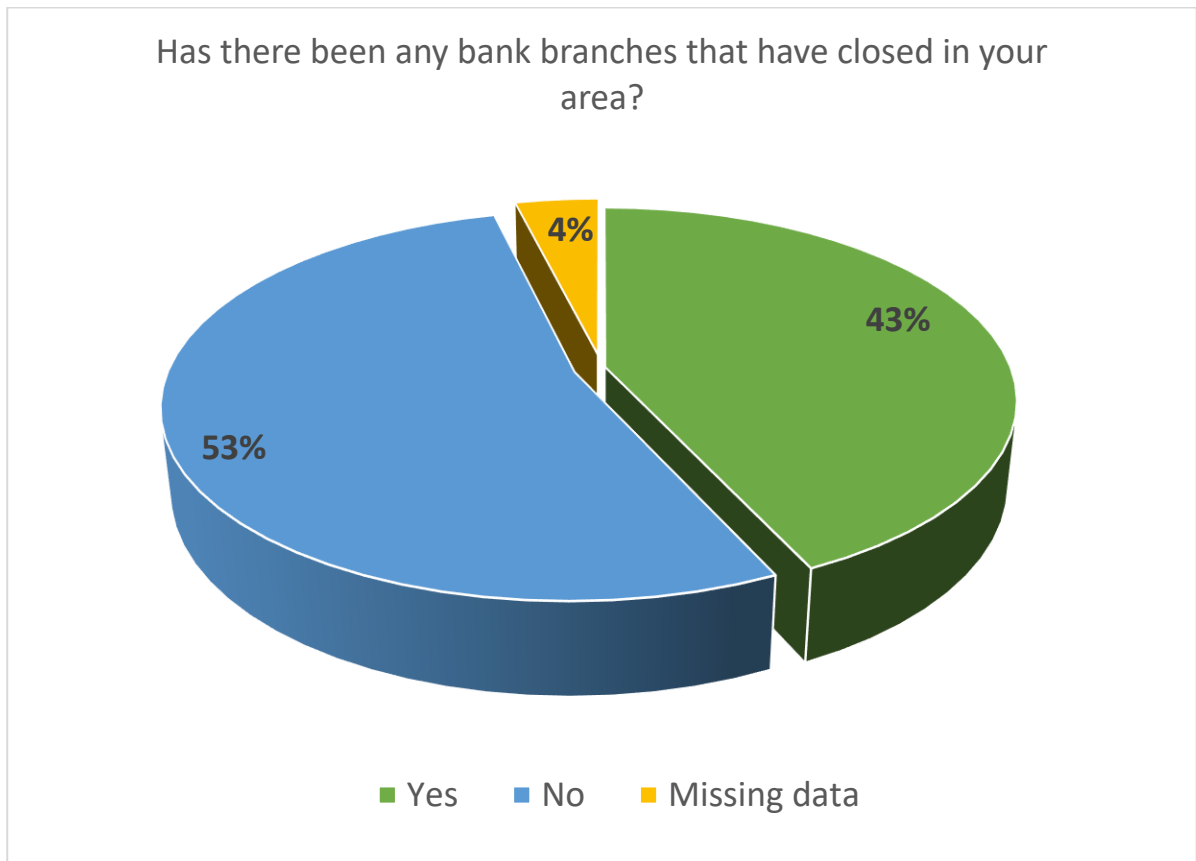


Figure 5.1: Number of respondents that experienced bank branch closures

The results from the primary research, from the chi squared test (Table 4.23) reveals that the *p* value of 0.000 is less than 0.05 indicating that the results are statistically significant, meaning that there is an association between bank branch closures and variables related to conducting business with bank branches, which was calculated from questions determining whether the respondent was impacted

Many of the respondents had not experienced branch closures in their area and as a result were not affected in this regard. However, the looting unrest led to the destruction of many buildings, resulting in the closure of banking institutions in adequately served areas where some of the underserved community residents would conduct their banking activities.

The study is consistent with Mchunu's (2021) report that banks had closed more than 300 bank branches and ATMs and would not accept cash or deposits until it was safe to do so. The destruction of branches and ATMs has hampered South Africans' ability to withdraw cash and make payments for their daily needs.

However, the results of the chi squared test reveals that the *p value* of 0.695 is greater than 0.05 indicating that the results were statistically not significant meaning that there is no association between the closure of the bank branch and those of conducting business at the bank branch. Based on this finding, the null hypothesis that bank branch closures have no effect on communities in underserved areas is accepted, and the alternative hypothesis is rejected.

The results of the primary research are inconsistent with the reports in the literature review that suggest that people are impacted by the closure of bank branches and the absence of banking institutions in their area.

5.3.3 Analysis of research question 2

Research Question: *“Does the closure of bank branches increase the use of digital banking in underserved communities?”*

As shown in Figure 4.2, a significant number of respondents did not respond to this question, either because they did not want to or because there was a preceding question that prevented them from answering.

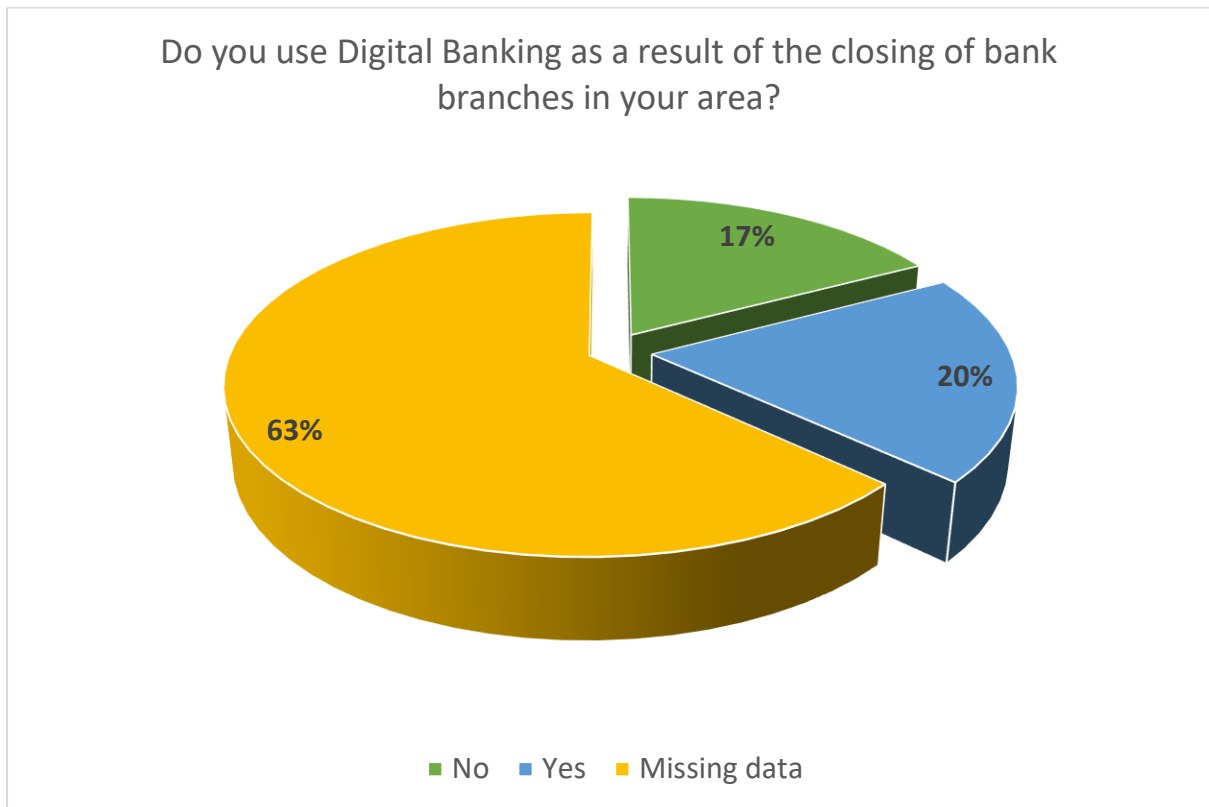


Figure 5.2: Use of digital banking due to bank branch closure

The results from the primary research, from the chi squared test reveals that the *p value* of 0.039 is less than 0.05 indicating that the results were statistically significant, indicating there is an association between the two variables branch closures and an increase in the use of digital banking. This means that if a branch closes in the area, underserved community residents are more likely to use digital banking.

The literature review supports the results of Rees (2021) who suggests that the bank branch closure can be attributed to the growth in digital banking as the main driver toward operational and other cost drivers. Based on this finding, the above null hypothesis is rejected and a direct alternative hypothesis that states that the closure of bank branches does increase the adoption of digital banking in underserved communities is accepted. The researcher was therefore able to answer the research question that the closure of bank branches does indeed increase the use of digital banking in underserved communities. The researcher, however, would not accept the above result with confidence due to the large number of missing data and the small number of respondent's data that allowed us to reach this conclusion.

5.3.4 Analysis of research question 3

Research Question: “*Are issues with electricity and broadband, as well as a lack of digital literacy and security concerns, preventing underserved communities from adopting digital banking?*”

As shown in Table 4.18 and 4.19, to determine whether if electricity and broadband issues as well as a lack of digital literacy and security concerns are factors that prevent underserved communities from adopting digital banking. In the primary research, a logistic regression was used as the statistical tool to determine if the factors were able to predict the independent or response variable, that is, use of digital banking.

The logistic regression model revealed a *p value* less than 0.05 indicating that the model was able to predict the respondents that used digital banking to those who did not. The logistic regression shown in Table 4.20, showed that the respondents confidence using computer-based or mobile application technology as the strongest and only predictor that was statistically significant with a *p value* less than 0.05 and an odd ratio less than 1. Pankomera and Van Greunen (2018), confirmed that people that are digitally literate are more likely to understand the digital banking concept and have an awareness and confidence to perform basic activities.

Based on the primary research results, an increase in confidence to use mobile applications may lead to an increase in the use of digital banking in underserved communities. However, since the *p value* of the rest of the factors was greater than 0.05 it means that the results for the accessibility factors, electricity and internet connectivity issues and security concerns were statistically not significant indicating that these factors had no association or relationship with the use of digital banking by respondents.

Based on these results, the above null hypothesis that states that electricity and broadband issues as well as a lack of digital literacy and security concerns do not prevent underserved communities from adopting digital banking, is accepted.

The researcher, however, does not accept the above assumption with confidence due to the large number of missing data and the small number of respondent's data that allowed us to reach this conclusion. Contrary to the primary research, the results in the literature review by Pankomera & Van Greunen (2018) show that inadequate broadband infrastructure is the most significant impediment for those at the bottom of the pyramid's adoption of digital banking.

Trust and security concerns according to Tarhini (2015) and Sathye (1999) are among the reasons for the non-adoption of digital banking. Based on these results, the researcher was able to answer the question that electricity and broadband issues as well as a lack of digital literacy and security concerns do not prevent digital banking adoption by underserved communities.

5.3.5 Analysis of research question 4

Research Question: *“Does the closure of bank branches result in the financial exclusion of people in underserved communities?”*

Table 4.21 and 4.22, shows the criteria that determines if respondents are potential candidates for financial exclusion. A total of 66 percent of respondents were considered financial exclusion candidates due to the lack of digital banking accessibility and the number of monthly bank branch visits.

The results from the primary research, from the chi squared test reveals that the *p value* of 0.000 is less than 0.05 meaning that the results are statistically significant, indicating that there is an association between the dependent variable, bank branch closure and the independent variable, financial exclusion candidate.

The findings of the primary research are consistent with the findings of the literature by David-West et al., (2019), who discovered that factors such as rural living, poor infrastructure, and travel distance, as well as economic factors like income inequality, unemployment, account operating costs and fees, and social biases like age, gender, literacy, and language barriers, all contribute to financial exclusion in emerging economies.

Based on these primary research results, the researcher rejected the null hypothesis and accepted the alternative hypothesis stating that the closure of bank branches results in the potential financial exclusion of people in underserved communities. A different finding by Wentzel et al., (2016) suggests that the most significant factors that influence financial exclusion at the bottom of the pyramid in South Africa are primary source of income, education level, age, home language and the number of dependents, and that living in a rural location instead of urban contributed insignificantly toward the research.

5.4 Conclusion

In this chapter the results received from respondents residing in underserved areas were examined. The research questions and study hypothesis were analyzed. The purpose of this chapter was to discuss the study's key research findings.

The demographic data revealed that men made up the vast majority of respondents. Furthermore, the majority of respondents were between the ages of 24 and 44. Many of the respondents lived in KZN, were employed, and had an income range more than R10000 per month.

The four research questions and hypotheses discussion highlighted that those two hypotheses were supported by a statistically significant result with a *p value* less than 0.05, with the other two hypotheses proving to be statistically not significant.

6 SUMMARY, CONCLUSIONS, LIMITATIONS, AND RECOMMENDATIONS

6.1 Introduction

This chapter conducts a comprehensive examination of the research's major findings with the purpose of reflecting on the study's expected outcomes. The study's primary objective is to investigate the impact of bank branch closures and digital banking penetration in South Africa's underserved communities. This chapter will conduct a summary, conclusion, recommendations and conclude with a study limitation.

6.2 Summary

The researcher performed an investigation on the impact of bank branch closure and the penetration of digital banking in underserved communities. The researcher conducted investigations in order to raise awareness about one of the most significant issues that people in underprivileged areas face. The literature has identified some of the benefits of digital banking that impoverished communities may enjoy. However, the researcher identifies some of the challenges that prevent the poor from fully utilizing this benefit. These challenges include issues with digital banking accessibility, such as frequent power outages, poor ICT infrastructure, which may lead to poor broadband connectivity, digital literacy, particularly among the older generation, and poverty, all of which are impediments to the successful adoption and exploitation of digital banking. The literature also emphasizes on the rapid rate at which bank branch closures are occurring, not only in the South Africa but also internationally, posing a problem for those who are unable to adapt to digital channels, and putting them at risk of financial exclusion. For this study, a quantitative research method was used, with a questionnaire serving as the data collection instrument. The questionnaire was distributed to 302 members of South Africa's underserved communities, with only 179 qualifying for inclusion in the study. The study was conducted ethically and anonymously, as confidential information about the respondents was not provided during the data collection process.

The data from the research questionnaires was analyzed and addressed the study's research questions and objectives. The study employed both descriptive and inferential statistics to analyze the data. In terms of demographic data, the researcher discovered that there were significantly more males than females, and that the age distribution majority was between the ages of 25 and 44, with the majority having a monthly income range greater than R10000. The researcher used a few hypothesis testing techniques, which resulted in the confirmation of two of the four hypotheses.

Ultimately, it was discovered that closing bank branches increases the use of digital banking in underserved communities and may lead to financial exclusion of people in underserved communities. The findings of the primary research, however, suggested that bank branches have no influence or impact on the community in underserved areas, and that issues with electricity and internet connectivity, a lack of digital literacy, and security concerns do not prevent underserved communities from using digital banking, which contradicted the findings of the literature review.

6.3 Conclusion

The results of this study indicated that all the research objectives were achieved, and the research questions were answered by the data obtained from this study. In concluding the study, we discuss the objectives and determine whether the study was able to adequately address these objectives.

6.3.1 Research Objective 1

“To develop an understanding of the factors that influence the banking activities of underserved communities”

The researcher used analyses of research question one and hypothesis one, as well as research question three and hypothesis three to address the first research objective. The first research question asked if branch closures had any impact on the community in underserved areas, while the third asked if issues with electricity and broadband, a lack of digital literacy, and security concerns prevent underserved communities from adopting digital banking.

Using statistical testing measures such as the Pearson Chi-square and Binary logistic regression, it was found that the results are statistically not significant with a *p value* greater than 0.05.

This mean that the researcher had to accept the null hypothesis and reject the alternative hypothesis for both hypotheses one and three. This leads us to the conclusion that branch closures do not affect underserved communities and that electricity issues, internet connectivity issues, lack of digital literacy and security concerns do not prevent digital banking use in underserved areas.

The literature, on the other hand, argued that the aforementioned factors play a significant role in communities being affected because branch closures result in people spending more to get to banking institutions that are further away and being inconvenienced because they must adjust to the new circumstances. Although the primary research yielded insignificant results, there is compelling evidence in the literature to believe that the factors mentioned do have an influence on the banking activities of underserved communities.

6.3.2 Research Objective 2

“To investigate the influence of the closure of traditional banking channels such as bank branches on underserved communities”

The researcher used analyses of research question two and hypothesis two to address the second research objective. The second research question asked if the closure of bank branches increases the use of digital banking in underserved communities. The researcher used a Pearson Chi-square test to determine if the bank branch closures had an association with the increase in the use of digital banking in underserved communities.

The results proved to be statistically significant with a *p value* of 0.039 indicating that there was indeed an association between the variables. The researcher rejected the null hypothesis and accepted the alternative hypothesis, which states that bank branch closures increase the use of digital banking by underserved communities.

The findings of the literature aligned with the findings of the primary research in this regard, citing digital banking as the primary reason for bank branch closures. The investigation leads the researcher to the conclusion that the closure of banking branches influences underserved communities to adapt to digital banking channels.

6.3.3 Research Objective 3

“To determine whether the closure of traditional banking channels, such as bank branches, results in the financial exclusion of underserved communities.”

The researcher used analyses of research question four and hypothesis four to address the third research objective. The fourth research question whether the closure of bank branches results in the financial exclusion of people in underserved communities. A Pearson Chi-square test was used to find out if there was any association between bank branch closures and financial exclusion in underserved communities. With a *p value* of 0.000, the results of the test are statistically significant leading the researcher to accept the alternative hypothesis that suggests that bank branch closures may result in the financial exclusion of people in underserved communities. The findings of the literature review are consistent with the findings of the primary research, indicating that poor infrastructure, living in underprivileged areas, unemployment, income, literacy, and language, to name a few, are some of the factors that play a significant role in financial exclusion in emerging economies.

6.3.4 Main Research Objective

The main research question for this study was defined in Chapter 1 as follows:

“To investigate how banking customers in underserved communities are affected by the introduction of digital banking and the closure of traditional banking channels such as bank branches.”

The researcher subdivided the main objective into four smaller objectives. The researcher did this to demonstrate that closing the bank branch has many consequences that must be unpacked individually in order to show the detail of each. The first goal demonstrates how reliant people in underserved communities are on banking branches. The results show that more than 73% of respondents visited a bank branch at least once a month. Furthermore, more than half of those polled engaged in banking activities that are not possible with digital banking. Cash deposits and withdrawals are examples of these activities. Additionally, the first objective revealed and provided an understanding of the accessibility factors (electricity issues, internet connectivity issues, a lack of digital literacy, and security concerns) that impact people in underserved communities' ability to bank digitally.

The second goal was to identify the respondents who used digital banking as a result of bank branch closures. Despite the low numbers, the results show that people in underserved communities are adapting to digital banking despite the challenges of electricity, connectivity, digital literacy, security concerns, and a high rate of unemployment affecting data affordability. The third objective determined whether people in underserved communities are at risk of financial exclusion as a result of bank branch closures and their slow adoption of digital banking, which could be due to the accessibility factors mentioned above.

The fourth objective is to make recommendations to banking institutions on how to mitigate the impact of the closure, which will be discussed in the recommendations section. All of these goals have enabled the researcher to thoroughly investigate and comprehend how the introduction of digital banking and the closure of traditional banking channels such as branches in underserved communities affect banking customers. As a result, the purpose of this study can be concluded to have been met.

6.4 Limitations

The study appears to have focused primarily on internet and cell phone banking, which are subsets of the digital banking services that banks offer to their customers. This choice was made since these two digital banking services are the most popular and widely used among customers. The research was limited to customers who had a bank account with ABSA, Capitec, First National Bank, Nedbank, or Standard Bank.

This was based on the assumption that the majority of people in underserved communities with bank accounts are more likely to have them with one of the aforementioned banking institutions. The most significant limitation was due to a shortcoming in the online survey, which allowed participants to skip some of the questions and not provide an answer. This may have created inconsistencies during data analysis.

6.5 Recommendations

The fourth research objective was: *“To make recommendations to banking institutions on how to lessen the impact of the closure of traditional banking channels such as bank branches on underserved communities”*

Many businesses are taking advantage of technologies that make things easier and more convenient for their customers as the 4th Industrial Revolution (4IR) unfolds. Banking institutions are also shifting to provide these convenient services, putting those who cannot adapt quickly enough at risk of being left behind. To mitigate the impact of bank branch closures, financial institutions may choose to keep some of the branches open to serve the laggards while gradually transitioning customers to self-service banking.

Second, banks may need to find ways to promote digital banking by simplifying it and making it easier to use for people who are digitally illiterate. Customers may be able to download basic, intermediate, or advanced banking applications, with the basic version containing only a few key features and the advanced version containing all banking functions. This would allow them to gain confidence in their ability to perform basic functions and upgrade once they are comfortable. Such initiatives will allow for the formation of communities that do not fear, but rather embrace, digitalization.

REFERENCES

- Adera, E. O., Waema, T. M., & May, J. D. (Eds.). (2014). ICT pathways to poverty reduction: Empirical evidence from East and Southern Africa. IDRC.
- Akhtar, D. M. I. (2016). Research design. *Research Design* (February 1, 2016).
- Al-Shbiel, S. O., & Ahmad, M. A. (2016). A theoretical discussion of electronic banking in Jordan by integrating technology acceptance model and theory of planned behavior. *International Journal of Academic Research in Accounting, Finance and Management Sciences*, 6(3), 272-284.
- Banerjee, A., & Chaudhury, S. (2010). Statistics without tears: Populations and samples. *Industrial psychiatry journal*, 19(1), 60.
- Barnes, S., & Lewin, C. (2005). An introduction to inferential statistics: Testing for differences and relationships. *Research methods in the social sciences*, 226-235.
- Beatson, A., Lee, N., & Coote, L. V. (2007). Self-service technology and the service encounter. *The Service Industries Journal*, 27(1), 75-89.
- Centre of Excellence in Financial Services. (2017). The impact of the 4th industrial revolution on the South African financial services market.
- Chisango, G., & Marongwe, N. (2021). The digital divide at three disadvantaged secondary schools in Gauteng, South Africa. *Journal of Education (University of KwaZulu-Natal)*, (82), 149-165.
- Coetzee, J. (2018). Strategic implications of Fintech on South African retail banks. *South African Journal of Economic and Management Sciences*, 21(1), 1-11.
- Corrigan, T. (2020). Africa's ICT Infrastructure: Its Present and Prospects.
- Dallerup, K., Jayantilal, S., Konov, G., Legradi, A., Pereira, N., & Stockmeier, H. (2018). A bank branch for the digital age. *Global Banking*. McKinsey.
- David-West, O., Aluko, T., & Adetunji, O. (2019). Mobile money: A panacea for financial exclusion in emerging markets. *Journal of Banking*, 8(1), 27-55.
- Donaldson, T., & Preston, L. E. (1995). The stakeholder theory of the corporation: Concepts, evidence, and implications. *Academy of management Review*, 20(1), 65-91.
- Field, A. (2009). Logistic regression. *Discovering statistics using SPSS*, 264, 315.
- Freeman, R. E. (2015). Stakeholder theory. *Wiley encyclopedia of management*, 1-6.
- Ghosh, P. (2019, June 07). 3 Major Banks Plan More Branch Closings As Thousands Shutter— In U.S. And U.K.—Amid Covid, Digital Growth. *Forbes*. <https://www.forbes.com/sites/palashghosh/2021/04/23/3-major-banks-plan-more-branch-closings-as-thousands-shutter-in-us-and-uk-amid-covid-digital-growth/?sh=7e2b59115bc6>

- Gillwald, A., Mothobi, O., & Rademan, B. (2018). The state of ICT in South Africa.
- Goertzen, M. J. (2017). Introduction to quantitative research and data. *Library Technology Reports*, 53(4), 12-18.
- Hair, J. F., Celsi, M., Ortinau, D. J., & Bush, R. P. (2010). *Essentials of marketing research* (Vol. 2). New York, NY: McGraw-Hill/Irwin.
- Haralayya, B. (2021). How Digital Banking has Brought Innovative Products and Services to India. *Journal of Advanced Research in Quality Control and Management*, 6(1), 16-18.
- Hosein, N. Z. (2009). Internet banking: An empirical study of adoption rates among Midwest community banks. *Journal of Business & Economics Research (JBER)*, 7(11).
- Hosmer Jr, D. W., Lemeshow, S., & Sturdivant, R. X. (2013). *Applied logistic regression* (Vol. 398). John Wiley & Sons.
- Jankowicz, A.D. (2000), *Business Research Methods*, Business Press, Plane TX.
- Jawale, K. V. (2012). Methods of sampling design in the legal research: Advantages and disadvantages. *Online International Interdisciplinary Research Journal*, 2(6), 183-190.
- Kaushik, M., & Mathur, B. (2014). Data analysis of students marks with descriptive statistics. *International Journal on Recent and Innovation Trends in computing and communication*, 2(5), 1188-1190.
- Kidder, L. H., & Selltiz, C. (1981). *Selltiz, Wrightsman, and Cook's research methods in social relations* (Vol. 10). Holt, Rinehart and Winston.
- Kimberlin, C. L., & Winterstein, A. G. (2008). Validity and reliability of measurement instruments used in research. *American journal of health-system pharmacy*, 65(23), 2276-2284.
- Kothari, C. R. (2004). *Research methodology: Methods and techniques*. New Age International.
- LaValley, M. P. (2008). Logistic regression. *Circulation*, 117(18), 2395-2399.
- Lavrakas, P. J. (2008). *Encyclopedia of survey research methods* (Vols. 1-0). Thousand Oaks, CA: Sage Publications, Inc. doi: 10.4135/9781412963947
- Lee, D. K., In, J., & Lee, S. (2015). Standard deviation and standard error of the mean. *Korean journal of anesthesiology*, 68(3), 220.
- Levin, K. A. (2006). Study design III: Cross-sectional studies. *Evidence-based dentistry*, 7(1), 24-25.
- Lincoln, Y. & Guba, E. 1985. "Naturalistic Inquiry", SAGE, Beverly Hills, 1985.
- Livingston, E. H. (2004). The mean and standard deviation: what does it all mean?. *Journal of Surgical Research*, 119(2), 117-123.

- Lobenhofer, J. S., Bredenkamp, C., & Stegman, M. A. (2003). Standard Bank of South Africa's E plan: Harnessing ATM technology to expand banking services. Chapel Hill, NC: Center for Community Capitalism.
- Lubbe, S. (2005). Preliminaries into problems to access information-the digital divide and rural communities. *South African Journal of Information Management*, 7(3).
- Lyman, T., & Lauer, K. (2015). What Is Digital Financial Inclusion and Why Does It Matter?. *CGAP Blog*, March, 10.
- Mack, N. (2005). *Qualitative research methods: A data collector's field guide*.
- Malhotra, N. K. (2006). Questionnaire design and scale development. *The handbook of marketing research: Uses, misuses, and future advances*, 83-94.
- Manyika, J., Lund, S., Singer, M., White, O., & Berry, C. (2016). Digital finance for all: Powering inclusive growth in emerging economies. *McKinsey Global Institute*, 1-15.
- Marous, J. (2021, July 01). Future of Branches Debated in a Transformed Digital Ecosystem. *The Financial Brand*. <https://thefinancialbrand.com/117095/future-of-banking-branches-digital-ecosystem/>
- Masocha, R., Chiliya, N., & Zindiye, S. (2011). E-banking adoption by customers in the rural milieus of South Africa: A case of Alice, Eastern Cape, South Africa. *African Journal of Business Management*, 5(5), 1857-1863.
- Mason, J. (1996). *Qualitative Researching*. London, SAGE Publications.
- Masrom, M. (2007). Technology acceptance model and e-learning. *Technology*, 21(24), 81.
- Maumbe, B. M. (2006). Digital financial service delivery to poor communities in South Africa: A preliminary assessment. *International review of business research papers*, 2(2), 72-79.
- McHugh, M. L. (2013). The chi-square test of independence. *Biochemia medica*, 23(2), 143-149.
- Mchunu, S. (2021, July 15). SA's banks close hundreds of branches to limit destruction. *IOL*. <https://www.iol.co.za/business-report/companies/sas-banks-close-hundreds-of-branches-to-limit-destruction-8c8ba764-c83c-4b2a-865b-95c28b556d86>
- Merriam, S. B. (1995). N of I?: Issues of Validity and Reliability in. *PAACE Journal of lifelong learning*, 4, 51-60.
- Newman, I., Benz, C. R., & Ridenour, C. S. (1998). *Qualitative-quantitative research methodology: Exploring the interactive continuum*. SIU Press.
- Ozili, P. K. (2018). Impact of digital finance on financial inclusion and stability. *Borsa Istanbul Review*, 18(4), 329-340.
- Pankomera, R., & Van Greunen, D. (2018). Challenges, benefits, and adoption dynamics of mobile banking at the base of the pyramid (BOP) in Africa: a systematic review. *The African Journal of Information and Communication*, 21, 21-49.

- Price Waterhouse Coopers. (2020, June 30). SA's major banks feel the effects of an unprecedented operating environment. PWC. <https://www.pwc.co.za/en/press-room/major-banks-analysis-dec-2020.html>
- Rajasekar, S., Philominathan, P., & Chinnathambi, V. (2013). Research methodology. eprint. arXiv preprint physics/0601009, 1-53.
- Ramavhona, T. C., & Mokwena, S. (2016). Factors influencing Internet banking adoption in South African rural areas. *South African Journal of Information Management*, 18(2), 1-8.
- Ranavade, A. A. (2019). "Digital Literacy in Net Banking", *International Journal of Emerging Technologies and Innovative Research* (www.jetir.org), ISSN:2349-5162, Vol.6, Issue 4, page no.231-233, April-2019, Available :<http://www.jetir.org/papers/JETIRBH06034.pdf>
- Rees, J. (2021, April 22). UK banks speed up plans to ax branches and switch focus to digital. S&P Global. <https://www.spglobal.com/marketintelligence/en/news-insights/latest-news-headlines/uk-banks-speed-up-plans-to-ax-branches-and-switch-focus-to-digital-63761687>
- Roopa, S., & Rani, M. S. (2012). Questionnaire designing for a survey. *Journal of Indian Orthodontic Society*, 46(4_suppl1), 273-277.
- Ross, P. T., & Bibler Zaidi, N. L. (2019). Limited by our limitations. *Perspectives on medical education*, 8(4), 261-264.
- Sardana, V., & Singhania, S. (2018). Digital technology in the realm of banking: A review of literature. *International Journal of Research in Finance and Management*, 1(2), 28-32.
- Seretse, M., Chukwuere, J., Lubbe, S., & Klopper, R. (2018). Problems around accessing information in rural communities. *Alternation Journal*, 25(1), 214-244.
- Sharma, G. (2017). Pros and cons of different sampling techniques. *International journal of applied research*, 3(7), 749-752.
- Srinivas, V. & Ross, A. (2018, October 09). Accelerating digital transformation in banking: Findings from the global consumer survey on digital banking. Deloitte Insights. <https://www2.deloitte.com/global/en/insights/industry/financial-services/digital-transformation-in-banking-global-customer-survey.html>
- Srinivas, V. & Wadhvani, R. (2019, February 13). Recognizing the value of bank branches in a digital world: Findings from the global consumer survey on digital banking. Deloitte Insights. <https://www2.deloitte.com/global/en/insights/industry/financial-services/bank-branch-transformation-digital-banking.html>
- Sukamolson, S. (2007). Fundamentals of quantitative research. Language Institute Chulalongkorn University, 1(3), 1-20.
- Sutanapong, C., & Louangrath, P. I. (2015). Descriptive and inferential statistics. *International Journal of Research & Methodology in Social Science*, 1(1), 22-35.

- Tarhini, A., Mgbemena, C., Trab, M. S. A., & Masa'Deh, R. (2015). User adoption of online banking in Nigeria: A qualitative study. *The Journal of Internet Banking and Commerce*, 20(3).
- Tarrant, H. (2019, June 07). SA's 'big four' banks have shut down almost 700 branches this decade. *The Citizen*. <https://www.citizen.co.za/business/2140329/sas-big-four-banks-have-shut-down-almost-700-branches-this-decade/>
- University of Illinois. (2014). Digital Literacy Definition and Resources. Urbana, IL: University of Illinois. Retrieved from <http://www.library.illinois.edu/digit/definition.html> [Google Scholar]
- Urhiewhu, L. O., & Emojorho, D. (2015). Conceptual and Adoption of Technology Acceptance Model in Digital Information Resources Usage by Undergraduates: Implication to Higher Institutions Education in Delta and Edo of Nigeria. *Journal of Education and Practice*, 6(21), 82-92.
- Vosloo, J. J. (2014). Chapter 5: Research design and methodology. Available at: dspace.nwu.ac.za/bitstream/handle/10394/12269/Vosloo_JJ_Chapter_5.pdf, 6.
- Wentzel, J. P., Diatha, K. S., & Yadavalli, V. S. S. (2016). An investigation into factors impacting financial exclusion at the bottom of the pyramid in South Africa. *Development Southern Africa*, 33(2), 203-214.
- Which Money Team. (2021, June 01). Bank branch closures: is your local bank closing? *Which Money*. <https://www.which.co.uk/money/banking/switching-your-bank/bank-branch-closures-is-your-local-bank-closing-a28n44c8z0h5>
- World Bank. (2014). Digital finance: empowering the poor via new technologies.
- Zibrán, M. F. (2007). Chi-squared test of independence. Department of Computer Science, University of Calgary, Alberta, Canada, 1-7.

APPENDICES

Appendix 1.1: Data Collection Instrument(S)

Please indicate your selected choice by marking the relevant answer block with an 'X':

Welcome to the research study!

My name is Ntokozo Mdluli and I am a Master's student in Business Administration at the University of the Witwatersrand in Johannesburg. As part of my studies, I am undertaking a research project, and investigating the Digital banking penetration in underserved communities in South Africa.

The aim of this research project is to explore and investigate how banking customers in underserved communities are affected by the introduction of digital banking and the closure of traditional banking channels particularly bank branches. As part of this project, I would like to invite you to take part in answering a questionnaire. This activity will take less than 10 minutes. The questionnaire will be completely confidential, and the information you give to me will be held securely and not disclosed to anyone else.

By clicking the button below, you acknowledge:

- Your participation in the study is voluntary.
- You are aware that you may choose to terminate your participation at any time for any reason.

1. Do you consent to the Study?

Yes	No
-----	----

2. Do you live or have lived in an underserved community?

Yes	No
-----	----

3. Please enter your Area and Province e.g., **eMzinyathi, KZN**

Area:.....

Eastern Cape	
Free State	
Gauteng	
KZN	
Limpopo	
Mpumalanga	
Northern Cape	
North West	
Western Cape	

4. How old are you?

Under 18	
18-24 years old	
25-34 years old	
35-44 years old	
45-54 years old	
55-64 years old	
65+ years old	

5. What is your gender?

Male	Female	Other
------	--------	-------

6. What is your current employment status?

Employed	
Unemployed	
Self-Employed	
Student	
Pensioner	
Other, please specify:	

7. What is your monthly income range?

Less than R2000	
Between R2000 and R5000	
Between R5000 and R10000	
Greater than R10000	

8. Do you have a South African bank account?

Yes	No
-----	----

9. How often do you go to the bank branch in a month?

Never	
Once a month	
Between one and five times a month	
More than five times a month	
Only when I have no other choice	

10. What are the main banking activities that you perform at the bank branch? You can select more than one...

Money deposits or transfers	
Bill Payments	
Prepaid services	
Enquiries (statements, card renewals etc.)	
Cash Withdrawals	
Other:	

11. How far away is the bank branch from your home?

Less than 2km's	
Between 2km's and 5km's	
Greater than 5km's	

12. How do you get to the bank branch?

I walk to the branch	
I take public transportation	
I drive to the branch	

13. What are some of the bank branch challenges that you experience?

Long waiting times	
Slow service delivery	
Other, please specify:	

14. Has there been any bank branches that have closed in your area?

Yes	No
-----	----

15. If yes, what banking alternatives have been available to you? You can select multiple...

Internet Banking	
Cell phone Banking	
ATMs	
Other, please specify:	

16. Do you own a computer, laptop or smart cellphone??

Yes	No
-----	----

17. Do you have access to the internet?

Yes	No
-----	----

18. Do you encounter issues with internet connectivity in your area?

Yes	No
-----	----

19. Do you encounter issues with electricity in your area (excluding national load-shedding)?

Yes	No
-----	----

20. Do you use mobile applications on your smart phone?

Yes	No
-----	----

21. Please rate your confidence with using computer-based or mobile applications and technology.

Not at all confident	Somewhat not confident	Unsure	Somewhat confident	Very confident
----------------------	------------------------	--------	--------------------	----------------

22. Have you heard of Digital Banking (Internet and Cellphone banking)?

Yes	No
-----	----

23. Do you use Digital Banking (Internet or Cellphone Banking) to do banking?

Yes	No
-----	----

43. Do you use Digital Banking (Internet or Cellphone Banking) as a result of the closing of bank branches in your area?

Yes	No
-----	----

44. If no, why do you use digital banking? You can select multiple...

Convenient and easy to use	<input type="checkbox"/>
To exercise financial control	<input type="checkbox"/>
Improved security	<input type="checkbox"/>
Reduced banking fees	<input type="checkbox"/>
Other, please specify:	<input type="checkbox"/>

24. If yes, on a scale from 0 to 10, 0 being very easy and 10 being extremely difficult, how do you find using digital banking (Internet and Cellphone Banking)?

Easy										Difficult	
0	1	2	3	4	5	6	7	8	9	10	

25. What are some of the challenges that you have experienced with Internet or Cellphone Banking?

Slow or no internet access	<input type="checkbox"/>
Fraud or security issues	<input type="checkbox"/>
Technical challenges	<input type="checkbox"/>
Haven't experienced any challenges	<input type="checkbox"/>
Other, please specify:	<input type="checkbox"/>

26. What are some of the reasons or issues that prevent you from using Internet or Cellphone banking?

Load shedding / Power cuts	
Poor internet connectivity	
Security concerns	
Data affordability	
Do not have a smart phone or computer	
Do not trust technology	
Prefer human contact	
Do not see the need	
Do not know how to use digital banking	
Other, please specify:	

27. Do you believe that Digital Banking is secure?

Yes	No	Not Sure
-----	----	----------

28. Do you believe that Digital Banking is convenient and saves you time?

Yes	No	Don't Know
-----	----	------------

29. Would you recommend Digital Banking to friends and family?

Yes	No
-----	----

45. Which of the below banking options do you prefer??

Digital Banking	
Branch Banking	
Both	
Neither	

30. Please share any other views on Digital Banking.

.....

.....

.....

Appendix 1.2: Statistical Analysis

Hypothesis H1

Case Processing Summary

	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Q14 Has there been any bank branches that have closed in your area? * Affected Q9 and Q10	173	96.6%	6	3.4%	179	100.0%

Q14 Has there been any bank branches that have closed in your area? * Affected Q9 and Q10 Crosstabulation

Count

		Affected Q9 and Q10		Total
		No	Yes	
Q14 Has there been any bank branches that have closed in your area?	No	0	1	1
	Yes	38	57	95
	Total	38	57	95
Total		70	103	173

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	.726 ^a	2	.695
Likelihood Ratio	1.084	2	.582
N of Valid Cases	173		

a. 2 cells (33,3%) have expected count less than 5. The minimum expected count is ,40.

Symmetric Measures^c

		Value	Approximate Significance
Nominal by Nominal	Phi	.065	.695
	Cramer's V	.065	.695
N of Valid Cases		173	

c. Correlation statistics are available for numeric data only.

Hypothesis H2

Case Processing Summary

	Valid		Cases Missing		Total	
	N	Percent	N	Percent	N	Percent
Q14 Has there been any bank branches that have closed in your area? * Q43 Do you use Digital Banking (Internet or Cellphone Banking) as a result of the closing of bank branches in your area?	179	100.0%	0	0.0%	179	100.0%

Q14 Has there been any bank branches that have closed in your area? * Q43 Do you use Digital Banking (Internet or Cellphone Banking) as a result of the closing of bank branches in your area? Crosstabulation

Count

		Q43 Do you use Digital Banking (Internet or Cellphone Banking) as a result of the closing of bank branches in your area?			Total
		No	Yes		
Q14 Has there been any bank branches that have closed in your area?		6	1	0	7
	No	65	18	12	95
	Yes	42	12	23	77
Total		113	31	35	179

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	10.090 ^a	4	.039
Likelihood Ratio	11.185	4	.025
N of Valid Cases	179		

a. 3 cells (33,3%) have expected count less than 5. The minimum expected count is 1,21.

Symmetric Measures^c

		Value	Approximate Significance
Nominal by Nominal	Phi	.237	.039
	Cramer's V	.168	.039
N of Valid Cases		179	

c. Correlation statistics are available for numeric data only.

Hypothesis H3

Block 0: Beginning Block

Classification Table^{a,b}

Observed	Predicted		Percentage Correct
	Q23 Do you use Digital Banking (Internet or Cellphone Banking) to do banking? Code 6	7	
Step 0 Q23 Do you use Digital Banking (Internet or Cellphone Banking) to do banking? Code 6	68	0	100.0
7	7	0	.0
Overall Percentage			90.7

a. Constant is included in the model.

b. The cut value is ,500

Variables in the Equation

	B	S.E.	Wald	df	Sig.	Exp(B)
Step 0 Constant	-2.274	.397	32.807	1	.000	.103

Variables not in the Equation

	Score	df	Sig.
Step 0 Variables Q27 Do you believe that Digital Banking is secure? Code	2.744	1	.098
Q18 Do you encounter issues with internet connectivity in your area? Code	1.327	1	.249
Q19 Do you encounter issues with electricity in your area (excluding national load-shedding)? Code	1.327	1	.249
Q21 Code Load Please rate your confidence with using computer-based or mobile applications and technology. Code Load	16.683	1	.000
Q24_6 Code Load If yes, on a scale from 0 to 10, 0 being very easy and 10 being extremely difficult, how do you find using Digital Banking (Internet and Cellphone Banking)?	.250	1	.617
Overall Statistics	17.481	5	.004

Block 1: Method = Enter

Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	15.967	5	.007
	Block	15.967	5	.007
	Model	15.967	5	.007

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	30.561 ^a	.192	.415

a. Estimation terminated at iteration number 20 because maximum iterations has been reached. Final solution cannot be found.

Classification Table^a

Observed		Predicted		Percentage Correct
		Q23 Do you use Digital Banking (Internet or Cellphone Banking) to do banking? Code 6	7	
Step 1	Q23 Do you use Digital Banking (Internet or Cellphone Banking) to do banking? Code 6	66	2	97.1
	7	6	1	14.3
Overall Percentage				89.3

a. The cutvalue is ,500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I. for EXP(B)	
								Lower	Upper
Step 1 ^a	Q27 Do you believe that Digital Banking is secure? Code	.247	.366	.456	1	.499	1.281	.625	2.626
	Q18 Do you encounter issues with internet connectivity in your area? Code	-16.048	10538.590	.000	1	.999	.000	.000	.
	Q19 Do you encounter issues with electricity in your area (excluding national load-shedding)? Code	-17.485	10441.263	.000	1	.999	.000	.000	.
	Q21 Code Load Please rate your confidence with using computer-based or mobile applications and technology. Code Load	-1.103	.392	7.910	1	.005	.332	.154	.716
	Q24_6 Code Load If yes, on a scale from 0 to 10, 0 being very easy and 10 being extremely difficult, how do you find using Digital Banking (Internet and Cellphone Banking)?	.236	.362	.423	1	.515	1.266	.622	2.575
	Constant	200.171	89010.590	.000	1	.998	8.571E+86		

a. Variable(s) entered on step 1: Q27 Do you believe that Digital Banking is secure? Code, Q18 Do you encounter issues with internet connectivity in your area? Code, Q19 Do you encounter issues with electricity in your area (excluding national load-shedding)? Code, Q21 Code Load Please rate your confidence with using computer-based or mobile applications and technology. Code Load, Q24_6 Code Load If yes, on a scale from 0 to 10, 0 being very easy and 10 being extremely difficult, how do you find using Digital Banking (Internet and Cellphone Banking)? .

Hypothesis H4

Case Processing Summary

	Valid		Cases Missing		Total	
	N	Percent	N	Percent	N	Percent
Q14 Has there been any bank branches that have closed in your area? * Respondent is candidate for financial exclusion?	179	100.0%	0	0.0%	179	100.0%

Q14 Has there been any bank branches that have closed in your area? * Respondent is candidate for financial exclusion? Crosstabulation

Count

		Respondent is candidate for financial exclusion?		Total
		No	Yes	
Q14 Has there been any bank branches that have closed in your area?		7	0	7
	No	34	61	95
	Yes	20	57	77
Total		61	118	179

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	15.916 ^a	2	.000
Likelihood Ratio	17.550	2	.000
N of Valid Cases	179		

a. 2 cells (33,3%) have expected count less than 5. The minimum expected count is 2,39.

Symmetric Measures^c

		Value	Approximate Significance
Nominal by Nominal	Phi	.298	.000
	Cramer's V	.298	.000
N of Valid Cases		179	

c. Correlation statistics are available for numeric data only.

Appendix 1.3: Ethics Documentation

Good day

My name is Ntokozo Mdluli, and I am a Master's student in Business Administration at the University of the Witwatersrand in Johannesburg. As part of my studies, I am undertaking a research project, and investigating the *Digital banking penetration in underserved communities in South Africa*. The aim of this research project is to explore and investigate how banking customers in underserved communities are affected by the introduction of digital banking and the closure of traditional banking channels particularly bank branches.

As part of this project, I would like to invite you to take part in answering a questionnaire. This activity will take less than 10 minutes. The questionnaire will be completely confidential, and the information you give to me will be held securely and not disclosed to anyone else.

You will not receive any direct benefits from participating in this research, and there are no disadvantages or penalties for not participating. You may withdraw at any time or not answer any question if you choose not to. The questionnaire and interview will be completely confidential, and the information you give to me will be held securely and not disclosed to anyone else. If you experience any distress or discomfort at any point in this process, we will stop the interview or resume another time.

If you have any questions during or afterwards about this research, feel free to contact me on the details listed below.

Yours sincerely,

Ntokozo Mdluli

Ntokozo Mdluli, 1966767@students.wits.co.za, 0728583713

Jacques Totowa, jacques.totowa@wits.ac.za, 011 717 8885