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Exploring South African entrepreneurs leveraging technology for innovation and growth.

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ABSTRACT

This qualitative study explores the drivers, challenges, and external enablers influencing how Soth African SMMEs adopt technologies such as cloud computing, artificial intelligence (AI), and mobile applications to support innovation and growth.

Guided by the Resource-Based View (RBV) and Diffusion of Innovation (DOI) theory, the study investigates, what motivates technology adoption, what challenges are encountered, and how external factors such as support services and infrastructure influence the adoption process. Through thematic analysis of in-depth interviews, the study finds that while technology enhances efficiency and scalability, its uptake is often constrained by financial limitations, digital skills gaps, and limited institutional support. The study recommends targeted policy interventions, improved access to funding, and practical skills development to support SMMEs digital transformation.

Keywords: Technology adoption, SMMEs, cloud computing, AI, mobile applications, South Africa.

DECLARATION

I, **Lufuno Ndou,** certify that this research report, *"Exploring South African Entrepreneurs' Leveraging Technology for Innovation and Growth,"* is entirely my own work. All references have been properly cited, and this report has not been presented for any other qualifications or assessment. I affirm that it reflects my independent efforts and adheres to ethical research standards.

Researcher



Signed: Date: 06 May 2025

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CHAPTER 1. INTRODUCTION

1.1. Research title

Exploring South African entrepreneurs leveraging technology for innovation and growth.

1.2. Statement of purpose

The qualitative study explores how South African entrepreneur's within Small, Medium, and Micro Enterprises (SMMEs) leverage cloud computing, artificial intelligence (AI), and mobile applications to drive innovation and business growth.

1.3. Background

South Africa faces significant unemployment and slow economic growth (Hausmann et al., 2023; Nhleko et al., 2023). Historical inequalities and limited resources further strain progress (Makwara et al., 2023).

Entrepreneurship is regarded as driver of employment generation and economic progress (Hill et al., 2023). South Africa's flourishing start-up scene offers hope for reducing unemployment, fostering innovation, and diversifying the economy (Francke & Alexander, 2019).

Despite the growing entrepreneurial spirit, challenges persist. Limited access to finance, infrastructure, and support hinder success (Fatoki, 2021). Complex regulations and lack of mentorship add further roadblocks (Musara & Gwaindepi, 2014).

Technology presents a potential solution (Achieng & Malatji, 2022) whereby E-commerce platforms expand reach, digital finance eases access to funding, and online training bridges the skills gap (Pascucci et al., 2023). Technology can further empower innovation tailored to local needs and growth (Graham, 2019). There is limited research investigating how South African SMMEs leverage technology for growth

(Amankwah-Amoah, 2019; Pan et al., 2018). This study bridges the gap by exploring their intentions, experiences, and challenges with technology integration.

1.4. Problem statement

SMMEs are essential for driving economic development and job creation (Hill et al., 2023). However, they face significant challenges in leveraging technology for innovation and growth due to limited digital literacy, financial constraints, and a complex regulatory environment (Fatoki, 2021). The digital divide further exacerbates these challenges, with inadequate access to internet infrastructure and skills hindering technology adoption, particularly in under-served areas (Achieng & Malatji, 2022). While some SMMEs have adopted technologies like cloud computing and mobile applications, their scalability and long-term capacity to enable business growth are underexplored (Van Dyk & Van Belle, 2019).

Additionally, the effectiveness of existing government support initiatives remains unclear, as limited research assesses their impact on entrepreneurial efforts and market conditions (Musara & Gwaindepi, 2014). Existing research often adopts a global perspective, overlooking the unique socio-economic challenges of South African SMMEs, which limits the development of tailored support strategies (Amankwah-Amoah, 2019; Bowmaker-Falconer & Herrington, 2020).

This research seek to address this knowledge gap by exploring barriers to technology adoption and proposing context-specific strategies to enhance innovation and sustainable growth among South African SMMEs.

1.5. Research purpose

This study explores how South African entrepreneurs, operating within SMMEs, leverage technology such as e-commerce and cloud computing to drive innovation and growth. It examines their experiences within the dynamic landscape, aiming to illuminate opportunities and challenges in technology adoption and integration. The findings shed light on factors influencing successful technology and innovation

adoption, providing meaningful perspectives for both entrepreneurs' and decision-makers in the digital age.

This study uses in-depth interviews to examine entrepreneurs' experiences, challenges, and strategies. While technology adoption is improving efficiency and scalability, financial constraints, skill shortages, and regulatory obstacles are hindering broader adoption. The study highlights the need for stronger policy support, increased funding, and digital skills development. It emphasises the importance of enhancing government support and bridging the digital divide to foster technology-driven growth among SMMEs.

1.6. Research objectives

I. Objective 1 :To explore key drivers motivating South African SMMEs to adopt technology for business innovation and growth.
II. Objective 2 : To identify challenges encountered by South African SMMEs in adopting technology.
III. Objective 3: To examine the external enablers and support mechanisms that influence technology adoption among South African SMMEs.

1.7. Research questions

I. Research question 1: What motivates South African SMMEs to adopt technology for innovation and business growth?
II. Research question 2 :What challenges do South African SMMEs face in adopting technology?
III. Research question 3: How do external factors, such as support services and infrastructure, influence the technology adoption process among South African SMMEs?

1.8. Rationale of the study

This study explores technology adoption by South African entrepreneurs within SMMEs, identifying successful strategies, challenges, and specific technologies they use (Mhlongo et al., 2023). It empowers key stakeholders; entrepreneurs with informed decision-making, policymakers with solutions for SMMEs limitations, and support organisations with insights to aid entrepreneurs' success (Anwana & Anwana, 2020). It enables understanding of technology's role in driving innovation and growth for South African businesses (Zaheer et al., 2019).

1.9. Delimitations

The technologies which this study focuses on are the adoption of cloud computing, artificial intelligence (AI), and mobile applications by South African entrepreneur's within SMMEs in the context of innovation and business growth. These technologies were purposefully, selected based on their accessibility, relevance, and growing adoption among small business in resource-constrained environments (Van Dyk & Van Belle, 2019). This research does not explore the adoption of other technologies, such as blockchain or Internet of Things (IoT), as these require advanced infrastructure and technical expertise, and currently exhibit low adoption among SMMEs (Fatoki, 2021).

1.10. Assumptions

The study posits that South African SMMEs are actively seeking technological solutions to drive innovation and achieve sustainable growth. It also assumes that entrepreneurs understand the function of technology in enhancing business scalability and operational efficiency, particularly through solutions such as cloud computing and mobile applications.

CHAPTER 2. LITERATURE REVIEW

2.1. Introduction

The section reviews existing research to provide context for this study, focusing on how South African entrepreneurs leverage technology for innovation and growth. It examines variables that influence technology adoption. The review also explores obstacles encountered by SMMEs and the broader effects of technology on business expansion, competitiveness, and economic growth. Guided by the Resource-Based View (Barney, 1991) and Diffusion of innovation (Rogers et al., 2014), theoretical frameworks, this chapter explains how internal resources and external factors influence technology adoption. A conceptual framework and propositions relevant to this study are presented.

2.1.1. Entrepreneurs within the SMMEs context

In this study, the terms entrepreneurs and SMMEs are used interchangeably, as the research focuses on individual entrepreneurs operating within Small, Medium, and Micro Enterprises (SMMEs) in South Africa. These entrepreneurs are the decision-makers who drive innovation, make technology investment decisions, and implement business strategies. Their actions and experiences are central to understanding how SMMEs adopt digital technologies for business growth. As such, the study treats entrepreneurs as the primary agents through which SMMEs engage with technology, reflecting the practical overlap between entrepreneurial behaviour and enterprise development in the South African context (Bowmaker-Falconer & Herrington, 2020; Hill et al., 2023).

2.2. South African SMMEs

South African SMME play a pivot role in driving economic growth and employment. In terms of legislative classification, the National Small Business Act, defines SMMEs based on turnover, number of employees and asset value. Their contribution to the South African economy is substantial, providing support to the national output and

sustaining a considerable portion of the workforce (Bowmaker-Falconer & Herrington, 2020).

Despite their importance, SMMEs face persistent challenges, including limited access to finance, inadequate infrastructure, skills shortages, and regulatory barriers (Fatoki, 2021; Musara & Gwaindepi, 2014). Additionally, socio-economic inequalities and the digital divide further constrain their growth potential (Achieng & Malatji, 2022).

Against this backdrop, the study explores how South African SMMEs adopt technology to drive innovation and business growth within a unique challenging socio-economic environment. Limited financial resources, infrastructural constraints, and a complex regulatory landscape presents both opportunities and challenges for technology adoption (Fatoki, 2021). Given these challenges, this research examines the adoption of cloud computing, artificial intelligence (AI), and mobile applications, which demonstrate potential in enhancing efficiency, scalability, and customer engagement among SMMEs (Van Dyk & Van Belle, 2019). These technologies were selected for their accessibility and relevance in addressing the operational needs of SMMEs within the South African landscape.

2.3. Technology adoption in South Africa

This section reviews existing studies on technology adoption among South African SMMEs. The studies categorise the findings based on specific technologies and environmental factors influencing adoption.

2.3.1. Cloud computing

Siriram, (2022) defines cloud computing as a delivering computer services that includes servers, storages, databases and applications over the internet. This eliminates the need for physical infrastructure, allowing business to operate more flexibly and affordably (Siriram, 2022). Efficiency and growth are driving South African businesses to adopt cloud computing. This technology offers secure data access and storage, seamless collaboration tools, and streamlined workflows. SMMEs are particularly drawn to cloud solutions as they reduce infrastructure costs and improve remote access capabilities (Vajjhala & Ramollari, 2021). In the modern hybrid work

environment, where employees split their time between offices and remote locations, cloud computing has become a productivity powerhouse and demonstrably enhances team collaboration and efficiency (Magwentshu et al., 2019).

2.3.2. Mobile Applications

Mobile apps are software applications designed for smartphones or tablets, enabling users. To access services and perform tasks on the go (Francke & Alexander, 2019). South Africa's high mobile penetration rate creates a fertile ground for mobile app adoption. SMMEs are leveraging mobile apps to expand customers reach, streamline business processes, and facilitate e-commerce transactions (Van Dyk & Van Belle, 2019).

2.3.3. Artificial intelligence (AI)

AI refers to computer systems capable of mimicking humans. Intelligence to perform tasks such as learning, decision making and natural processing (Perifanis & Kitsios, 2023). Machine learning and AI are gaining momentum, with potential applications for automating tasks like customer service, streamlining operations, and personalising learning experiences within educational ventures (Perifanis & Kitsios, 2023).

2.3.4. Internet connectivity

Unequal availability of dependable and affordable internet services continue to be a significant challenge, particularly for rural SMMEs (Achieng & Malatji, 2022). This limited access can hinder their belief in technology’s ability to improve performance (Bowmaker-Falconer & Herrington, 2020).

2.3.5. Regulatory environment

Supportive government policies that promote technology accessibility and skills development are essential to the South African entrepreneurial landscape (Bowmaker-Falconer & Herrington, 2020). Complex bureaucratic processes and compliance requirements can act as barriers to innovation and business growth (Musara & Gwaindepi, 2014).

2.4. SMMEs innovation and growth

South African SMMEs contribute significantly to employment and GDP but face persistent barriers such as limited funding, poor infrastructure, and policy inefficiencies (Matekenya & Moyo, 2022). Despite these constraints, many SMMEs use innovation as a survival strategy, adopting digital tools like cloud computing and AI to streamline operations, improve efficiency, and access broader markets (Daraojimba et al., 2023).

Digital transformation also plays a key role in driving innovation-led growth. Technologies such as mobile apps help SMMEs enhance customer engagement and service delivery, especially in underserved areas (Classen et al., 2021). However, innovation is shaped by access to digital skills, mentorship, and support networks.

2.5. Variables selected for the study.

The following variables are selected based on their significance in addressing the adversities faced by South Africa SMMEs in leveraging technology: technology adoption, business growth and innovation. Internal resources and external resources which affect the adoption of technology are explored. Fatoki (2021) and Bowmaker-Falconer & Herrington, (2020) identify factors which influence technology adoption and business growth.

This study focuses on technology, compatibility, innovation and growth , as they help address key issues identified in the problem statement, such as financial constraints, regulatory challenges, and digital literacy gaps. Technology adoption and compatibility assess the integration of new tools within existing business structures, while innovation and growth assess the influence of technology on business success and market competitiveness (Achieng & Malatji, 2022).

2.6. Theories that inform the study.

This study explores South African SMMEs technology adoption through the lens of two key theories.

2.6.1. Resource based view (RBV)

This theory proposes that an organisation's internal resources are the foundation for competitive advantage (Barney, 1991). Strong financial resources enable SMMEs to invest in valuable, rare, inimitable, and non-substitutable technological infrastructure and skilled personnel, crucial for effective technology adoption (Achieng & Malatji, 2022). Entrepreneurial drive acts as a catalyst, guiding the strategic use of technology for growth (Hill et al., 2023).

2.6.2. Diffusion of innovation theory (DOI)

This concept offers a model for understanding the influences on the adoption of new technologies (Rogers et al., 2014). The theory suggests that limited resources like internet access and skills gaps can hinder performance and effort expectancy within the DOI framework (Achieng & Malatji, 2022). Additionally, a less developed technology ecosystem might limit social influence from peers or mentors promoting technology adoption (Bushe, 2019; Musara & Gwaindepi, 2014). Finally, insufficient government support for digital access can restrict facilitating conditions necessary for adoption (Kruger & Steyn, 2019).

2.6.3. Integrating RBV and DOI in this research

This study explores the interplay between entrepreneurship, technological innovation, and South Africa's unique socio-economic context. South African entrepreneurs are motivated by a strong ambition to innovate and make a meaningful impact on social and economic progress (Neck et al., 2023; Shane & Venkataraman, 2000; Venkataraman, 2019). The combined use of RBV and DOI provides a structured approach to analyse how entrepreneurs can leverage their resources and navigate external challenges to drive innovation and business growth.

The RBV emphasises the role of internal resources such as financial capital, technology skills, and human capabilities in creating competitive advantage and driving technology adoption (Barney, 1991). Given the resource limitations of South African SMMEs, RBV helps evaluate how these businesses can optimise their internal strength to overcome challenges and foster growth. The DOI theory, on the other hand, emphasises the impact of external elements, such as regulatory frameworks,

societal dynamics, and market forces, on the implementation and spread of emerging technologies (Rogers et al., 2014).

While RBV offers valuable insights into resource optimisation, it may overlook the dynamic external environment that significantly impacts SMMEs (Nagano, 2019). In contrast, DOI effectively outlines technology adoption processes but may oversimplify the complexities of organisational decision making (Kruger & Steyn,2024). Integrating both theories ensures a balanced perspective that considers both strategic resources allocation and external influences.

2.7. Conceptual framework

The conceptual framework for this study integrates the Resource-Based View (RBV) (Barney, 1991), and Diffusion of Innovation (DOI) (Rogers et al., 2014), theories to examine how South African SMMEs adopt technology to drive innovation and business growth. Figure 1 illustrates the interaction between internal capabilities and external influences in shaping entrepreneurial outcomes.

The interplay between technology which is an internal resource and compatibility which is an external influence generates motivation for innovation. Entrepreneurs with strong capabilities and a sense of technological fit are more likely to engage in innovative practices that enhance products, processes, and business models.

Successful innovation drives growth, enabling market expansion, operational improvements, and customer engagement. Thus, the framework portrays technology adoption among South African SMMEs as a dynamic, non-linear process shaped by the complementary forces of RBV (Barney,1991), and DOI (Rogers et al., 2014) theory. Internal strengths and supportive external conditions together enable innovation-driven growth.

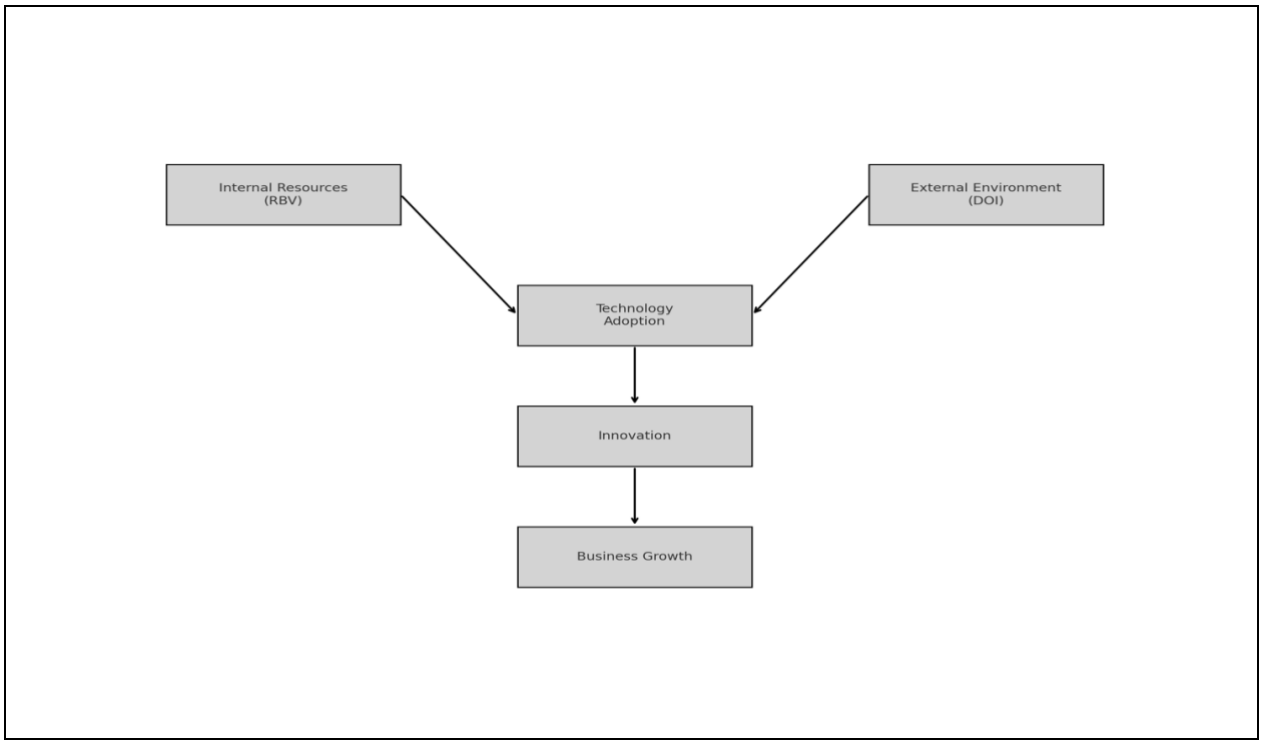


Figure 1:Conceptual framework: SMME technology adoption framework adapted from Barney (1991) and Rogers, Singhal, and Quinlan (2014).

2.8. Research propositions

The adoption of technology by South African SMMEs is essential for stimulating innovation and driving business growth. However, its effective implementation depends on a combination of internal and external factors, along with the need to overcome broader challenges such as the digital divide. The following research propositions explore these dimensions.

2.8.1. Proposition 1: Internal resources as a driver of technology adoption

The RBV suggests that firms' internal resources such as financial capital, digital infrastructure, and skilled human capital serve as critical enablers and motivators for technology adoption. Within the South African SMMEs context, where external support is often limited, these internal resources become even more pivotal.

Achieng and Malatji (2022) highlight that the presence of sufficient internal capacity provides both the confidence and capability to engage in technological innovation and scale business operations.

Therefore, the following proposition is made:

Proposition 1: South African SMMEs with robust internal resources are more likely to be motivated to adopt technology for innovation and growth (Achieng & Malatji, 2022).

2.8.2. Proposition 2: Constraints to technology adoption

While technology offers significant potential to enhance innovation and growth, its successful adoption is frequently hindered by structural challenges. Among these, the persistent digital divide particularly in rural or under-resourced areas and the shortage of relevant digital skills in the workforce are prominent barriers. These constraints can limit SMMEs' ability to access, implement, and optimise emerging technologies.

As highlighted by Alexander (2021), Begazo et al. (2023), and Mpofu and Nicolaides (2019), such inequalities restrict the inclusivity and effectiveness of technology adoption. Addressing these challenges is essential to ensure that all SMMEs, regardless of location or capacity, can participate in technology driven innovation.

Therefore the following is proposed:

Proposition 2: South African SMMEs face constrains in technology adoption. (Alexander, 2021; Begazo et al., 2023; Mpofu & Nicolaides, 2019).

2.8.3. Proposition 3: Role of external enablers in technology adoption

Although internal resources are essential, external factors beyond the control of SMMEs play a critical role in either enabling or constraining the realisation of technology-driven innovation. Alexander (2021) highlights several key enablers, including the compatibility of digital infrastructure, peer influence through competitive pressure, and public sector initiatives such as subsidies, training programmes, and digital policy frameworks.

These environmental conditions can shape entrepreneurs' perceptions of feasibility and value, ultimately affecting their willingness and capacity to adopt new technologies.

Therefore the following is proposed:

Proposition 3: Supportive external factors significantly enhance the likelihood of technology adoption among South African SMMEs (Alexander, 2021).

2.9. Conclusion

This chapter reviewed key literature on technology adoption in South African SMMEs, guided by the RBV (Barney,1991), and DOI (Rogers et al., 2014) theory. It outlined the broader digital landscape, relevant technologies, and contextual factors influencing adoption. These insights provide a theoretical foundation for exploring how internal capabilities and external conditions shape entrepreneurial innovation.

CHAPTER 3. RESEARCH METHODOLOGY

3.1. Introduction

This chapter explores the study methodologies employed in this research to analyse how technology is leveraged by South African service sector SMMEs for innovation and growth. A qualitative research method, particularly in-depth interviews, was utilised to gather rich data from entrepreneurs. The chapter details the rationale behind the chosen method, sampling strategy, and data analysis techniques. Additionally, it acknowledges potential limitations and outlines the steps implemented to guarantee ethical conduct and trustworthiness in the research.

3.2. Paradigm

This study adopts an interpretivist paradigm, which recognises that reality is socially constructed and shaped by individual experiences and context. Interpretivism emphasises understanding the subjective meanings and complex realities constructed by participants, rather than seeking a single objective truth (Creswell & Creswell, 2017). This approach is relevant for this research as it seeks to understand the lived experiences of South African SMMEs as they navigate technology adoption for innovation and growth.

3.3. Research approach

The research approach refers to the overall strategy that outlines how the study is conducted to achieve its objectives (Creswell & Creswell, 2017). A qualitative research approach is employed to capture rich, descriptive data on entrepreneur's experiences with technology adoption. Qualitative research is well suited to explore complex, context-dependent phenomena where developing an in-depth understanding is prioritised over generalisability (Braun & Clarke, 2006; Creswell & Creswell, 2017). The approach focuses on meaning-making process and subjective interpretations, enabling the study to uncover how technology adoption facilitates innovation and

business growth within South African SMMEs operating under diverse and often challenging conditions.

3.4. Research design

A research design is the overall structure and strategy used to integrate different components of a study in a coherent and logical way, ensuring that the research problem is effectively addressed (Creswell & Creswell, 2017). It outlines the procedures for collecting, analysing, and interpreting data.

The study adopts qualitative research design, which is characterised by the systematic collection and interpretation of non-numerical data to understand how individuals make meaning of their experiences (Creswell & Creswell, 2017). In this study, the qualitative design enabled an in-depth exploration of how South African SMMEs experience, interpret, and respond to the challenges and enablers of technology adoption. Focusing on the lived realities of entrepreneurs, the study aligns with Van Manen's (2016) view that qualitative inquiry is essential for uncovering the meanings embedded in human experience, particularly in environments shaped by resource constraints and evolving digital landscapes.

In-depth, semi-structured interviews are used as the primary data collection method to elicit detailed narratives and reflections, facilitating an authentic representation of participants' realities. The population of the study is SMMEs in South Africa. Purposive sampling is used to identify participants to the research. Thematic data analysis is used to analyse the information collected.

3.5. Data collection methods

The key strategy for collecting data consists of conducting in-depth interviews. This approach proved ideal for gathering detailed information about the experiences, strategies, and challenges faced by SMMEs (Dzimba & van der Poll, 2022). The interviews allowed for open-ended questions, providing a platform for entrepreneurs to share unique perspectives beyond predetermined responses (Furawo & Scheepers, 2018). To understand the potential advantages and disadvantages of this method in

the context of this research, insights were drawn from the study by Dzimba and van der Poll (2022).

3.6. Population and sampling

3.6.1. Population

The population for this study is South African SMMEs. The South African government definition of SMMES is used to determine which company qualifies to be SMMEs. The South Africa government definition of an SMME is based on the number of employees, annual turnover, and total gross asset value, as outlined in the National Small Enterprise Act (Department of Small Business Development, 2019).

3.6.2. Sample and sampling method

A purposive sampling strategy is employed to select participants with specific, relevant experience in technology adoption within the SMMEs sector. Purposive sampling is chosen because it enables the deliberate inclusion of information rich cases, providing detailed and insightful data aligned with the research objectives (Palinkas et al., 2015).

The sample consisted of eight participants. The sample size is considered appropriate for qualitative study using semi-structured interviews, where the aim is to achieve thematic saturation rather than statistical generalisation. Gues, Bunce, and Johnson (2006) argue that thematic saturation typically occurs within six to twelve interviews, supporting the sufficiency of the selected sample. Additionally , a small sample size allows for deeper exploration of participants' lived experiences, enhancing the richness and contextual depth of the findings.

3.7. The research instrument.

This study utilised a semi-structured interview guide to collect qualitative data from SMMEs. The guide explores their experiences with technology adoption for innovation and growth. A pilot test, including open-ended questions aligned with research

objectives, is conducted with three participants to assess clarity and flow from the interview framework (Forero et al., 2018).

Interviews are audio-recorded with the informed consent from participants. Online interviews are recorded using Microsoft Teams, while in-person interviews were recorded using a mobile phone.

Following data collection, systematic sampling is applied for analysis, and responses are thoroughly examined to identify recurring ideas, patterns and themes in entrepreneurs' feedback.

The complete study instrument, including the interview guide and a participant information sheet explaining the research purpose, rights, and confidentiality, is provided in the **appendix B.**

3.8. Information analysis strategies and interpretation

Following Braun and Clarke (2006) six phase model, thematic analysis was used to interpret qualitative data in alignment with the study's objectives and theoretical framework (RBV and DOI). Interview transcripts were transcribed and reviewed to familiarise the researcher with the data. Initial code such as funding limitations, skills shortage, and AI integration were developed manually. These were then grouped into sub-themes and consolidated into three overarching themes; internal capabilities and resource constraints, digital and technological readiness and external environmental and institutional influence. The themes were directly mapped to the research questions and propositions, ensuring coherence with the study's aim of exploring how SMMEs adopt technology to drive innovation and growth.

3.9. Methodological limitations

The study is acknowledging limitations that could restrict the broader applicability of its findings. The purposive sample of 8 entrepreneurs from service industries may not represent all South African SMMEs. Sampling methods might introduce bias, and the study design may miss regional variations in technology adoption. These limitations were considered to ensure transparent findings (Palinkas et al., 2015).

3.10. Trustworthiness

3.10.1. Transferability

The study employs purposive sampling to select participants with diverse experiences in the South African SMMEs landscape. Entrepreneurs from various sectors, including engineering, IT services, and waste management, participated in the study. They utilise digital solutions, such as AI, cloud computing, and HR systems, and the interviews explore how they have overcome financial and regulatory barriers to adopt and benefit from these tools. For example, participants describe adopting cloud-based storage to reduce operational costs and improve data accessibility. The narratives provide insights into their innovative strategies, reflecting their adaptability and creativity in overcoming resource limitations (Bowmaker-Falconer & Herrington, 2020; Vajjhala & Ramollari, 2021).

This approach ensures a wide range of perspectives on technology adoption, increasing the relevance of the findings in similar contexts. Detailed qualitative data is collected through comprehensive interviews, capturing the real-life challenges and successes of entrepreneurs leveraging technology in resource-constrained environments (Furawo & Scheepers, 2018; Palinkas et al., 2015).

Examples from the study demonstrated how entrepreneurs leveraged AI for process automation and cloud computing for efficient data management, achieving innovation and operational improvements despite challenges. These findings are further contextualised within the broader body of research on technology adoption, emphasising both the unique characteristics of the South African environment and the common challenges faced globally.

3.10.2. Credibility

Trustworthiness in this exploratory study is ensured through meticulous design and rigorous application of data collection and analysis techniques. Utilising adaptable interview methods with open-ended questions facilitates a thorough examination of participants' experiences and the emergence of unforeseen themes. This adaptability ensures comprehensive data collection while maintaining alignment with research objectives. To validate and refine the interview questions, the guide is piloted with a

small sample, leading to improvements in clarity and relevance, and enhancing its ability to elicit rich and meaningful data (Forero et al., 2018; Dzimba & van der Poll, 2022).

Application of these processes is evident in the findings. The interviews provide detailed insights into entrepreneurs' experiences with technology adoption, such as overcoming financial constraints, leveraging cloud-based systems like Sage and Google Drive, and dealing with challenges related to government support. By structuring interviews to explore these specific themes, the study ensures the authenticity of the data, as participants share their experiences freely while addressing the research focus.

Additionally, the study employs audio recordings to accurately capture participants' narratives, minimising risks of misinterpretation during transcription. These transcripts underwent thematic analysis, where consistent coding and review of emerging themes reflect the participants' authentic voices. This iterative process, supported by an audit trail of coding decisions and cross-verification of data, enhanced the reliability of the findings (Braun & Clarke, 2006; Forero et al., 2018).

3.10.3. Dependability

In qualitative research, dependability confirms that a study's results are consistent and can be replicated by other researchers. To achieve dependability, this study employs systematic processes for data collection and analysis, ensuring that the outcome accurately reflects the participants' experiences and insights into technology adoption among South African SMMEs (Forero et al., 2018).

The study uses semi-structured interviews, allowing flexibility to delve into participant-specific contexts while maintaining consistency through a standardised interview guide. Each interview is audio-recorded with consent, ensuring accurate transcription for thematic analysis. To enhance transparency, all data collection instruments, including the interview guide and participant consent forms, are documented in Appendix B of the research report.

The collected data undergoes a thorough thematic analysis, to ensure the findings are rooted in the participants' experiences and perspectives. This process began with

familiarisation with the data, where audio recordings of interviews are transcribed verbatim. The transcripts are then meticulously reviewed to obtain a thorough insight into the perspective conveyed by the participants.

Following this, the information is subjected to initial coding, where segments of the text are systematically labelled to capture key aspects such as resource constraints, regulatory challenges, and the benefits of technology adoption. These codes highlight the fundamental issues and opportunities experienced by South African entrepreneurs in adopting and leveraging technology.

Finally, the codes are grouped into broader, coherent themes that represent the participants' experiences. Themes such as "Resource Constraints," "Government Influence," and "Technology as a Growth Enabler" emerged through iterative refinement, ensuring they accurately reflected the data. This rigorous, multi-stage process of coding and theme development provides a resilient structure for analysing and interpreting the data, supporting the study's objectives, and ensuring reliability and consistency. rigorous

To maintain dependability and strengthen the study's reliability, a detailed audit trail was established. This included meticulous documentation of coding decisions, the development of themes, and every step of the analytical process. By providing a transparent account of how data is analysed, the study ensures that its methodology can be reviewed and replicated by future researchers. Additionally data is cross-verified using perspectives from a wide selection of participants representing various industries and differing levels of technological maturity. This approach ensured a comprehensive understanding of the challenges and strategies encountered by South African SMMEs in adopting and leveraging technology, strengthening the resilience and credibility of the research's conclusions.

3.10.4. Confirmability

To ensure reliable results and minimise researcher bias, this study employs systematic thematic analysis. This process involves coding interviews to identify key themes and maintaining a detailed audit trail, including notes on coding decisions and justifications (Braun & Clarke, 2006). This transparency allows independent

researchers to review the process and potentially reach similar conclusions, thereby strengthening the confirmability of the findings (Forero et al., 2018).

Thematic analysis includes detailed coding and organisation of interview data to identify key themes and patterns, ensuring that findings are firmly rooted in participants' perspectives and experiences. Transparency is maintained through an audit trail documenting each step of the analysis, including coding decisions, theme definitions, and rationale for thematic categorisations. This included detailed notes explaining why specific data segments are coded in particular ways and how themes were refined. For example, the transition from manual to automated processes using tools like Sage and cloud computing is highlighted in the findings and validated through repeatable coding practices.

Confirmability was demonstrated by thoroughly documenting the coding process. Each interview transcript was carefully reviewed to extract codes related to financial constraints, regulatory barriers, and the benefits of technology adoption (e.g., cloud computing, AI, and ERP systems). These codes are systematically grouped into broader themes such as "Resource Constraints," "Government's Role in Technology Adoption," and "Technology as a Growth Enabler," as reflected in the thematic analysis.

Additionally, triangulation was used to cross-verify findings. Insights from interviews across different industries, such as IT, civil engineering, and hospitality, are compared to identify commonalities and differences, ensuring a well-rounded representation of the data.

This meticulous approach to confirmability underscores the reliability of the findings, providing a robust foundation for understanding technology adoption among South African entrepreneurs.

3.11. Ethical consideration

Ethical considerations are central to this study, prioritising the safeguarding and respect of participants' rights, safety, and confidentiality throughout the research process. All participants provide informed consent before data collection begins. The

consent document clearly outlines the study's objectives, data collection techniques, potential applications of the findings, and the safeguards implemented to ensure participants' privacy and confidentiality. This transparency ensures that participants are fully aware of their involvement and can make informed decisions regarding their participation.

Confidentiality is safeguarded by replacing personal identifiers with unique codes (pseudonym) to protect participants' identities. The study data is securely stored using password-protected systems and encrypted backups to prevent unauthorised access. The data is exclusively accessible to the researcher.

Involvement in the research is entirely optional, and participants are informed of their right to withdraw at any time without repercussions or consequences. Such assurance is crucial in fostering trust and ensuring that participants feel comfortable sharing their insights.

Furthermore, ethical approval from Wits University is obtained to ensure that the study adheres to established ethical guidelines and principles. The ethical approval form is attached as appendix D.

3.12. Characteristics of participants

The study includes eight participants from diverse sectors, including IT services, engineering, waste management, construction, and hospitality. The group consists of five females and three males, aged between thirty and fifty-one years, with qualifications such as chartered accountants, master of business administration, and doctor of philosophy. They hold various leadership roles. Their experience ranged from ten to thirty years, demonstrating extensive industry knowledge.

AI, Cloud computing, and mobile apps are commonly used digital solutions, with some participants also utilising specialised tools like AutoCAD and biometric systems. These characteristics provide valuable insights into technology adoption among South African SMMEs.

Table 1: Characteristics of participants

Participant ID	Gender	Age Range	Qualifications & Position	Sector	Experience (years)
1	Female	30- 40	CA, MD	IT Services	14
2	Female	51+	B-Tech ,MD	Waste Management	15
3	Male	51+	Pr Engineer, Honours Degree	Engineering Consultant	30
4	Male	30 - 40	PHD Candidate, MD	Engineering & Construction	13
5	Female	51+	MBA, CFO	IT Services	25
6	Female	40-50	MBA	Construction	10
7	Male	40-50	MBA, CIO	IT Services	28
8	Female	51+	MBL, MD	Hospitality	14

3.13. Conclusion

This study details the methodology employed to investigate technology adoption among South African SMMEs. A qualitative approach, utilising in-depth interviews, is used to gather comprehensive insights. It outlines the population and sampling strategy, while addressing research rigor. Thematic analysis is used to analyse the information collected. Ethical guidelines are adhered to in order to maintain participant confidentiality and ensure compliance with research standards.

CHAPTER 4. PRESENTATION OF RESULTS AND DISCUSSION OF FINDINGS

4.1. Introduction

This chapter presents the findings from the interviews conducted with South African entrepreneurs. Thematic insights are presented in alignment with each of the three research objectives. Direct quotes are included to preserve the depth and authenticity of participants' voices. The findings highlight both the strategic motivations behind technology adoption by SMMEs and the structural and institutional barriers influencing the process.

4.2. Presentation of results

4.2.1. Research objective 1: To explore key drivers motivating South African SMMEs to adopt technology for business innovation and growth.

Participants consistently highlighted that the adoption of digital technologies by SMMEs was not optional but a strategic necessity driven by operational challenges, cost-efficiency needs, and a desire for business growth. Many entrepreneurs described specific technologies they had integrated to address internal inefficiencies, improve accuracy, and scale operations with limited resources.

Respondents mentioned a range of digital tools, including cloud-based accounting systems, mobile applications for task and customer management, CAD software in the engineering sector, and AI-enabled platforms for automation and client interaction.

The majority of participants adopted cloud-based platforms due to their flexibility, low infrastructure costs, and ability to facilitate remote work and collaboration.

Participant 4 explained:

"Switching from Excel to Sage was a game-changer for us, minimising errors and reducing the time spent on administrative tasks."

Participant 3, in the engineering field, echoed a similar outcome:

“CAD software sped up our design processes, improving both quality and client satisfaction.”

Participant 6 stated:

“Cloud solutions offered flexibility and allowed us to reduce manual errors without massive costs.”

Several participants highlighted that technology adoption was closely linked to scalability. Businesses wanted to expand their operations without proportionally increasing human resources or fixed costs.

Participant 1 remarked:

“AI has enabled us to scale operations without needing to expand our workforce significantly.”

Participant 5 added that:

“AI automation allowed us to focus more on strategic decisions and client engagement instead of daily admin.”

Improved service delivery, enhanced customer communication, and quicker decision-making were additional drivers. Respondents saw technology as a tool not only for efficiency but also for gaining a competitive edge and building credibility with clients.

Participant 8 noted:

“Clients trust us more when they see that we use modern systems to manage information and communicate quickly.”

In addition to these operational drivers, respondents also reported adopting technology as a means to survive in a challenging business environment. Particularly during and after COVID-19, remote access tools and cloud storage became essential to ensure continuity and prevent data loss.

Participant 2 shared:

“After we lost equipment to theft, cloud backup was the only thing that saved our records.”

While digital tools were seen as valuable, several participants indicated that internal capability such as financial readiness and staff skills played a major role in shaping their technology choices.

Participant 7 explained:

“We had to choose software that didn’t require much training because we didn’t have time or money for long onboarding processes.”

Across all responses, operational efficiency, cost reduction, scalability, and innovation were the core motivators for digital adoption. These drivers were consistently balanced against internal resource constraints, highlighting a pragmatic approach to selecting and integrating technologies that best addressed immediate business needs.

4.2.2. Research objective 2 - To identify challenges encountered by South African SMMEs in adopting technology.

Participants consistently reported that limited digital access and infrastructure challenges were significant barriers to effective technology adoption by the SMMEs. SMMEs operating in townships and semi-urban areas faced unreliable internet connectivity, high data costs, and frequent disruptions that undermined the use of cloud platforms and web-based applications. In such environments, participants described reverting to manual processes or basic tools when digital platforms became unreliable. These interruptions created inefficiencies and sometimes affected client trust and service delivery timelines.

Participant 2, operating from a peri-urban area, explained:

“Sometimes our systems are down for hours due to poor connectivity, which delays everything from communicating with clients to accessing cloud storage.”

Beyond infrastructure and digital literacy emerged as central issues. Many entrepreneurs indicated that their staff lacked the necessary technical proficiency to use software tools effectively. Even when businesses could afford digital tools, poor digital readiness among employees slowed implementation and sometimes led to underutilisation.

The lack of basic IT knowledge among staff was especially challenging for older or non-technical team members. Businesses often had to invest in upskilling or simplify digital processes to avoid workflow disruption.

Participant 7 shared:

“Training our staff was a steep learning curve and required significant investment, but it was necessary for success.”

Participant 8 noted:

“We had to break things down and train our admin staff from scratch, especially for cloud filing systems and online communication tools.”

Several respondents described adopting mobile applications and free tools as initial entry points due to affordability and ease of use. For example, WhatsApp Business, Google Forms, and free accounting apps were used before more complex systems could be implemented.

Participant 6 explained:

“We started with basic tools we could access from phones. Only later did we move to proper cloud software when we felt ready.”

Entrepreneurs also shared adaptive strategies like hiring freelancers or outsourcing tech functions to bridge internal skill gaps. However, not all could afford such support, and those without digital mentors or peer networks found the transition more difficult.

Overall, the findings under Research Objective 2 show that while technology adoption is widely recognised as necessary, infrastructure limitations, digital literacy gaps, and affordability of skilled support significantly shaped the timing and extent of adoption.

The digital divide remains a key structural barrier for SMMEs, requiring both technical and human-capital interventions.

4.2.3. Research objective 3: To examine the external enablers and support mechanisms that influence technology adoption among South African SMMEs.

The external environment, particularly government support, industry partnerships, and policy frameworks was found to play a significant role in shaping technology adoption among SMMEs. However, participants expressed mixed views regarding the availability, accessibility, and effectiveness of these external enablers.

Many entrepreneurs highlighted that while there are government programmes intended to support small businesses, these initiatives are often difficult to access due to excessive bureaucracy, lack of awareness, or poor communication from implementing agencies. Several participants perceived the government's role as focused more on job creation than on fostering innovation through digital adoption.

Participant 6 observed:

"There's too much red tape and not enough programmes that directly support small businesses in adopting new technologies."

Participant 5 echoed this, stating:

"I tried applying for one of the digital grants but the process was so complicated, and I never received any feedback."

Some participants acknowledged that certain support structures, such as the Small Enterprise Development Agency (SEDA), public incubators, or government-sponsored training workshops, had helped raise awareness or provide occasional digital exposure. However, these were often limited in scope, inconsistent across regions, or insufficient to meet the deeper financial and technical needs of growing enterprises.

Participant 4 offered a more optimistic view, stating:

“Although there is too much bureaucracy, I believe there are enough programmes to support small businesses in adopting new technologies.”

However, even where support existed, several entrepreneurs felt that information was not widely shared or communicated in a way that small businesses could act on.

Participant 7 commented:

“Unless you are connected or already know someone, you don’t even hear about the programmes in time to apply.”

In addition to government support, respondents mentioned that industry networks, mentorship opportunities, and collaboration with universities or technology hubs could act as enabling mechanisms. However, these partnerships were largely informal or underutilised. For many entrepreneurs, technology adoption remained a self-driven initiative, often based on trial-and-error, peer recommendations, or personal investment, with little systematic external guidance or financial relief.

Participant 2 remarked:

“We’ve had to figure out most things ourselves. Sometimes, other entrepreneurs help, but there’s no official place to go for tech support.”

The lack of targeted funding or subsidies for digital tools was particularly noted. Participants expressed the need for grant-based schemes, tax incentives, and affordable access to enterprise-grade software that would otherwise be out of reach. They also emphasised that financial incentives alone were not enough. There was a strong call for customised, practical training programmes designed to help small teams use the tools effectively.

Participant 1 shared:

“It’s not just about buying the software, we need someone to show us how to use it in our kind of business.”

Participant 8 reinforced this point, adding:

*“We don’t need generic training. We need digital workshops that focus on businesses like ours, practical, not theoretical. ”*While external support mechanisms exist in principle, their fragmented implementation and limited accessibility have reduced their actual impact on SMMEs’ digital transformation. Many entrepreneurs are willing to adopt technology but are discouraged by confusing processes, lack of visibility, and resource mismatches. A more coherent and inclusive support system backed by streamlined processes, proactive outreach, and needs-based funding and training was seen as essential for enabling broader and deeper technology adoption across the SMME sector.

4.3. Discussion of finding

4.3.1. Research question 1: What factors influence South African SMMEs to adopt technology for innovation and business growth.

The findings indicate that technology adoption among South African SMMEs is primarily driven by internal operational constraints rather than proactive pursuit of innovation. Financial limitations, understaffing, and inefficient manual processes frequently prompted the adoption of digital tools such as cloud computing platforms, AI applications, and Computer-Aided Design (CAD) software. These technologies were used not merely to innovate, but to solve practical problems like reducing administrative load, preventing errors, and improving service delivery.

This findings aligns with the RBV (Barney, 1991), which posits that internal resources such as technological capability, human capital, and knowledge are central to achieving and sustaining competitive advantage. In the context, digital tools were perceived as strategic enablers, especially when access to financial capital or external support was limited.

The findings resonate with Fatoki (2021), who found that South African SMMEs frequently adopt technology to enhance internal efficiency and ensure survival in constrained environments. Entrepreneurs in this study also framed technology as a necessity rather than a luxury, an operational imperative more than a strategic differentiator.

Businesses with stronger digital literacy and implementation planning reported greater gains from adoption, while others struggled to extract value due to a lack of technical skills or strategic clarity. This reflects earlier observations by Van Dyk and Van Belle (2019), who noted that SMMEs often adopt technology in an ad hoc manner and may lack the resources to ensure full integration. As in this study, their research highlighted that technology was most valuable when embedded into core processes rather than used as a bolt-on solution.

While the desire to adopt digital tools was widespread, internal capability remained a gatekeeper. Staff needed to be trained, tools needed to be affordable, and integration had to match the firm's existing structure. For many SMMEs, this meant adopting technology incrementally, often starting with basic systems and upgrading as their skills and confidence improved.

Internal resource constraints are primary driver of technology adoption among South African SMMEs. Adoption is largely tactical and necessity driven, aimed at improving internal efficiency and maintaining competitiveness. This reinforces the RBV logic. (Barney,1991); when digital tools are aligned with a firm's internal capabilities, they can serve as a powerful lever for performance improvement and long-term growth.

4.3.2. Research Question 2: What challenges do South African SMMEs face in adopting technology

Digital tools are valued by the SMMEs. The propensity to adopt these digital tools was shaped by unequal infrastructure, affordability gaps, and limitations in digital capability. Technology adoption was not resisted; it was often simply out of reach for businesses operating under persistent challenges such as poor internet access and financial constraints.

Across the dataset, the digital divide emerged as a defining challenge. SMMEs in urban settings with relatively stable internet access and stronger digital literacy reported smoother transitions to cloud computing and automation tools. In contrast, those in peri-urban and township areas described a very different experience, one marked by unstable connectivity, prohibitive data costs, and insufficient technical

support. These businesses were often forced to revert to manual systems or adopt low-tech workarounds.

Such infrastructural issues were compounded by a lack of internal digital skills. Even in cases where basic infrastructure was in place, the absence of digital literacy among staff limited the effective use of technology and hindered long term adoption.

These findings point to a critical insight from the DOI theory (Rogers et al., 2014), which suggests that adoption is not solely influenced by a technology's perceived advantage, but also by organisational readiness, compatibility, and socio-technical environment in which it is introduced. In this study, readiness, both infrastructural and human was highly variable, and this variability directly shaped the pace and success of adoption.

This aligns with Graham (2019), who argues that South Africa's fragmented digital infrastructure reinforces inequality in innovation potential.

The challenges faced by South African SMMEs in adopting technology does not stem from reluctance or resistance, but from constrained access to essential enablers of digital readiness. In my view, the uneven pace of adoption is driven by systematic barriers. The findings suggest that unless foundational issues such as affordability, infrastructure, and digital skills are addressed, SMMEs will continue to experience fragmented and conditional participation in the digital economy.

4.3.3. Research Question 3: What external enablers or support mechanisms influence technology adoption among South African SMMEs

Institutional support for digital adoption among SMMEs appears fragmented and poorly aligned with their operational realities. Despite the availability of government programmes and public incubators, these initiatives often fail to meet the practical needs of entrepreneurs, particularly in terms of accessibility, relevance, and communication. This disconnect has pushed many SMMEs to seek informal support or rely on self-directed learning, which may provide short-term solutions but undermines their capacity for digital growth.

The influence of the external environment, as conceptualised in this study, reflects the DOI theory (Rogers et al., 2014), which emphasises that adoption is not only shaped by an organisation's internal decision-making, but also by its exposure to enabling structures, peer influence, and institutional support. In this context, the absence of relevant and accessible external enablers significantly shaped both the speed and scope of adoption.

SMMEs often face a disconnect between available institutional support programmes and their practical business needs. While formal mechanisms such as workshops and training exist, they tend to be too generic, inaccessible, or poorly targeted to the realities faced by small enterprises. As a result, many SMMEs make digital adoption decisions independently, often through trial-and-error without adequate guidance or strategic input.

Conversely, those with access to peer networks or incubator support benefit from more context-specific, timely, and actionable insights. This contrast underscores the growing importance of informal support structures in facilitating technology adoption, especially in environments where formal institutional mechanisms are limited or ineffective.

Achieng and Malatji (2022) argue that digital policy implementation in South Africa lacks localisation and sector-specific sensitivity, resulting in programmes that are misaligned with the realities of SMMEs. The present findings confirm this, showing that while institutional support exists in theory, its practical impact is diminished by inflexible design, fragmented communication, and a lack of targeted outreach.

The absence of tangible incentives such as digital adoption grants, subsidised software, or tailored tax relief, reflects a significant gap in the institutional support ecosystems of SMMEs. The findings show that current initiatives prioritise awareness over practical enablement. Without funding models to reduce investment risks or training tailored to small teams, meaningful technology adoption remains limited.

External support mechanisms for digital adoption in the South African SMME context are inconsistently experienced and often poorly executed. While the intent behind these structures aligns with national innovation policy objectives, their design and

delivery frequently fall short of addressing the realities of SMMEs. In my view, the effectiveness of external support will depend on its ability to be responsive, context-specific, and aligned with the operational needs of small businesses. Without such alignment, institutional support risks becoming irrelevant to the very enterprises it aims to empower.

4.4. Conclusion

This chapter demonstrated that technology adoption among South African SMMEs is driven primarily by internal operational constraints rather than innovation intent. Financial limitations, limited technical skills, and inefficient processes were key motivators for adopting digital tools, consistent with the RBV (Barney, 1991). Adoption challenges were shaped by the digital divide, particularly inadequate infrastructure, unaffordable connectivity, and low digital literacy, supporting the DOI theory's (Rogers et al., 2014), emphasis on readiness and context. Institutional support was found to be fragmented and poorly aligned with the needs of SMMEs, pushing many to rely on informal networks. Overall, the findings highlight the need to strengthen internal capacity and redesign external support mechanisms to be more accessible, practical, and context-specific.

5. SUMMARY, CONCLUSION, IMPLICATIONS, LIMITATIONS AND RECOMMENDATIONS

5.1. Summary of findings

The research explores how South African SMMEs leverage technology for innovation and growth, identifying key challenges, enablers, and outcomes associated with technology adoption. The findings reveal that while digital tools such as cloud computing, AI, and mobile applications enhance operational efficiency and business scalability, significant obstacles persist. Financial constraints, regulatory inefficiencies, and skill gaps, continue to hinder widespread technology integration.

Despite these challenges, technology adoption emerged as transformative enablers, enhancing operational efficiency and scalability. Government assistance, such as funding Initiatives and training programmes, is vital in addressing these barriers and promoting inclusive innovation. The study emphasises the importance of bridging the technology gap and enhancing digital literacy to enable broader technology adoption among SMMEs.

5.2. Conclusion

The research emphasises the essential role of technology in driving strategic evolution and growth within South African SMMEs. Entrepreneurs who successfully adopt and integrate digital tools achieve significant improvements in operational efficiency, customer satisfaction, and competitive positioning. Technologies such as AI and cloud computing were particularly impactful, enabling businesses to scale operations and streamline processes despite resource limitations. However, persistent barriers, including financial constraints, inadequate digital infrastructure, and limited government support, continue to impede widespread technology adoption. Addressing these challenges through targeted interventions and strategic investments is essential for empowering SMMEs and fostering economic development.

5.3. Limitations

This study, with a sample size of eight participants, captured key themes relevant to its objectives. However, the small, service-sector-focused sample limits applicability to other industries or regions. A larger, more diverse sample in future research could enhance generalisability.

The geographic focus on South Africa, with its unique socio-economic context, restricts transferability to regions with different technological ecosystems and regulatory environments. The study was primarily conducted in Gauteng with only one participant from Cape Town, which may limit regional representation. Additionally, concentrating on cloud computing, AI, and mobile applications excluded other emerging technologies like blockchain and IoT, which may also play significant roles in technology adoption.

Relying on qualitative semi-structured interviews while insightful, introduces potential biases in data collection and interpretation. Despite systematic thematic analysis, subjectivity remains a constraint. Future research should adopt mixed-method approaches, broaden sample diversity, and explore additional technologies and industries to strengthen the applicability of findings.

5.4. Implications

The study highlights key implications for technology adoption among South African SMMEs, guided by the resource-based view and diffusion of innovation theories. Internal resources, technological capabilities, and environmental factors are essential drivers of innovation and growth.

Practically, the findings suggest that targeted government policies, including financial incentives, infrastructure development, and skills training, can enhance technology adoption (Bowmaker-Falconer & Herrington, 2020). Policymakers should streamline regulations, while entrepreneurs should adopt scalable solutions like cloud computing to overcome resource constraints (Fatoki, 2021). Bridging the digital divide through equitable access to technology and digital literacy programmes is crucial.

Public-private partnerships can create a sustainable business ecosystem supporting technological advancement (Achieng & Malatji, 2022).

Sector-specific challenges also require tailored support. Service-sector SMMEs may benefit from targeted programmes aimed at boosting operational efficiency through digital tools (Van Dyk & Van Belle, 2019).

Theoretically, this research advances understanding of how internal and external factors shape technology adoption in developing economies.

A collaborative approach involving the government, industry, and entrepreneurs can foster a supportive ecosystem for sustainable technology adoption and business growth.

5.5. Recommendations

5.5.1. Government support and policy reform

The South African government should streamline regulatory frameworks and reduce bureaucratic processes to foster a technology-driven environment. Introducing targeted financial incentives, simplifying compliance procedures, and offering grants for technological innovation can support SMMEs (Bowmaker-Falconer & Herrington, 2020).

5.5.2. Increased funding and resource allocation

Collaboration between public and private sectors is essential to provide adequate funding for SMMEs. Establishing venture capital funds, offering tax incentives for technology investments, and supporting smaller enterprises with grants can bridge the financial gap (Fatoki, 2021).

5.5.3. Skills development and training

Entrepreneurs and employees must receive continuous training to bridge the digital skills gap. Government and industry stakeholders should establish training programmes, online courses, and mentorship initiatives to build digital capabilities (Alexander, 2021).

5.5.4. Bridging the digital divide

Efforts should be directed towards reducing the digital divide through improved internet infrastructure, affordable technology access, and digital literacy campaigns. Public-private partnerships can create sustainable ecosystems for technology-driven growth (Achieng & Malatji, 2022).

5.5.5. Adoption of scalable technologies

SMMEs should prioritise adopting scalable and cost-effective technologies like cloud computing, AI, and mobile applications. Promoting successful case studies and creating technology adoption guides can support informed decision-making among entrepreneurs (Van Dyk & Van Belle, 2019).

5.6. Future study

Future research could explore technology adoption in diverse sectors such as manufacturing, agriculture, and retail to uncover sector-specific challenges and enablers. Long-term studies could assess how businesses adapt and sustain technology-driven growth over time, providing valuable insights into long-term outcomes (Rogers et al., 2014). Future studies could also examine specific entrepreneurial strategies

Investigating emerging technologies like blockchain, big data analytics, and the IoT would reveal new opportunities and challenges in business processes. Research on government policies and public-private partnerships could inform strategies to create supportive ecosystems for technology adoption.

Evaluating digital literacy and capacity building programmes would provide insights into how training initiatives affect technology uptake, guiding the development of targeted and impactful interventions. Addressing these areas would strengthen strategies fostering innovation, competitiveness, and economic growth among South African SMMEs.

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APPENDIX A: PARTICIPANT INFORMATION SHEET

Dear Participant

My name is Lufuno Ndou, and I am a master's student at University of Witwatersrand, Johannesburg. My supervisor is Dr Tonderai Sibanda, I am conducting a research study on how small, medium, and micro-enterprises (SMMEs) in South Africa leverage technology to drive innovation and business growth.

We are interested in speaking with entrepreneurs like yourself who are using technology to make their businesses thrive. Your insights would be invaluable to this research project.

The interview will be held at your convenience, either in person or online. It will last approximately 30-45 minutes and all your responses will be kept strictly confidential. Your participation is entirely voluntary, and you are free to withdraw from the interview at any point. During the interview, with your permission, the conversation will be audio-recorded to ensure accurate capture of your valuable insights.

Your participation in this study will be greatly appreciated. The information you provide will be used to develop recommendations for policymakers and support organizations to better assist SMMEs in leveraging technology for success.

The risks for this research study are no more than what happens in everyday life. This research study will be written up as a research report. The report will be available on the university library website. If you would like to receive a summary of this report, I will be happy to send it to you.

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

Yours sincerely,

Researcher: Lufuno Ndou, 2547166@students.wits.ac.za, 082 998 3988

Supervisor: Dr Tonderai Sibanda, tonderai.sibanda@wits.ac.za, 082887625

APPENDIX B: INTERVIEW GUIDE QUESTION

Introduction

The interview guide was designed to gather qualitative data from South African SMMEs on their experiences with technology adoption. Each question was crafted to align with specific research objectives and questions, enabling a focused exploration of motivations, challenges, and external support mechanisms. The questions are grouped according to the research objectives and questions they address, with original numbering retained in parentheses for reference.

Background information

- Tell me about your business, what do you do, and how long has your entrepreneurial journey been unfolding?
- What initially motivated you to pursue entrepreneurship?

Research objective 1: To explore key drivers motivating South African SMMEs to adopt technology for business innovation and growth.

Research question 1 : What motivates South African entrepreneurs SMMEs to adopt technology for innovation and business growth?

- Let's talk technology, can you walk me through the different technologies you've integrated into your business operations?
- What influenced your decision to adopt these technologies?
- Thinking about these technologies, can you share some specific examples of how they have empowered your business to innovate and grow?
- Can you provide inspiring examples of how you have utilised technology to develop or enhance products, services, or processes within your business?
- Beyond innovation, how have these technological advancements impacted the growth of your business?

- If you could offer a piece of golden advice to other South African entrepreneurs considering adopting technology for their businesses, what would it be?

Research objective 2: To identify challenges encountered by South African SMMEs in adopting technology.

Research question 2: What challenges do South African SMMEs face in adopting technology?

- Implementing new technologies can be challenging. Did you encounter any challenges in adopting or using these technologies? If so, how did you overcome them?

- As you navigate the exciting world of business expansion, what are some of the biggest challenges you face in terms of growing your business further?

Objective 3: To examine the external enablers and support mechanisms that influence technology adoption among South African SMMEs.

Research question 3: How do external factors, such as support services and infrastructure, influence the technology adoption process among South African entrepreneurs SMMEs?

- In your experience, how does the South African government or support organisations currently influence technology adoption among SMMEs? Do they create a supportive environment, or are there areas for improvement?

- If you could have access to any type of support, what resources or programs would be most beneficial for you to leverage technology for even greater innovation and business expansion?

- Looking ahead, what are your aspirations for integrating new technologies into your business in the coming years?

Thank you for sharing your valuable experience, your insights will be crucial in understanding how technology shapes the success of South African SMMEs.

5 APPENDIX C: PARTICIPANT CONSENT FORM

Title of project: Exploring South African entrepreneurs leveraging technology for innovation and growth

Name of researcher: Lufuno Masindi Ndou

I, ……., agree to participate in this research project.

I agree to the following:

(Please circle the relevant options below)

The research study was explained to me. I understand what this study is about.	YES	NO
I understand that I can volunteer to take part in the study	YES	NO
I agree that the interview may be audio recorded	YES	NO
I agree that direct quotations from my interview may be used by the researcher in their research report	YES	NO
I agree that my participation will remain anonymous (my name or other identifying data will not be used by the researcher in their research report	YES	NO
I agree that other researchers may use the information I provide in my interview (depending on their own ethics clearance being obtained) but my name and any personal information will not be used or passed on.	YES	NO

…… (signature)

…… (name of participant)

…… (date)

…… (signature)

…Lufuno Ndou…… (name of researcher/person seeking consent)

……. (date)

6 APPENDIX D: ETHICS CLEARANCE CERTIFICATE

Graduate School of Business Administration
University of the Witwatersrand, Johannesburg

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

Ethics Clearance Certificate

Ethics protocol number: WBS/BA254716 6/795
This certificate is only valid with a legitimate ethics protocol number and signed by the Researcher (below).

Project title	Exploring South African entrepreneurs leveraging technology for innovati and growth
Investigator / Researcher	Mrs Lufuno Ndou
Nature of Project	MBA (Research Article)
Decision of the Committee	Approved, provided stakeholders and participants are guaranteed confidentialty.
Issue Date of Certificate	04/07/2024
Expiry date	Date of submission of the project / research report
Chairperson	Dr Ayanda Magida +27 11 717 3953 ayanda.magida@wits.ac.za

Declaration by Researcher

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

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

L Ndou — Signature

06 July 2024 — Date: