The impact of digital technologies on SME business performance in South Africa

Mfanasibili Emmanuel Mdhluli

1984260

1984260@students.wits.ac.za; 0784594366

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ABSTRACT

In the era of digital transformation and digital technologies, small and medium enterprises (SMEs) face an ever-changing operating environment where being digitally savvy is critical for success. Therefore, adopting and using digital technology may prove to be an important decision that may lead to SMEs continuing to operate as going concerns, growing and being sustainable well into the future. This research delves into the impact of SMEs using digital technologies on business performance. While a myriad of business performance metrics can be tested, for this research, revenue, profit, operational efficiency, customer satisfaction, innovation, risk management and the economic indicator of job creation are analysed.

The challenges faced by SMEs are well documented, but there seems to be a lack of research on the benefits and impact of using digital technologies. Faced with limited resources, SMEs must make strategic decisions to drive their businesses forward and investing in digital technologies is one of them. This study seeks to understand the rationale of deciding to use digital technologies utilising the extended technology adoption model (TAM2) coupled with business measures.

A quantitative electronic survey was used to collect the data from a sample of 84 South African SMEs. The findings reveal that using digital technologies has a positive impact on SME business performance, thus making it imperative for SMEs to adopt and use digital technologies as part of their business models. The findings elucidate that using digital technologies is not merely an operational imperative, but is also transformative, unlocking sustained competitiveness. The study adds to the literature on the understanding of the impact of using digital technologies on SME business performance, especially from a South African context.

KEYWORDS

Digital technologies; SME; Business performance

DECLARATION

I, Mfanasibili Emmanuel Mdhluli, declare that this research report 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 Management in the field of Digital Business at the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination in this or any other university.

Name: Mfanasibili Emmanuel Mdhluli Signature:

Signed at Sharonlea, Randburg

On the19th day of February 2024

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LIST OF ACRONYMS

AI: Artificial Intelligence

BP: Business Performance

CFA: Confirmatory Factor Analysis

GDP: Gross Domestic Product

ICT: Information Communication Technology

IM: Image

IoT: Internet of Things

JR: Job Relevance

KPI: Key Performance Indicator

OECD: Organisation for Economic Co-operation and Development

OQ: Output Quality

PEOU: Perceived Ease of Use

PU: Perceived Usefulness

RD: Results Demonstrability

SEM: Structural Equation Modelling

SME: Small and Medium Enterprise

SN: Social Norm

VO: Voluntariness

CHAPTER 1: INTRODUCTION

1.1 Statement of purpose

This is a quantitative study which aims to examine the perceived impact of digital technologies on small and medium enterprise (SME) business performance in South Africa.

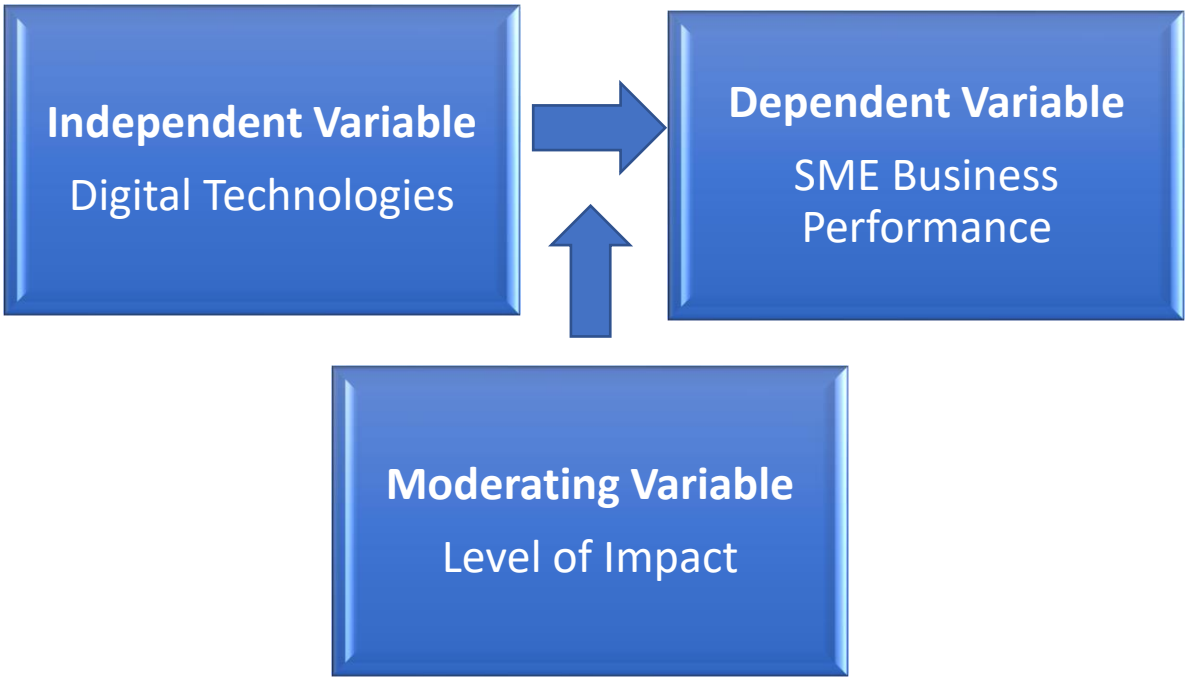

Figure 1.1: Conceptual Framework

In statistical analysis, independent and dependent variables are phrases used to describe the connection between two or more variables. Another variable that influences the connection between two other variables is known as a moderating variable. In this study, the moderating variable determines the level of impact that digital technologies have on SME business performance. The digital technologies considered as independent variables for this study are Email, Website, Social Media, Mobile Apps/Payments, Cloud Services, Internet of Things, Big Data Analytics, Artificial Intelligence, Robotics, ERP/CRM/SCM/HCM, and Blockchain. The business performance measurements or metrics considered as dependent variables for this study are revenue, profitability, operational efficiency, customer

satisfaction, innovation and risk management. The economic indicator of job creation is also considered as a key macroeconomic variable gleaned from SME performance and growth.

1.2 Background of the study

Small and medium enterprises (SMEs) play an important role in economies. They contribute significantly to Gross Domestic Product (GDP) growth, employment, and general economic activity. The Organisation for Economic Co-operation and Development (OECD) further states that SMEs play a key role in national economies around the world through the creation of employment, value add and innovation (OECD, 2017). Devos (2022) cited the World Bank statistics which indicated that SMEs represent circa 90% of all enterprises and are responsible for 50% of employment and about 40% of GDP in emerging markets. In 2017, the OECD opined that SMEs in emerging market economies contributed to 45% of total employment and 33% of GDP. It is clear that between 2017 and 2022 SMEs grew their contribution to employment and general business activity, as evidenced in GDP growth. The OECD (2022) also provided similar figures showing that SME contribution towards gross value added (which is GDP before taxes and subsidies) grew from 18% in 2010 to 40% in 2020. These statistics illustrate the impact and significance of SMEs to economic growth and business activity in economies. South African SMEs are no exception.

Rajagopaul, Magwentshu and Kalidas (2020) reported that South African SMEs represent more than 98% of all businesses and employ between 50% and 60% of the workforce across all sectors. They further state that SMEs are responsible for 25% of the job growth in the private sector, although their GDP contribution of 39% lags that of SMEs in the European Union at 57%. This contribution by South African SMEs is nevertheless stellar when considering the structural differences between European Union economies and South Africa. The case for the significant contribution is further strengthened by StatsSA (2020), which indicates

that South African small and medium-size businesses generate over one-fifth of total economic turnover.

In South Africa, SMEs are defined by the number of employees and annual turnover (Kirsten, Vermaak & Wolmarans, 2015; Zulu, 2019). StatsSA (2020) asserts that in 2019, a total of R10.5 trillion in total turnover was generated by the formal business sector, with small businesses contributing R2.3 trillion (22%), while medium-sized businesses contributed R1.05 trillion (10%). In total, SMEs contributed R3.8 trillion (32%) in total turnover for 2019 (StatsSA, 2020). These numbers are significant in that they paint a picture of the often-unappreciated contribution that SMEs make to the South African economy. To further illustrate their significance, in 2013 SMEs contributed 16% of total turnover, which expanded to 32% in 2019. Inversely, large business contribution declined from 75% to 68% over the same period (StatsSA, 2020). This SME turnover growth is across different sectors, including the construction and business services sectors (StatsSA, 2020).

The National Development Plan by the South African government prioritises SMEs as the key driver of future growth, poverty alleviation and job creation (OECD, 2022). It envisages SMEs contributing 60% to 80% of GDP growth and employing 90% of the country's workforce to align with global trends (OECD, 2022). However, even with a positive contribution to overall turnover, GDP growth and employment, the failure rate of South African SMEs remains very high. Friedrich (2020) and OECD (2022) quantified that the South African SME failure rate is roughly between 70% and 80% within five years of operation. There seems to be limited success of SMEs, as the majority do not even make it past five years of operation. There could be several factors that lead to SMEs' failure within the first five years of operations.

Adonis (2022) lists factors such as high interest rates, rising operating costs, and the current energy crisis (i.e., electricity power cuts in South Africa) as significant pressures on small businesses. Other factors cited were poor finance management, poor marketing practices, low access to funding, poor

management competence, lack of government support, low access to reliable data, as well as corruption (Rens, Iwu, Tengeh & Esambe, 2021). Moreover, lack of technological capability, lack of skills, globalisation, and the characteristics of entrepreneurs were cited as some of the challenges facing SMEs (Rens *et al*., 2021). It is clear that SMEs face multiple challenges and issues affecting their ability to operate, be sustainable and remain going concerns. In addition, inadequate technological infrastructure was noted as a factor affecting connectivity to technology networks (Rens *et al*., 2021). It is with this lens and understanding of the factors at play that this research seeks to explore whether digital technologies have an impact on South African SMEs' business performance, focusing on key financial and non-financial business measures such as revenue, profitability, efficiency, customer satisfaction, innovation and risk management, and providing insights into their overall impact on SME performance.

1.3 Research problem

Digital transformation and innovation have become a central theme in businesses and society in general. Malodia, Mishra, Fait, Papa and Dezi (2023) posited that SMEs have been slow and conservative in the rate of adopting digital transformation, while large organisations have embraced it successfully and have benefited from it. The authors further state that while digital transformation has been extensively researched, the focus has largely been on large organisations and technology start-ups. Teng *et al*. (2022) also stated that although multiple academic studies on digital transformation have been conducted recently, they have been focused on digital native, platform-based and large businesses. This has led to a dearth of empirical research conducted on digital transformation of SMEs. Malodia *et al*. (2023) also conclude that there are few studies focused on SME digital transformation, and a need for further research on SME digital transformation therefore exists.

Teng *et al*. (2022) focused on SMEs in mainland China, thus providing a Chinese context, and found that digital technologies (tools) have a positive effect on SME

digital transformation. They also found that digital technologies (tools) have significant impact on the financial performance of Chinese SMEs that adopt intelligent operations. Such technologies continuously improve the user experience, make the SMEs agile and can achieve breakthrough business results.

More so, Chen *et al*. (2016), while researching the effect of digital transformation on organisational performance of SMEs in the Taiwanese textile industry, indicated that firms that make optimal use of Information Communication Technology (ICT) tended to access new market opportunities, gain new knowledge on their customers and improve their product development processes. Malodia *et al*. (2023), an Indian study, found that the adoption of e-commerce, digital marketing and use of big data technologies is important for the success of digital transformation. However, they mentioned that firm performance effects of digital transformation are underexplored and require further research, especially for SMEs.

It is therefore clear that SME digital transformation studies are now starting to take place in many jurisdictions, but there is limited research from an African context, including South Africa. More knowledge on the level of usage of digital technologies by South African SMEs is required in order to better understand the business value gleaned from these technologies.

1.4 Research questions

Based on the problems identified above, the following research question has been formulated**:**

1. What is the impact of digital technologies on SME business performance?

The answer(s) to this question help to understand the rationale for the usage of digital technologies by South African SMEs and the level of business performance impact that these technologies bring to the SMEs.

1.5 Rationale

Literature on SME digital transformation and the use of digital technology is sparse, especially from a South African perspective. It is therefore critical to add to the body of knowledge regarding SME digital transformation through the lens of digital technology adoption and business performance. Similar or congruent studies have been conducted in other parts of the world such as India, China and Taiwan (Teng *et al*., 2022; Chen *et al*., 2014; Malodia *et al*., 2023), the findings of which detailed that digital technology has a significant impact on SME financial performance.

From the quoted studies, there are clear benefits of using information or digital technology for SMEs and there is value in studying these phenomena in a South African context to ascertain whether the same or similar results can be obtained. Additionally, the South African economy differs from that of China, India and Taiwan. South African SMEs face technology constraints through limited access to appropriate technologies (Rens *et al*., 2021; Teng *et al*., 2022). It is therefore important to further understand the drivers of SME success, growth, and sustainability. This study seeks to contribute to the body of research that already exists, with a particular focus on South African SMEs. Additionally, this study is not sector or industry specific but focuses on SMEs in general to gain a better understanding of the impact of using digital technologies on SMEs in South Africa agnostic of industry or sector or industry.

1.6 Significance

This study seeks to add to the body of knowledge in this space, and focuses especially on digital technologies, their usage, and the impact they make on SME business performance from a South African SME perspective. The study is

important, as its findings add to local knowledge of SMEs from a technology/tool adoption perspective. It is envisaged to help guide policy makers, SMEs, and other parties in better understanding mission critical digital technologies. In so doing, the findings help to ensure that SMEs exist as going concerns for longer, play a meaningful role in the mainstream economy, and help in alleviating social and economic challenges such as poverty, underdevelopment, economic growth and unemployment.

1.7 Delimitations of the study

This study is focused on SMEs in South Africa that use digital technologies and excludes those that do not use digital technologies. It focuses on digital technology adoption by SMEs and the potential impact such technology has on SME performance.

It also focuses on some of the key business performance measurements or metrics such as revenue, profitability, efficiency, customer satisfaction, innovation and risk management, and includes job creation as a key macroeconomic variable gleaned from SME performance and growth. There are other performance measures that could be included, however, those that have been mentioned are chosen specifically for their relevance to this study.

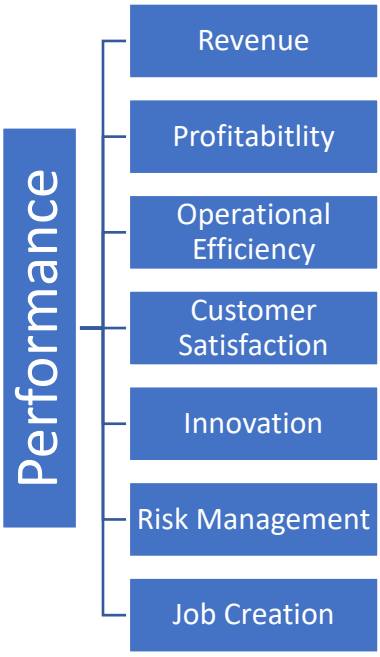

Figure 1.2: Chosen Business Performance Metrics

1.8 Definition of terms

Business performance: A company's ability to profit from its resources and achieve its objectives, measured using a set of key performance indicators (KPIs). Some KPIs include profitability, revenue, sales, customer satisfaction ratings, productivity and efficiency (Terpiłowski, 2022).

Customer satisfaction: A person's feeling of satisfaction or disappointment emanating from the comparison of a product or service's perceived performance against expectations (Rajeev, 2022).

Digital Transformation: A transformation concerned with digital technology that can bring changes in an organisation's business model, products and services, and structures (Nadkarni & Prügl, 2021).

Digital Technology: A multitude of technologies in varying formats such as tools, services and applications that enable the creation, transmission, processing and storage of data (Ruzive & Masengu, 2021).

Innovation: A process of developing and application of new ideas or improving existing ones to bring about practical value and outcomes (Tohidi & Jabbari, 2012).

Risk Management: A process that outlines all possible risks, evaluates them, and proposes actions to reduce, mitigate or avoid any potential losses emanating from the risks (Hayashi & Kamei, 2018).

Small and Medium Enterprise (SME): Enterprises with less than 250 employees (Ayandibu & Houghton, 2017). Such enterprises also generate an annual maximum turnover of R64 million and have a maximum gross asset value of R19 million (The Banking Association South Africa, 2022).

1.9 Assumptions

The following assumptions are made for this study:

I. Study participants have different levels of digital technology usage and understanding.
II. Study participants come from different industries and sectors.
III. An understanding of how digital technologies are affecting South African SMEs' commercial prospects is crucial for enhancing SME prospects.
IV. A critical assumption that was made in this research was that SMEs have already undergone the evaluation of their adoption of digital technology using the TAM2 model and an adoption baseline has been established to assess the types of digital technologies that are being adopted and the resultant business performance by SMEs in South Africa. The TAM2 model expands on the original Technology Adoption Model by incorporating social and usability factors that influence why SMEs adopt new technologies.
V. The survey responses are be based on objective truth and honesty.

1.10 Chapter outline

Chapter 1 sets the scene of the research, explains the research problem, lists the research questions to be answered in lieu of the research problem identified, provides a rationale for the study, its limitations and assumptions, and defines its key terms to enable the reader to engage meaningfully with the document.

Chapter 2 provides a literature review relating to SMEs in South Africa. It also reviews digital technology and its adoption as key to driving business performance. Furthermore, business performance as a construct and its tenets are also discussed, focusing on those measurements considered for this research. Hypotheses are presented at the end of each section of the chapter.

Chapter 3 provides an outline of the research methodology that was used to conduct the research. The research design and approach are outlined along with

the corresponding research population, sample size and method, the data collection instrument and how the data was analysed. Ethical considerations are also dealt with in this chapter.

Chapter 4 provides the detailed research findings, which either confirm or invalidate the hypotheses provided in chapter 2. In chapter 5, a discussion of the research findings is provided, focusing on the research propositions/hypotheses.

Chapter 6 presents the concluding arguments driven by the purpose of the research, the research questions and the research hypotheses set out in this study. Recommendations are made based on the findings and suggestions for future research presented as well.

CHAPTER 2: LITERATURE REVIEW AND THEORETICAL FRAMEWORK

2.1 Introduction

This chapter begins with the background of digitisation, and defines digital technology, the types, its uses, and its catalytic nature in enabling business growth and transformation, with a key focus on SMEs. An overview on SMEs is presented in this chapter, describing SMEs, their characteristics, economic contribution and their perceived adoption or lack thereof of digital technologies. Included in this exploration are the types of SMEs, their size and/or categorisation from a South African point of view.

Business performance measures are assessed and described based on their universal applicability and their ability to reflect business performance in a discernible manner. Theoretical and conceptual frameworks are also presented to give the research academic and theoretical grounding and credibility. The intended hypotheses based on the research topic and research questions are then listed in the review.

2.2 Overview of digitisation

The advent of digitisation, digitalisation and digital transformation has changed the way business is conducted. Business models are evolving and primarily centre on the adoption of digital technologies as a facet of digital transformation. SMEs would do well in adapting to this changing environment by grasping the benefits of digital technology to improve their agility, decision-making, rapid execution and sustainable advancement (Teng *et al*., 2022).

The terms digital or digitisation, digitalisation and digital transformation are often used interchangeably. However, these mean different things, although they are interrelated. Digital is defined as the translation of analogue information into computer language in binary form (Ancillai, Sabatini, Gatti & Perna, 2023). Armstrong and Lee (2021) also define digital or digitisation as the translation of analogue artefacts or information into digital form. Armstrong and Lee further define digitalisation as the redefining and reshaping or reconstruction of processes and systems from an analogue and physical nature into predominantly digital forms.

The underlying premise is that physical or analogue processes and systems are changed into programmable computer form. This transformation on its own does not lead to noticeable change of the business. That change is driven by digital transformation, which refers to the leveraging of these computerised or digital technologies to drive business model innovation and strategies to offer new and unique customer value (Malodia *et al*., 2023). Additionally, the marked change in the form and nature of the organisation is driven by the need to improve in response to technological disruption (Armstrong & Lee, 2021). It is therefore noticeable that digital technologies play a critical role in the transformation of an organisation to deliver greater value to customers.

Digital technologies have transformed the way business operates and interacts with its customers, suppliers, employees, competitors and stakeholders. Ancillai *et al*. (2023) state that digital technology manifests in three distinct ways, i.e., through digital artefacts, digital platforms, and digital infrastructure. Digital artefacts are applications or software or even digital content, while digital platforms are a commonly shared set of services. Digital infrastructure comprises tools and systems of communication, collaboration and computing capabilities supporting innovation processes (Ancillai *et al*., 2023). The combination of the three underpins the way business operates in this day and age.

2.3 Overview of SMEs

SMEs are generally understood as the backbone of economies globally. They play a significant role driving innovation, economic growth as well as job creation. They account for circa 80% of the workforce (Rajagopaul *et al*., 2020). They are defined as non-subsidiary, independent entities employing less than a given number of employees (OECD, 2000). The number differs according to each country or jurisdiction. Rajagopaul *et al*. (2020) define SMEs as separate and distinct entities managed by one or more owners and operating in any sector or sub-sector.

As established large incumbent businesses restructure, outsource and downsize, SMEs are expected to make up for this and their contribution in the economy increases (OECD, 2000). They play a strategic role in the production of products and services, innovation, and job creation (Govuzela & Mafini, 2019). They also contribute about 40% to GDP in emerging economies and create 7 out of 10 jobs (World Bank, n.d.)[1]. The World Bank estimates that by 2030, 600 million jobs will be needed to absorb the growing global workforce and SMEs are central to achieving this goal. Thus, it is important for governments to prioritise the development and support of these SMEs. Additionally, due to their critical role in the economy and job creation, it is imperative that they are protected and enabled, especially in uncertain and turbulent times, as their survival and recovery can serve as a lifeboat for the economy (Rajagopaul *et al*., 2020).

SMEs are constantly faced with multiple challenges such as limited resources, lack of access to finance and fierce competition, which can negatively affect their performance. Therefore, SMEs are constantly searching for ways to improve their competitiveness and performance. The adoption and usage of digital technology provides one potential solution to these challenges.

[1] https://www.worldbank.org/en/topic/smefinance#:~:text=With%20nearly%2010%20million%20SMEs,role%20in%20enhance%20SME%20financing.

Digital technology adoption can help SMEs overcome some of their challenges by reducing costs, driving revenue and profit, increasing innovation and productivity, and enhancing customer experience. Therefore, the extent to which SMEs adopt digital technology and how it affects their business performance is an important area of research, especially in a South African context. SMEs are a major contributor to global economic growth and play a pivotal role in job creation and economic development (World Bank, n.d.)[2].

2.3.1 South African SMEs

SMEs are typically defined by their size and countries use different metrics in their definitions. In South Africa, SMEs are defined by the number of employees and annual turnover (Kirsten, Vermaak & Wolmarans, 2015; Zulu, 2019). Small businesses are classified as those that employ 11 to 50 employees with an annual turnover of a minimum R17 million and maximum of R80 million, varying by sector. Medium-sized businesses are those that employ 51 to 250 employees, with an annual turnover of a minimum of R35 million and maximum of R220 million, varying by sector. The breakdown per type of business and sector is presented below.

South African SMEs contribute approximately 40% of all business activity (Govuzela & Mafini, 2019) and make up 98.5% of businesses in the country (Rajagopaul *et al*., 2020). They employ between 50% and 60% of the workforce and are responsible for 25% of job creation in the private sector (Rajagopaul *et al*., 2020). They also contribute 43% of all wages paid and are the key drivers of the economy in line with other emerging economies (Govuzela & Mafini, 2019).

The importance of SMEs in South Africa and in general can never be overstated. Their impact is both economic and social, as they provide social stability through job creation which reduces chronic unemployment (Govuzela & Mafini, 2019). They further drive innovation and help reduce levels of economic inequality.

[2] https://www.worldbank.org/en/topic/smefinance#:~:text=With%20nearly%2010%20million%20SMEs,role%20in%20enhance%20SME%20financing.

Therefore, understanding their level of digital technology usage and the impact thereof on their business performance is invaluable in further enhancing the support mechanisms required to see them grow further and add more value to the economy.

2.4 Digital technologies and SMEs

2.4.1 Digital technology

There is no universal definition of digital technology, however, it is broadly considered to be the generation, processing, or storing of information through electronic tools, technology devices, and systems (Sheng *et al*., 2022). The aforementioned have changed every aspect of human life (Sheng *et al*., 2022) and the business environment by promoting digital entrepreneurship (Zahra, Liu & Si, 2022). Additionally, Holzmann and Gregori (2023) opine that the debate around digitalisation revolves around the transformative capacity of digital technologies and their ever-increasing presence in everyday life. Zahra *et al*. (2022) further state that digital technology is a key part of the business model design process for companies, thus enabling their success. It has also enabled the creation of new ventures to strengthen the entrepreneurship ecosystem.

The most studied digital technologies include social media, mobile devices, analytics, cloud computing and the Internet of Things (IoT) (Ancillai *et al*., 2023). However, devices such as tablets, laptops/computers, digital video gaming devices and office automation systems also form part of digital technologies (Sheng *et al*., 2022). Other more recent digital technologies include platforms, blockchain, artificial intelligence (AI) and virtual reality, which have transformed several industries such as accommodation, agriculture and transportation (Holzmann & Gregori, 2023). These are shown in Figure 2.1 as part of the digital transformation process for small and mid-size businesses as well as the outcomes that can be realised.

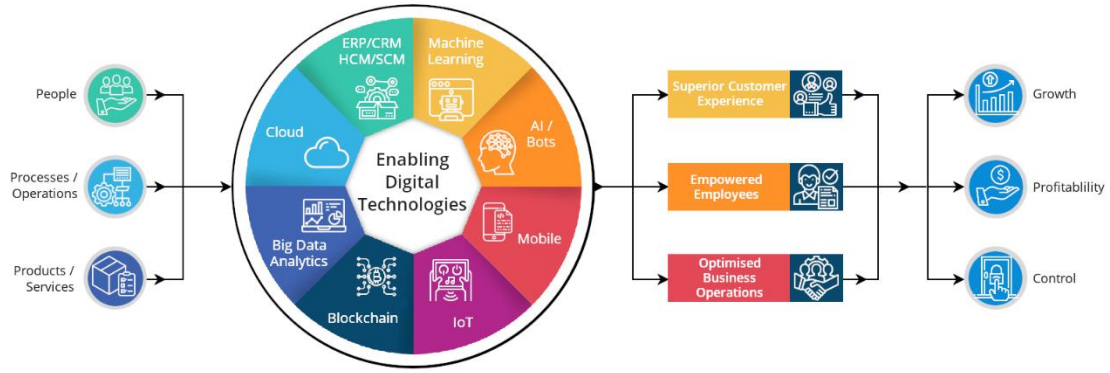

Figure 2.1: Digital Transformation for Small & Mid-Size Business
Source: Venkat (2020)

Digital technologies have become critical in enabling online-based businesses to reach customers and stakeholders through new digital channels (Zahra *et al*., 2022b). They also contribute in reshaping the business environment and the development of new business models (Danilet, 2022). This has led to the emergence of new opportunities to drive company profitability and growth.

A new group of technology- and internet-driven entrepreneurs has emerged through the integration of entrepreneurship and digital technology (Zahra *et al*., 2022). This has led to companies transforming their business architecture to create and appropriate value by offering digital products and services (Zahra *et al*., 2022). Furthermore, Ancillai *et al*. (2023) note that digital technology on its own is valueless per se. The value lies in how the technology interacts with a company's business model to yield positive outcomes and uncover news ways to create value.

Rawat, Kothari and Chandra (2022) in their study posit that industry 4.0 places emphasis on the benefits that can be gleaned from the usage of digital technology and its advancement. This can potentially lead to higher growth for small businesses. Incorporating these technologies into the architectural and technical infrastructure of the organisation can help in streamlining processes (Danilet, 2022). It can also impact externally to drive customer experience and value proposition, while internally, it can profoundly change and shape operations,

organisational structure, business processes and birth new business models (Ancillai *et al*., 2023).

At a fundamental level, digital technology enables the cleansing, transformation and standardisation of large data quantities to enable analytical insights (Lin & Lin, 2022). It further aids in the construction, processing and manipulation of dataflows automatically, thus enabling the ability to customise decision-making (Lin & Lin, 2022). This is crucial for SMEs, as they are more vulnerable to external shocks, both economic and non-economic in origin, than bigger organisations (Skare *et al*., 2023). Skare *et al.* (2023) further add that digitalised organisations tend to fare better when shocks occur, as they are able to execute both immediate and ongoing crisis management, which then leads to better performance in comparison to their peers.

It is important to also note that Chen *et al*. (2016) in their study on the effect of digital transformation on organisational performance of SMEs in the Taiwanese textile industry stated that earlier research found no discernible relation between information technology (IT) investment and firm profitability when measured in return on equity and return on assets. They further add that other researchers also could not find any meaningful linkage between increased IT investment and business economic performance. However, in a later study, Skare *et al*. (2023) postulate that the main force behind digital transformation is digital technology.

Based on prior research, it can therefore be assumed that digital technology plays a pivotal and positive role in the ongoing success of SMEs. The research conducted here seeks to test this view further, from a South African perspective.

2.4.2 Digital technology adoption by SMEs

In the OECD (2021) report on the digital transformation of SMEs, it was noted that many companies are equipping their employees with digital tools and over 50% are now utilising computers with access to the internet. These technologies are viewed as core digital tools, and governments and policy makers must

therefore ensure SMEs have access to these as an entry point to digital transitioning.

However, for SMEs to thrive, be sustainable, compete and become long-term viable entities, an adoption of higher-order digital technologies is required. Moreover, sector- and function-specific approaches to digital technology adoption must be considered to compliment the core digital tools already in place (OECD, 2021).

Delving into the variables and procedures that influence ICT adoption and their effect by SMEs in the manufacturing and logistics industry in South Africa, Gono, Harindranath and Özcan (2016) found that the literature posits that SMEs are poor at exploiting ICT. They further state that this is often caused by resource constraints and the inability to meaningfully invest in technology. The OECD (2021) in their report commented that the gap between established firms and SMEs in technology adoption has grown in the last decade. They mention that in countries such as Greece, Hungary, Poland, Portugal and Turkey, growth has come to a standstill, while in countries such as Denmark, Sweden and Finland, rapid growth has progressed further.

SMEs are faced with multiple challenges in adopting digital technology. A lack of critical digital infrastructure, necessary mindset, skills and finance are sighted as some of the challenges SMEs face (Telukdarie, Dube, Matjuta & Philbin, 2023). SMEs do not possess the requisite technological knowledge to maximise digital technology potential and exploit these technologies fully. Further, Gono *et al*. (2016) stated that prior research discovered that the usage of existing technology further hinders adoption, as it places a significant cap on the scope and rate of technological change that a business can implement based on familiarity and awareness.

Based on the resource constraints plaguing SMEs in the adoption of digital technology, Malodia *et al*. (2023) indicated that prior studies found that SMEs have not embraced digital transformation and have largely remained

conservative in its adoption, despite the benefits and opportunities that digital technology brings.

The literature presents numerous examples of benefits to SMEs in adopting digital technology and having a progressive stance on digital transformation holistically. Kumar *et al*. (2021) noted that the adoption of technology can help SMEs overcome many challenges. As an example, the COVID-19 pandemic provided an opportunity for SMEs to pivot their strategies, business models and operations to ensure they continue to exist. The pandemic brought with it the intensified use of digital technologies, as 70% of SMEs globally increased their usage (OECD, 2021). A total of 55% of Brazilian SMEs saw an increase in customer relationships, process agility and customer acquisition when using digital technologies during the pandemic (OECD, 2021). It was further noted that 72% of Canadian SMEs believe that e-commerce is strategically now required in order to have a successful business. Furthermore, technology serves as an enabler for SMEs to enter new and previously inaccessible markets and grow their market share (Gono *et al*., 2016).

Even from an economic benefit perspective, it has been found that 4,000 digital technology-based SMEs in Brazil, Germany, India and China created jobs twice as fast as other SMEs (Melo, Queiroz, Junior, de Sousa, Yushimito & Pereira, 2023). SMEs create about 50% of new jobs and contribute to global economic development (Telukdarie *et al*., 2023).

It is clear from the literature that SMEs continue to face challenges in operating their businesses. However, digital technology can serve as a conduit for minimising the challenges, creating new opportunities, and enhancing the dynamism of SMEs going forward. Hence, the adoption and usage of digital technologies is pivotal to the growth of the SME sector.

2.5 Impact of digital technologies on SMEs

SMEs are described as important drivers of economic growth and job creation for countries (Kirsten *et al*., 2015). Additionally, as stated earlier in this study, they contribute a high number of new jobs and contribute significantly to GDP growth. They also play a pivotal role in driving innovation, introducing new products and services and, at a social level, alleviating poverty. They face numerous challenges in growing and sustaining their businesses, including a lack of access to information infrastructure (Fubah & Moos, 2022). This relates to gaining access to information pertaining to funding, available technology and other resources required for SMEs to be successful. It is therefore important to gain an understanding of the business performance measures that digital technology positively impacts in order to encourage South African SMEs to adopt such technology to improve their chances of growth and sustainability.

In line with the literature, it is critical to understand the level of impact that digital technology has on SMEs to gauge whether the materiality level of the impact is worth the adoption of the technology. It should never be adoption for the sake of adoption, or simply following technology trends with no real business impact.

The advent of digital transformation and the importance of digital technologies as part of the digital transformation construct have changed the business landscape and how business operates. New business models have emerged that have created new opportunities and challenges for business, especially SMEs. Many studies have described the importance of adopting and using digital technologies to gain competitive parity and advantage. Radicic and Petković (2023) state that the push towards digital transformation is premised on the belief that adopting new technologies has the potential to drive innovation and competitive advantage. They further posit that using digital technologies inspires the development and acquisition of new skills, competences and knowledge. This research aims to explore the impact of digital technologies on the performance of SMEs through the usage of these technologies.

SMEs can glean both substantial opportunities and threats from the spread of digital technologies (Mazzarol, 2015). Their ability to access these technologies enables them to compete in international markets (Mazzarol, 2015) and locally as well. This can offer opportunities to grow and compete regardless of their size (Roman & Rusu, 2022). The impact of technology creating competitive advantage is higher than it has ever been, regardless of the business size (Radicic & Petković, 2023). This is further supported by previous studies that have shown that adopting and using digital technologies can have a positive impact on competitiveness, productivity and performance for SMEs (Roman & Rusu, 2022). This results in digital-forward businesses seeing higher revenue and productivity when compared to their less digitally-inclined peers (Roman & Rusu, 2022). Strategically investing in digital technologies has been noted to foster financial inclusion for SMEs by enabling them to access financial resources much easier than before (Roman & Rusu, 2022). In so doing, this has enabled better management of financial transactions and finances. Access to finance is a critical strategic pillar that enables SMEs to finance their operations and make key capital allocation decisions to grow their businesses. Credit access and the ability to diversify financing options is a factor in stimulating SME performance (Roman & Rusu, 2022). Further, using digital technologies has been found to increase the likelihood of SMEs acquiring funding from banks (Roman & Rusu, 2022). There is a clear and positive effect on strategic finance and growth when SMEs adopt and use digital technologies.

At an operational level, the impact of adopting and using digital technologies leads to the reduction of transaction costs and the improvement in access to information, staff communication, suppliers, and networks (Roman & Rusu, 2022). It can also through big data analytics improve decision-making through intelligent insights (Radicic & Petković, 2023). Popović-Pantić, Semenčenko and Vasilić (2020) in their study of digital technologies and financial performance of female-operated SMEs in Serbia state that businesses that recognise the importance of digital technology and inculcate it into their operations benefit and improve their market share in the short term. This is premised on the business's ability to innovatively implement the technology.

It is also important to note that the various types of digital technology such as big data, social media, enterprise resource planning, supply chain management, IoT, cloud solutions and others have been recorded as having a positive impact on SME performance. The adoption of social media enables improved customer communication and improves brand awareness, marketing of products and services, and market research, and leads to increased sales, overall reduction in marketing costs and improved performance (Qalati, Ostic, Sulaiman, Gopang & Khan, 2022). It further enhances productivity, system integration, competitiveness and collaboration. Qalati *et al*. (2022) in their results found a positive correlation between social media adoption and SME performance.

Big data as a digital technology was found to expand the absorptive capacity and stimulate innovation of new products and services to meet customer demands and needs and also to help explore potential market opportunities (Radicic & Petković, 2023). Additionally, the digitalisation of data has led to vertical and horizontal integration of value chains and thus improving and leveraging network effects. The use of big data coupled with embracing cloud solutions has enabled SMEs to access widespread environments to potentially compete with larger businesses. It has also helped SMEs to minimise capital expenditure, as many cloud providers offer pay-as-you-use solutions that are more opex inclined rather than capex inclined.

There seems to be overwhelming consensus in the literature that digital technology adoption and usage has a positive impact on SME business performance. It is assumed that adoption of digital technology enhances productivity, fosters innovation, helps lower costs, improve efficiency, increases market reach through digital marketing and communication, and ultimately increases profitability. This, however, hinges on the proactive and deliberate strategic adoption of technology underpinned by clear goals and objectives to drive growth.

2.5.1 Business performance measures

The measurement of performance is an important part of business and has also become important for researchers and managers alike (Zulkiffli & Perera, 2011). This is because accurately measuring performance is a critical part of assessing the success or failure of a business (Tseng *et al*., 2009) and its accomplishments (Zulkiffli & Perera, 2011).

Conventionally, financial performance indicators have been used to assess business performance, thus encouraging a short-term focus (Tseng *et al*., 2009). Indicators such as profit, return on investment, turnover (Zulkiffli & Perera, 2011), revenue, and market share (Tseng *et al*., 2009) have been used the most to measure business performance. However, the evolution of business and the complexities of the global business environment have precipitated the use of non-financial performance indicators (Tseng *et al*., 2009) such as number of customers, design quality and product improvement (Zulkiffli & Perera, 2011), to name a few. These measures provide a broader and holistic view of performance.

For the purposes of this research, both financial and non-financial business performance measures are used to measure business impact. Financial measures are revenue and profit. Non-financial measures are operational efficiency, customer satisfaction, innovation, and risk management. Job creation is an economic indicator but is included in the review, as it is an important outcome based on the economic impact role played by SMEs in South Africa. Additionally, Rogers further described five areas, comprising customers, competitiveness, data usage, innovation, and value generation, which outline the current state of digital transformation for businesses. These domains imply that firm performance, especially through digital transformation, should include measures of SME expectations, customer satisfaction, number of new customers, level of innovative idea, employee performance, and firm relevance in the market (Rogers, 2016), The business performance measures that are used in this study are defined below.

Revenue: Tamplin (2023) defines revenue as the total amount of income generated for a good or service including all cash generated through the sales process. Revenue is generated through direct sales, received dividends, rent income through leasing of property and through income from investments (Tamplin, 2023). The measurement of revenue is critical for all types of businesses, as it enables managers or owners to gauge the level of income generated by the business.

Profit: Profit is another important performance measure and is the description of a business's financial performance for a given period (Puspitaningtyas, Toha & Prakoso, 2018). It is viewed as a mechanism to present financial events or transactions in monetary terms and presented in financial statements. Puspitaningtyas *et al*. (2018) further state that profit is the interpretation of excess income minus expenses for a specified period and does not always refer to cash flows in real terms and reflects increased economic capacity of a business. Profit is an important indicator of the amount of money a business is making (Tamplin, 2023).

Operational Efficiency: Profit occurs when revenue exceeds operational expenses as part of the accounting process. Operational expenses affect the level of profit an organisation makes, and operational efficiency reflects the aspiration of managers or business owners to reduce operational costs to improve profit margins. Therefore, it is important for businesses to measure their level of operational efficiency (Mouzas & Bauer, 2022). This can be characterised by the reduction in the number of process steps, automation of processes, or the reduction of the number of components in a process (Tseng *et al*., 2009). Operational efficiency can thus be said to be intricately linked to profitability and the control of operating margins (Mouzas & Bauer, 2022). Operational efficiency is said to be achieved by reducing waste in production and operations through efficient resource utilisation through the measurement/tracking of key inputs and outputs (Gillis, 2021).

Customer Satisfaction: Financial outcomes of a business largely depend on acquiring and keeping customers. This drives business sales revenue and ultimately profit. It is therefore imperative to measure the level of customer satisfaction, as it has a bearing on the business's ability to attract new customers and keep existing ones. According to Guido (2015), customer satisfaction can be defined as the post-purchase psychological state of a customer based on their valuation of the usage experience of a product or service. It relates to their perception, extent, and direction of the divergence between perceived performance and criterion. This ultimately results in satisfaction or dissatisfaction with the product or service. For SMEs, customer satisfaction is extremely critical as they work on growing their business and entrenching customer loyalty.

Innovation: An essential ingredient to customer satisfaction is innovation. It is also essential to economic profit, as McKinsey and Company (2022) in their explainer article state that innovation-focused businesses outperform their peers by more than two times in generating economic profit. This economic profit differential is substantial in the drive to deliver net new growth. This is because business innovation is the capability to conceive, develop, deliver and scale new products and services, processes and business models for customers (McKinsey & Company, 2022). Having innovation capability is pivotal in the knowledge economy and drives technological advancements, especially in technology-intensive industries (Tseng *et al*., 2009). In the digital age, being innovative is increasingly important for SMEs to drive growth, profitability and sustainability in the long term. The ability to satisfy unmet customer needs, provide compelling solutions and craft business models to monetise solutions (McKinsey & Company, 2022) create a competitive advantage for SMEs.

Risk Management: An additional critical performance indicator to measure is the level of risk management in the business. SMEs already face a myriad of challenges, which in turn manifest risks. Starting a business is a risk, capital allocation decisions bring risk, markets bring risk, and operations, supply chains, staff and technology all have inherent risks. It is therefore required that SMEs treat risk and the management thereof as core to their business to address

uncertainties. Smit and Watkins (2012) note that previous studies confirmed that SMEs are ignorant to the risks they face and adopt a reactionary stance on risk management. They further state that SMEs need to elevate the significance of risk identification and reduction to mitigate potential calamitous consequences.

Aven (2016) explains that risk strategies should be developed to deal with risk treatment through avoidance, reduction, transfer and retention using risk assessments in relative or absolute ways, and further states that establishing context, identifying situations and events, conducing cause and consequences analysis, making likelihood judgments, evaluating risk and, finally, treating the risk are necessary steps in ensuring sound and effective risk management.

The risk factors that cause SME success or failure are both internal and external in nature (Msimango-Galawe & Urban, 2019). Internal factors are driven by the SME operation, while external factors emanate from the environment in which the business operates. An entrenched and structured enterprise risk management approach by SMEs therefore has the potential to result in cost reductions, reduced risk exposure and organisational alignment to achieve set goals and objectives (Smit & Watkins, 2012).

Job Creation: The SME literature concurs that SMEs play a vital role in economies and job creation. Rens *et al*. (2021) state that SMEs play a key role in a country's socio-economic growth through job creation. Gono *et al*. (2016) emphasise the role of SMEs in employment, the development of new business ventures, and the reduction of poverty. Furthermore, Govuzela and Mafini (2019) list job creation as one of the strategic roles played by SMEs in any economy. Kongolo (2010) states that SMEs have the propensity to utilise labour-intensive processes when compared to larger businesses, thus contribute substantially to job opportunities, income generation and poverty alleviation. The author also mentions that SMEs contribute circa 65% of total employment in developed countries. The literature is evidence of the impact that SMEs have and their critical role in the economic lives of economies and their citizens. Thus, a compelling need exists to understand the job creation ability of digitally-inclined

SMEs, especially with the advent of the proliferation of digital technologies under the digital transformation construct.

2.6 Hypotheses

The hypotheses developed for this study are as follows:

Hypothesis 1: The usage of digital technologies is correlated with the following constructs of the extended technology adoption model: perceived usefulness, perceived ease of use, social norms, image, result demonstrability, output quality, job relevance, and voluntariness.

Sub-Hypotheses:

H1a: Perceived usefulness is positively correlated with the usage of digital technologies.

H1b: Perceived ease of use is positively correlated with the usage of digital technologies.

H1c: Social norms is positively correlated with the usage of digital technologies.

H1d: Image is positively correlated with the usage of digital technologies.

H1e: Result demonstrability is positively correlated with the usage of digital technologies.

H1f: Output quality is positively correlated with the usage of digital technologies.

H1g: Job relevance is positively correlated with the usage of digital technologies.

H1h: Voluntariness is negatively correlated with the usage of digital technologies.

Hypothesis 2: The usage of digital technologies has a positive impact on the following business measures of South African SMEs: revenue, profit, operational efficiency, customer satisfaction, risk management, innovation, and job creation.

Sub-Hypotheses:

H2a: The usage of digital technologies has a positive impact on revenue.

H2b: The usage of digital technologies has a positive impact on profit.

H2c: The usage of digital technologies has a positive impact on operational efficiency.

H2d: The usage of digital technologies has a positive impact on customer satisfaction.

H2e: The usage of digital technologies has a positive impact on risk management.

H2f: The usage of digital technologies has a positive impact on innovation.

H2g: The usage of digital technologies has a positive impact on job creation.

2.7 Analytical framework

2.7.1 Theoretical framework

The theoretical framework for this research is the extended Technology Adoption Model (TAM2), which was first introduced by Venkatesh and Davis (2000). The model posits that the adoption of technology is based on the user's acceptance of technology driven by their perception of usefulness and ease of use, with additional constructs of social influence and cognitive instrumental processes incorporated into the model. The model further states that over and above the original TAM model constructs of perceived usefulness and ease of use to determine technology acceptance, it is necessary to expand understanding relating to the determinants of usefulness, as they play a key role in driving usage intention. Figure 2.2 displays the model and its components along with explanations for each (Venkatesh & Davis, 2000).

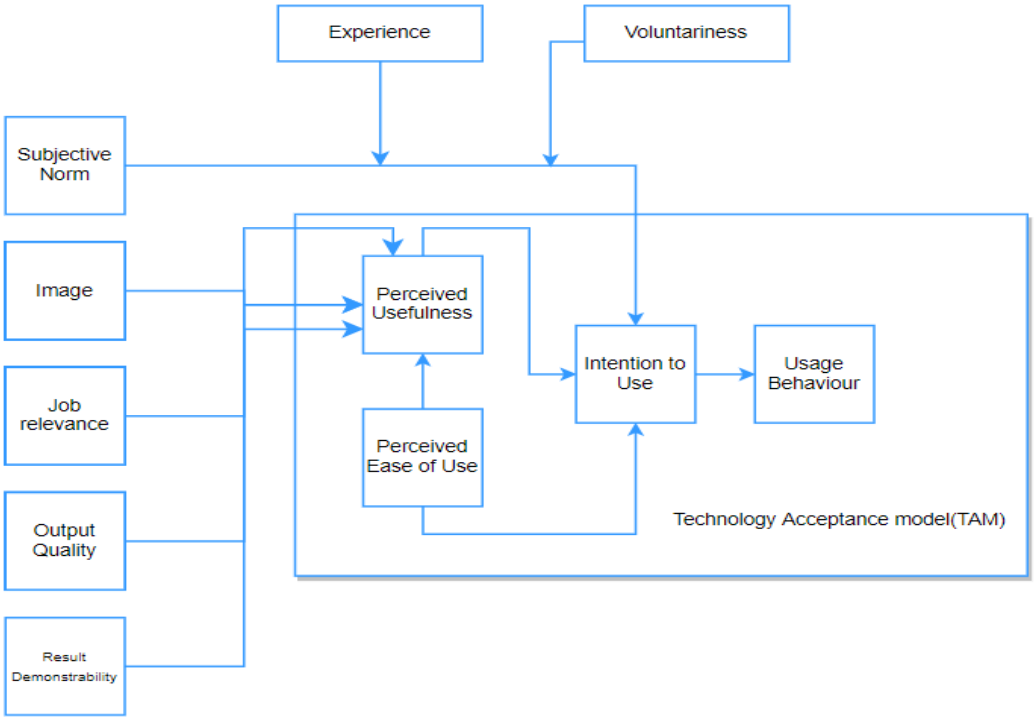

Figure 2.2: TAM2 Model

Source: Venkatesh and Davis (2000)

The TAM2 model construct and its variables are described in further detail below.

Social Influence Processes:

- **Subjective Norm:** This relates to a person's perception that people who are important to them think they should perform or not perform a behaviour in question (Venkatesh & Davis, 2000). From an SME digital technology adoption perspective, it can be inferred that customers, shareholders and other stakeholders would be important 'persons' who might influence the SME in adopting a technology, whether voluntarily or not to comply with their needs or demands.
- **Voluntariness:** Refers to the extent to which adopters perceive adoption as non-mandatory (Venkatesh & Davis, 2000). It can be viewed as a moderating variable for subjective norms to distinguish between mandatory and voluntary usage.

- **Image and Social Influence:** This is defined as the normative degree to which the use of technology or innovation has an influence on one's image or standing within a reference group (Venkatesh & Davis, 2000). This construct can be applied to SMEs relating to how the business is viewed in the market in which it operates and by its customers. Adopting digital technology may influence its standing with customers, regulators, partners, suppliers and other stakeholders. This might have a profound effect on its ability to grow and succeed in its chosen market.
- **Experience:** Initially, due to subjective norm influence, system usage might be high due to a lack of experience, but over time the normative influence wanes due to increased direct usage experience and thus enables a concrete review of usefulness (Venkatesh & Davis, 2000). An SME might adopt a certain digital technology due to stakeholder demands, but later decide to decommission the technology when its usefulness or lack thereof has been established.

Cognitive Instrumental Processes:

- **Job Relevance:** Refers to the perceived importance of the target system to one's job (Venkatesh & Davis, 2000). It emphasises the importance of the set of tasks that the system is able to support in relation to one's job. For SMEs it can be inferred that a digital technology's importance is directly linked to its ability to improve operational efficiency and process streamlining, thus potentially resulting in cost reductions and output improvements.
- **Output Quality:** As much as a system can perform tasks in relation to job function, it is also critical that the system performs those tasks well for adoption to be considered (Venkatesh & Davis, 2000). Output quality is an important construct for SMEs in their quest to produce and deliver quality outputs in a form of products or services for their customers.
- **Results Demonstrability:** Tangible results emanating from the use of a system or innovation (Venkatesh & Davis, 2000). The inability of an innovation or system in demonstrating results can render it un-useful and thus thwart adoption. This is critical for SMEs to gauge the value of digital

technology adoption and attribute value gains correctly. The results need to be discernible and unambiguous.

- **Perceived Ease of Use:** This variable is retained from the original TAM model and posits that the easier it is to use the system, the more valuable it becomes in increasing job performance (Venkatesh & Davis, 2000). SMEs are faced with multiple challenges and need to be efficient in their operations to remain cash positive and viable, therefore adopting fit-for-purpose and easy-to-use digital technologies is a critical aspect of the business.

The TAM2 model enables an understanding of technology adoption drivers and assists in understanding the influence of digital technologies in steering SME business performance.

2.7.2 Conceptual framework

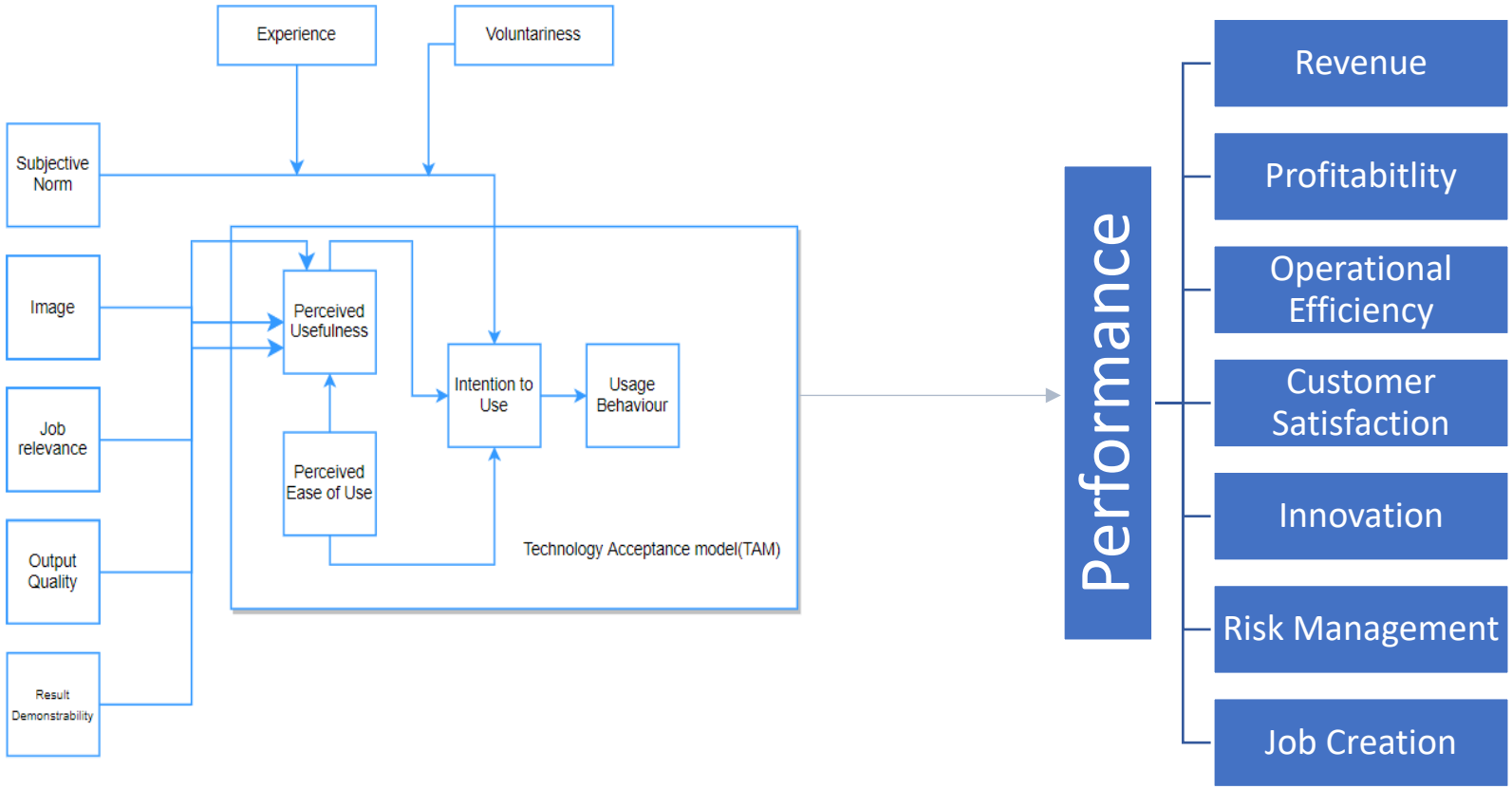

Figure 2.3: Conceptual Framework

2.8 Conclusion of literature review

The literature review provided an overview of the digital technology construct, its tenets and impact on SMEs. Furthermore, an overview of SMEs as an entity was undertaken in order to distinguish them from other types of business entities and review their characteristics. This provided a backdrop of two of the key artefacts of this research. The theoretical and conceptual framework (TAM2) was proposed for this research to provide it with theoretical grounding and credence.

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CHAPTER 3: RESEARCH METHODOLOGY

3.1 Introduction

This chapter presents the method deployed in this study. It details the research approach, the research design, data collection methods, population and sampling method, research instrument, procedure for data collection, data collection including descriptive statistics and relationship analysis, outlines the potential study limitations and challenges and, lastly, describes the quality assurance and ethical considerations to ensure reliability, and internal and external validity.

3.2 Research approach

There are two major types of research methods, i.e., quantitative and qualitative. The quantitative method is defined as a procedure or data analysis that generates or uses numerical values data (Saunders & Lewis, 2012). On the other hand, the qualitative method is defined as the process of data collection or data analysis that generates or uses non-numerical data (Saunders & Lewis, 2012). A quantitative research methodology was deployed in this study to achieve the intended objectives, as quantitative research measures and analyses relationships between variables numerically (Saunders & Lewis, 2012). Quantitative studies show predictable and explicable cognition and behaviour (Antwi & Hamza, 2015). This study assesses the impact of digital technologies on SME performance using the quantitative method to measure relationships.

3.3 Research design

A cross-sectional study design was used in this study. The researcher was interested in gathering information on the adoption of digital technologies by SMEs in South Africa and how the current level of adoption affects SME business performance, for which a survey is considered an appropriate data collection method. A questionnaire

survey was conducted, as it is considered a trustworthy and efficient approach to gather information (Wilkinson & Birmingham, 2003). The SME owners/founders/managers comprised the targeted respondents of the questionnaire survey.

The chosen research design presents a number of advantages, as it enables a rapid and efficient means to collect data from a sizable number of respondents and allows for easier comparison of data (Basias & Yannis, 2018). This assisted in forming a reliable and valid view on the impact of digital technologies on the business performance of SMEs in South Africa. Using this design, data collection is relatively inexpensive and has been proven to be a reliable and valid method of data collection (Wilkinson & Birmingham, 2003).

3.4 Data collection methods

The data was collected using an electronic questionnaire survey which was sent to the research sample. The first step was to develop and design the survey questionnaire with clear and unambiguous questions relating to the phenomena being researched. The questionnaire was piloted with a small group of willing respondents to test its effectiveness.

A representative sample group of respondents was recruited to partake in the research once a successful pilot had been completed. The questionnaire was distributed electronically via email to a random sample group. Completed questionnaires were collected electronically on Qualtrics for analysis. The data collection process is depicted in Figure 3.1 below.

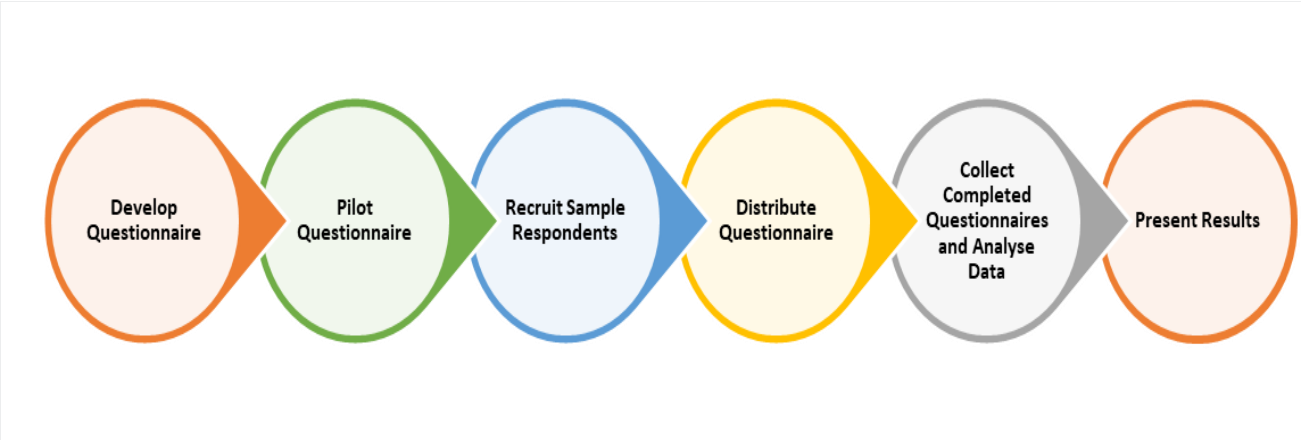

Figure 3.1: Data Collection Process

3.5 Population and sample

3.5.1 Population

Saunders and Lewis (2012) defined a population as the complete set of group members. The population of this study was SMEs in South Africa, consisting of a total of 745 SMEs in the ABSA SME[3] development programme and 400 SMEs from an independent SME database[4], respectively. The questionnaire survey was sent to all members of the population for their response to the questions related to the research being undertaken.

3.5.2 Sample and sampling method

A sample is a subgroup of the whole population (Saunders & Lewis, 2012). It can be a subset of people, organisations or places. A single-stage sampling procedure was followed, as the researcher had direct access to the population. The sampling unit for this research was the SMEs in the ABSA SME programme and an independent

[3] ABSA SME Development Programme is a programme that empowers small and medium enterprises by capacitating them to grow their businesses and provides them with supplier opportunities within ABSA Bank's supply chain in South Africa.
[4] The independent SME database is from an SME development practitioner who over time has worked with these SMEs to help them grow their businesses in the Richards Bay region of KwaZulu-Natal, South Africa.

SME database. Non-parametric convenience sampling was used, as it may have been difficult to access the entire SME population. The participants were encouraged via their respective SME development programmes to participate in the survey. As this is a general and non-sector or industry specific study on SMEs, the potential impact on sample size and rate of response is minimised. This is because generally, sector or industry specific studies tend to reduce potential sample size, make it harder to source respondents and reduce response rate.

The total sample size expected was 271, which represents 24% of the total population. The sample was calculated using a 90% confidence level, and a 5% margin of error to make the sample more representative of the population. In previous and similar research there has not been consistency in the sample size. Tseng *et al*. (2009) in their study sent out 150 questionnaires and only 50 were returned. Teng *et al*. (2022a) had 299 SME employee respondents to their study while Gono *et al.* (2016) had 130 respondents. There is no clear precedence on the requisite number of respondents, hence the formula in equation 1 was used to obtain a reasonable sample size for this study.

*Necessary Sample Size = (Z-score)2 * StdDev*(1-StdDev) / (margin of error)2*

$n = (Z - score)^2\ X\ StdDev(1 - StdDev)/(e)^2$

$n = (1{,}645)^2\ X\ 0{,}5(1 - 0{,}5)/(0{,}05)^2$

$n = 0{,}6765/0{,}0025$

$n = 271$

Equation 1

3.6 The research instrument

An electronic questionnaire survey was utilised for this study using the Qualtrics application to administer the survey. It consisted of closed, multiple choice and Likert scale type questions. Section A of the survey began by asking questions relating to

descriptive information on the SMEs. Questions relating to age of business, ownership type and industry were asked.

Section B provided a list of popular and commonly used digital technologies and asked SMEs to select those that they are currently using in their business. This provided a view of the digital technologies that South African SMEs are using at a point in time.

Furthermore, in section C, questions concerning the usage of digital technologies were posed, based on the TAM2 model. These relate to perceived usefulness, perceived ease of use, subjective norm, image, job relevance, output quality and result demonstrability. These questions seek to understand the motivation behind SMEs adopting digital technologies.

The last section of the survey focused on perceived business performance in relation to the adoption of digital technologies by SMEs in South Africa. Questions on the chosen business performance measures, i.e., revenue, profit, operational efficiency, innovation, customer satisfaction, risk management and job creation were posed to the respondents to gauge the perceived level of impact on business performance by digital technologies.

The survey contained a total of 26 questions across sections A, B and D. Section C contained a list of 12 digital technology options for the respondent to choose from in confirming which ones they are already using. The questionnaire survey and cover letter are attached in the appendices for reference.

3.7 Procedure for data collection

Data was collected using an electronic questionnaire survey that was shared via a digital link on WhatsApp to an SME group and emailed to those participants who

have provided their email addresses in the SME database that the researcher has access to. A copy of the survey is attached in the appendices of this report.

Collecting data in this way is both cost effective and relatively easy. It also enables quick response turnaround times, as respondents were able to use their mobile phones to access the survey and respond at leisure. This helped improve the response rate of the survey. Moreover, since a quantitative research design was utilised, no non-response bias and researcher bias was experienced.

3.8 Data analysis

3.8.1 Descriptive statistics

Descriptive research is used to describe accurately persons, events or situations (Saunders & Lewis, 2012). Weiers (2011) defined descriptive statistics as a branch of statistics where the emphasis is on the summarisation and description of data that have been collected. Descriptive statistical analysis was performed on the demographic data to establish the characteristics of the respondents. Age of business, sector, location and ownership structure were analysed in order to obtain frequency statistics to describe the data composition.

3.8.2 Relationship analysis

Relationship testing was conducted using confirmatory factor analysis to establish whether a fit exists between the measured variables contained in the survey and the latent variables of usage behaviour and business performance. Confirmatory factor analysis enabled the testing of the extended technology adoption model and SME business performance and the overall fit of the structural model to the data. The strength of the relationship between these variables was tested through the data to establish how well the model explains the data (Harris & Gleason, 2022).

Once the model fit had been established using CFA, structural equation modelling was utilised to examine the relationship between the measured variables and the latent variables and between the latent variables (Harris & Gleason, 2022). This allowed the measurement of direct and indirect relationships between variables to establish correlation and even causality where it can be established (Harris & Gleason, 2022). The analysis assisted in addressing the hypotheses of this study. Jamovi Statistical Software was used to conduct the analysis due to its comprehensiveness and user friendliness.

3.9 Possible limitations and challenges of this study

- Measurement error: The survey questions may not accurately measure the impact of digital technologies on SME business performance.
- Poor response rate: This may reduce the statistical power of the research, as it may impede the ability to detect the true effect of digital technologies on SME business performance.

3.10 Quality assurance

3.10.1 External validity

This study focused on SMEs in South Africa and how their usage of digital technologies has an impact on their business performance. This study can be generalised in other settings, such as another country or region to explore a similar dynamic for SMEs in those settings. However, the researcher was mindful of contextual differences and characteristics of SMEs in different settings as this might have posed a threat to the generalisability of this study. The population and sample for this study was South African SMEs in general with no specific industry, demographic or location focus, therefore, this could be generalised to be representative of the entire South African SME population.

3.10.2 Internal validity

This study was based on analysis at a point in time and therefore valid for the period being reviewed. However, as SMEs mature and the business environment changes over time, this study may become less valid, especially in a South African context.

Additionally, this study was based on a time tested and proven theoretical framework, namely, the extended technology adoption model (TAM2) and well-known business performance concepts that have been measured in business for decades.

3.10.3 Reliability

The questionnaire survey was carefully designed to ensure that it contains clear, unambiguous questions that lead to consistent responses. Simple language and a clear explanation of the purpose of this study was communicated to the participants to minimise any potential reliability issues. The data was collected electronically to ensure control of the process and consistent results. The study used Cronbach's alpha to confirm reliability and internal consistency of scales.

3.11 Ethical considerations

This study participants were informed of the purpose of this study and offered the opportunity to voluntarily participate or not. Their information was kept and used for the purpose of this study only. The data was always kept anonymous and confidential. A cover letter describing this study, associated privacy and expectations was sent with the link to the survey to provide participants with assurance of the legitimacy and confidentiality of their participation. Ethical clearance was sought from the Post-Graduate Committee of the University of the Witwatersrand before the survey was sent to the participants. The ethical clearance letter is attached as an appendix.

CHAPTER 4: PRESENTATION OF RESULTS/FINDINGS

4.1 Introduction

The findings of this study are presented in this chapter. A total of 84 survey responses were received from SMEs. The demographic characteristics of SMEs are presented to provide context to the tests thereafter. Data and statistical analysis based on the research rationale and hypotheses are presented using the research methodology explained in the previous chapter. Descriptive analysis (demographic), Confirmatory Factor Analysis (CFA), Structural Equation Modelling (SEM) and hypotheses analysis and explanations are also presented. The chapter concludes with a summary of the results/findings obtained.

4.2 Demographics

Demographic data was collected to gain a high-level view of the respondents' location for the purpose of analysis. This data enabled the ability to gauge the impact of digital technologies on SME performance considering age of business, sector, ownership structure, location and types of digital technologies being used. All data were collected electronically and anonymously. A total of 84 survey responses were received from SMEs.

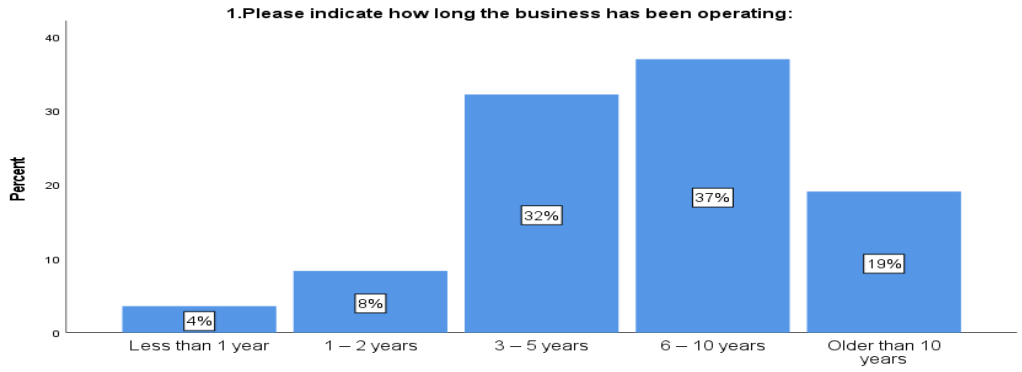

Figure 4.1: Business Tenure

Figure 4.1 depicts a balanced spread in the tenure of the businesses, with 37% being in operation for six to 10 years, 32% having been operating for three to five years, and almost 20% having been operating for longer than 10 years. The results show that 88% of the businesses have been operating for longer than three years. This is a positive result, as past research has shown that on average 70% to 80% of South African SMEs fail within five years (Friedrich, 2020).

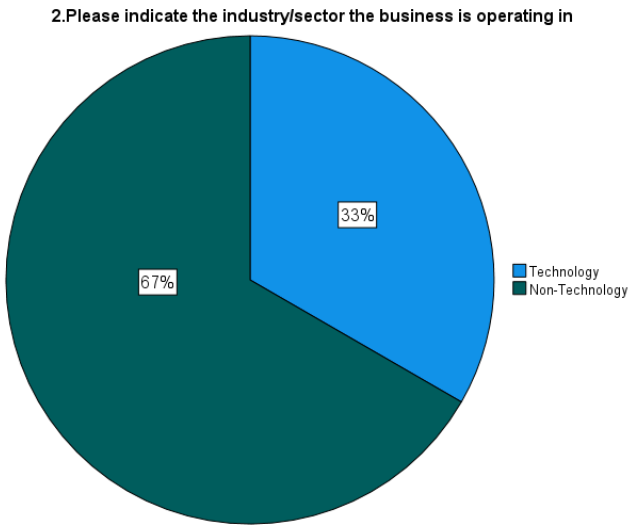

Figure 4.2: Business Industry/Sector

Figure 4.2 shows that 67% of the respondents operate in the non-technology industries, although their businesses do use technology in their operations. The remaining 33% are technology-based businesses.

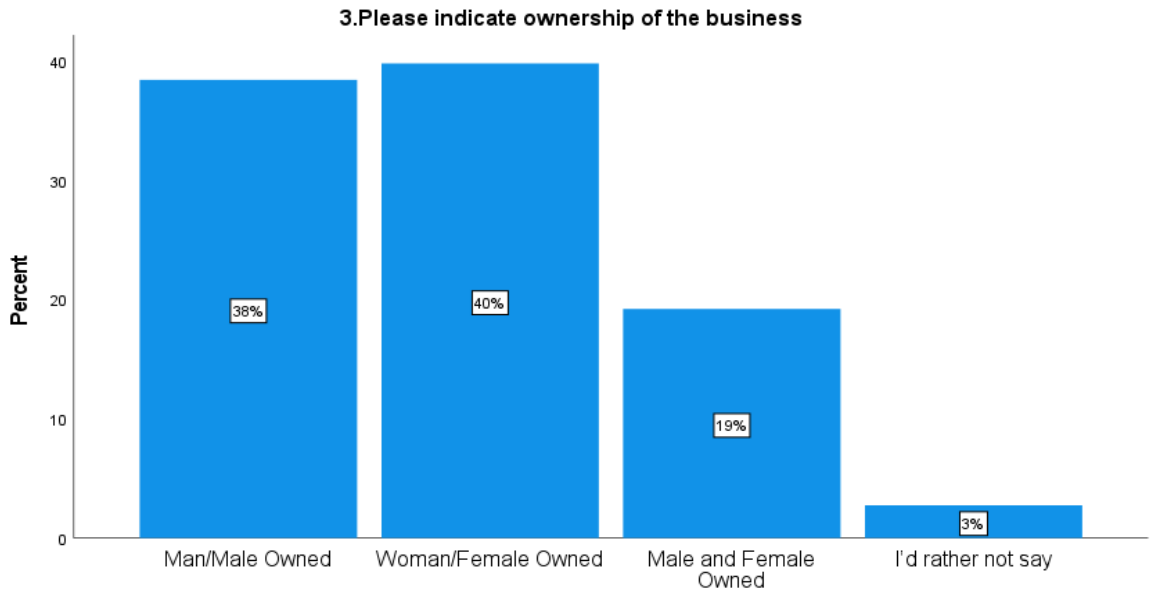

Figure 4.3: Business Ownership

Based on the results in Figure 4.3, 40% of the businesses are women owned, while 38% are men owned. A further 19% of the businesses are dually owned by men and women.

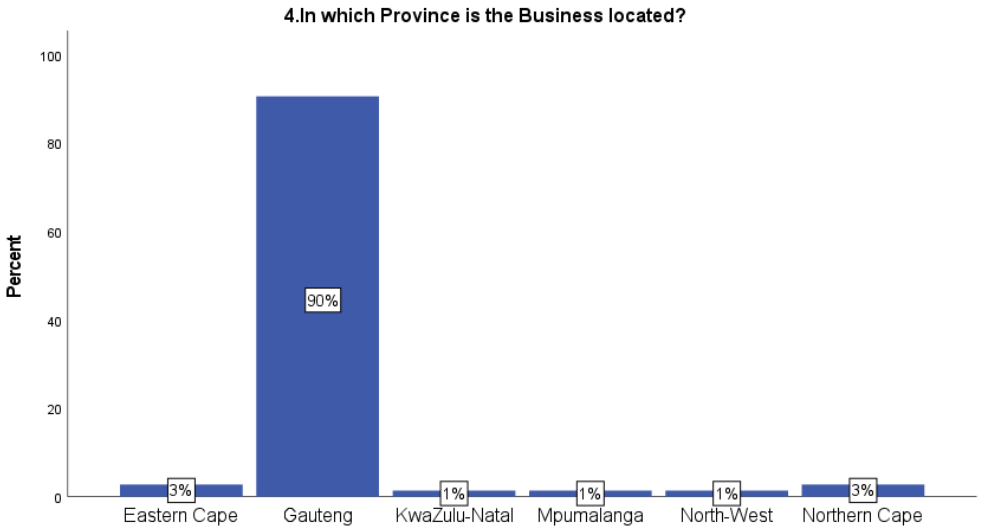

Figure 4.4: Business Location

As per Figure 4.4, a total of 90% of the respondents operate their businesses in the Gauteng Province. The rest are spread amongst five other provinces, namely, Eastern Cape, KwaZulu-Natal, Mpumalanga, North West and Northern Cape, with no respondents from the Western Cape, Free State and Limpopo provinces despite surveys being sent to SMEs in those provinces.

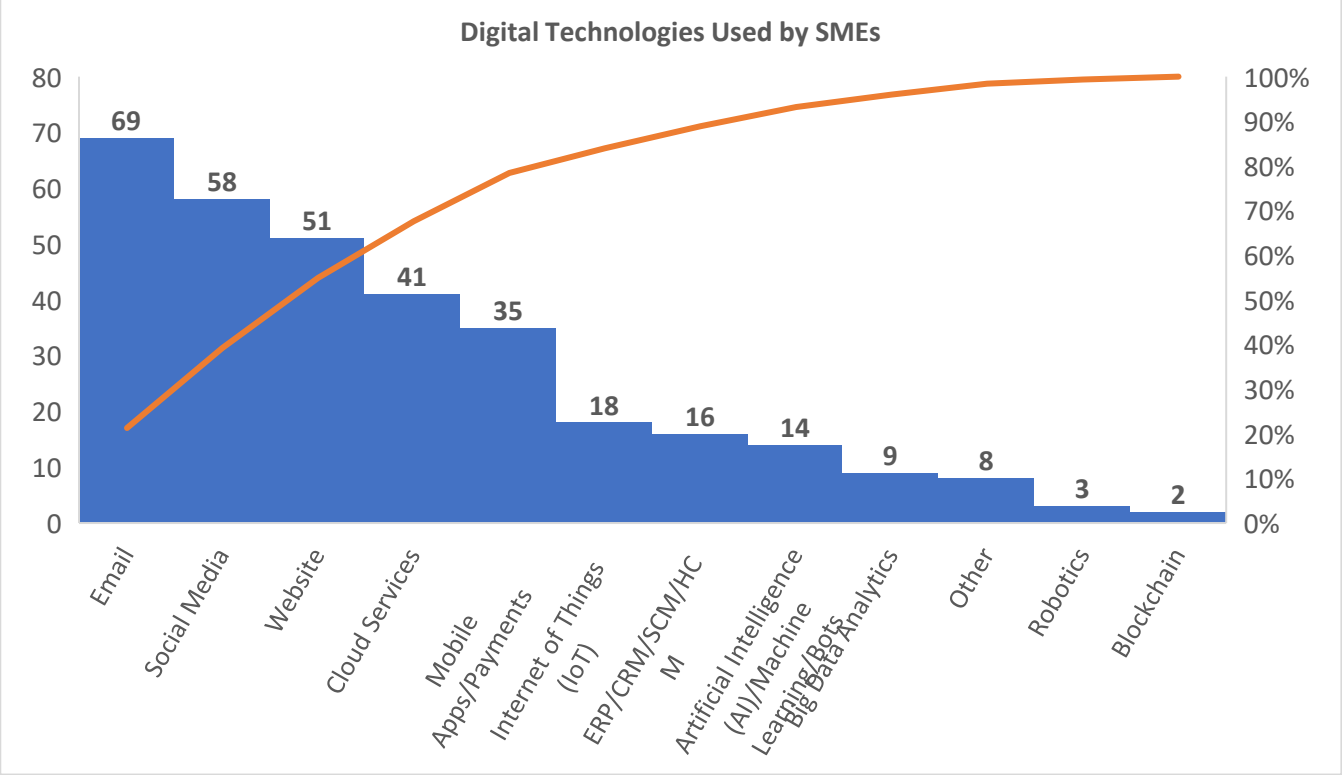

Figure 4.5: Digital Technologies Used by SMEs

A total of 82% of the respondents shown in Figure 4.5 indicated that they use email as part of their technology stack, while 69% and 61% indicated that they use social media and have websites, respectively. A total of 49% indicated that they use cloud services and 42% use mobile payment applications in their businesses. A wide range of digital technologies appear to be used by SMEs, including high-order and more complex digital technologies such as Internet of Things (IoT), Artificial Intelligence (AI) and Big Data. On average, 32% of digital technologies listed for this research are being used by SMEs in South Africa.

4.3 Reliability

Table 4.1: Reliability

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardised Items	N of Items
.947	.952	33

From Table 4.1, reliability was tested using Cronbach's Alpha and the results show that all the variables met the recommended cut-off of 0.95, indicating substantial covariance among the items relative to the variance. It can be concluded from the reliability test that the items in the test are closely correlated and measure the same underlying construct.

4.4 Confirmatory Factor Analysis for Hypothesis 1

4.4.1. Model Fit

This section presents the results of the CFA to assess the model's applicability for the use of digital technology by SMEs in South Africa. Standardised Root Mean Square Residual (SRMR), Tucker-Lewis Index (TLI) and Comparative Fit Index (CFI) were some of the criteria used. In addition to measuring the root mean square error of approximation (RMSEA) with a 90% confidence interval, the chi-square test was used for assessing perfect fit. Additionally, CFA was used to test for the validity of hypothesis 1 and its sub-hypotheses.

Table 4.2: Fit Test

Test for Exact Fit		
χ^2	**df**	**p**
601	382	< .001

The chi-square test for exact fit provided a statistic of 601 with 382 degrees of freedom, showing a significant difference between the expected model and the observed fit ($\chi^2/df = 1.573$, $p < .001$), see Table 4.2. While the chi-square test is sensitive to sample size and may therefore be rejected with large samples, it still serves as a starting point wherein model fit is being evaluated.

Table 4.3: Fit Measures

Fit Measures					
				RMSEA 90% CI	
CFI	**TLI**	**SRMR**	**RMSEA**	**Lower**	**Upper**
0.907	0.90	0.0937	0.0887	0.0749	0.102

The CFI represents how the proposed model compares to that of an insignificant model. In this case, it compares how the suggested model compared to no model at all. In Table 4.3, the CFI analysis of 0.907 shows that observed data fitted by the suggested model fit fairly well in this case when compared to the baseline model in this regard. Further, the obtained TLI value of 0.90 indicates that the model fits adequately with the data. TLI assists in assessing the relative fit of the proposed model against an insignificant model. Moreover, the SRMR value noted for the difference between observed and predicted covariance matrices equals 0.0937, which suggest a reasonable fit of the model, as indicated by the scores below 0.08. Finally, the RMSEA analysis considers model complexity and with a score of 0.0887 falls within the acceptable range. Further, the 90% confidence interval (CI) of RMSEA includes values close to 0.05, indicating better fitness of the model.

In summary, results from the CFA indicate that other fit measures such as the CFI, TLI, SRMR and RMSEA suggest a relatively good fit overall of the proposed model to the observed data, while the chi-square test indicates large discrepancies due to sensitivity to large sample sizes.

4.4.2. Factor Loadings

Factor loadings represent the strength and direction of the relationship between latent constructs and their observed indicators. The analysis evaluated factor loadings for each indicator within their respective factors, i.e., Perceived Usefulness (PU), Perceived Ease of Use (PEOU), Social Norms (SN), Image (IM), Voluntariness (VO), Job Relevance (JR), Output Quality (OQ), Results Demonstrability (RD) and Business Performance (BP).

Table 4.4: Factor Loadings

Factor	Indicator	Estimate	SE	Z	p	Stand. Estimate
PU	Q6_1	0.940	0.1033	9.100	< .001	0.869
	Q6_2	0.944	0.0992	9.520	< .001	0.888
	Q6_3	0.939	0.0872	10.765	< .001	0.953
	Q6_4	0.855	0.1795	4.764	< .001	0.823
PEOU	Q6_5	0.907	0.0958	9.476	< .001	0.885
	Q6_6	0.894	0.0840	10.640	< .001	0.956
	Q6_7	0.803	0.0983	8.165	< .001	0.820
	Q6_8	0.717	0.0987	7.264	< .001	0.735
SN	Q6_9	0.939	0.1291	7.273	< .001	0.929
	Q6_10	0.859	0.1583	5.426	< .001	0.712
	Q6_11	0.502	0.1432	3.506	< .001	0.385
IM	Q6_12	0.803	0.1308	6.137	< .001	0.797
	Q6_13	0.704	0.1358	5.180	< .001	0.594

Factor	Indicator	Estimate	SE	Z	p	Stand. Estimate
	Q6_14	0.839	0.1009	8.316	< .001	0.916
VO	Q6_16	9.913	14.8309	0.668	0.504	7.053
	Q6_17	0.149	0.2240	0.664	0.507	0.112
JR	Q6_18	1.046	0.1049	9.966	< .001	0.903
	Q6_19	0.985	0.0800	12.311	< .001	1.012
	Q6_20	0.947	0.0992	9.549	< .001	0.875
OQ	Q6_21	0.941	0.1207	7.798	< .001	0.778
	Q6_22	0.876	0.0928	9.445	< .001	0.880
	Q6_23	0.921	0.0923	9.973	< .001	0.908
RD	Q6_24	1.024	0.0939	10.911	< .001	0.953
	Q6_25	0.974	0.0976	9.987	< .001	0.905
	Q6_26	0.881	0.1210	7.280	< .001	0.745
BP	Q7_1	1.046	0.1411	7.412	< .001	0.761
	Q7_2	1.082	0.1400	7.731	< .001	0.776
	Q7_3	1.126	0.1355	8.314	< .001	0.817
	Q7_4	1.168	0.1202	9.714	< .001	0.896
	Q7_5	1.172	0.1305	8.978	< .001	0.856
	Q7_6	1.151	0.1190	9.676	< .001	0.893
	Q7_7	1.132	0.1483	7.637	< .001	0.775

All the PU indicators (Q6_1, Q6_2, Q6_3, Q6_4) in Table 4.4 indicate strong factor loadings ranging from 0.855 to 0.944, all statistically significant at $p < .001$. The standardised estimates were within the range of 0.823 to 0.953, showing a robust relationship of the indicators to the PU construct. PEOU indicators (Q6_5, Q6_6, Q6_7, Q6_8) demonstrated significant factor loadings ranging between 0.717 and 0.907 ($p < .001$). The standardised estimates ranged from 0.735 to 0.956, indicating a higher association towards the PEOU construct. SN indicators (Q6_9, Q6_10, Q6_11) displayed significant factor loadings ranging from .502 to .939 ($p < .001$). The standardised estimates ranged between .385 and .929, indicating the robust relationship of these indicators with the construct of SN. IM indicators (Q6_12,

Q6_13, Q6_14) produced strong factor loadings between 0.704 and 0.839 ($p < .001$), with standardised estimates ranging between 0.594 and 0.916, signifying a high level of reliability of the IM construct. However, from VO indicators (Q6_16, Q6_17), non-significant factor loadings ($p > 0.05$) were found that potentially raise the question about the size of the contribution of both these two VO dimensions to the VO construct. JR indicators (Q6_18, Q6_19, Q6_20) showed strong factor loadings from 0.947 to 1.046 ($p < .001$); moreover, the confidence limits of standardised estimates ranged from 0.875 to 1.012, indicating a strong association with JR construct. OQ indicators (Q6_21, Q6_22, Q6_23) presented strong factor loadings in the values ranging from 0.876 to 0.941 ($p < .001$). The standardised estimates ranged from 0.778 to 0.908, stressing the reliability of the OQ construct. RD indicators (Q6_24, Q6_25, Q6_26) displayed above-average factor loadings ranging from 0.881 to 1.024 ($p < .001$), with the RD's standardised estimates being between 0.745 and 0.953, which affirms strong relationship of the indicators to the RD building block. BP indicators (Q7_1 to Q7_7) ranged from good to high and significant factor loadings ranged between 1.046 and 1.172 ($p < .001$), with standardised estimates ranging from 0.761 to 0.896, denoting strong links/ties with the BP construct.

The factor loadings analysis was useful for decoding the construct validity of the proposed model, where most of the indicators showed significant and strong factor loadings. Finally, non-significant factor loadings of a small number of Voluntariness (VO) indicators suggest the need for possible further re-examination or reconsideration of their appropriateness in the model in future, especially when usage is valuated instead of adoption.

4.4.3. Factor Covariances

This section presents the results of the factor covariances analysis conducted as part of the CFA to understand the inter-construct relationships within the proposed model in the context of South African SMEs using digital technologies and the impact

thereof on business performance. The analysis explores the covariances between the constructs, i.e., Perceived Usefulness (PU), Perceived Ease of Use (PEOU), Social Norms (SN), Image (IM), Voluntariness (VO), Job Relevance (JR), Output Quality (OQ), Results Demonstrability (RD) and Business Performance (BP).

Table 4.5: Factor Covariances

		Estimate	SE	Z	p	Stand. Estimate
PU	PU	1.00000 [a]				
	PEOU	0.45435	0.1020	4.4526	< .001	0.45435
	SN	0.38430	0.1336	2.8773	0.004	0.38430
	IM	0.47421	0.1088	4.3602	< .001	0.47421
	VO	-7.86e−4	0.0112	-0.0701	0.944	-7.86e−4
	JR	0.52910	0.0940	5.6315	< .001	0.52910
	OQ	0.58821	0.0947	6.2122	< .001	0.58821
	RD	0.56513	0.0868	6.5134	< .001	0.56513
	BP	0.29872	0.1202	2.4858	0.013	0.29872
PEOU	PEOU	1.00000 [a]				
	SN	0.59226	0.1017	5.8239	< .001	0.59226
	IM	0.48784	0.1030	4.7380	< .001	0.48784
	VO	-0.00204	0.0109	-0.1879	0.851	-0.00204
	JR	0.50402	0.0903	5.5841	< .001	0.50402
	OQ	0.57002	0.0925	6.1617	< .001	0.57002
	RD	0.52156	0.0932	5.5973	< .001	0.52156
	BP	0.47738	0.0974	4.9033	< .001	0.47738
SN	SN	1.00000 [a]				
	IM	0.66190	0.1122	5.9019	< .001	0.66190
	VO	-9.20e−6	0.0110	-8.36e−4	0.999	-9.20e−6
	JR	0.59990	0.0996	6.0240	< .001	0.59990
	OQ	0.62757	0.1083	5.7951	< .001	0.62757

		Estimate	SE	Z	p	Stand. Estimate
	RD	0.76212	0.0988	7.7158	< .001	0.76212
	BP	0.19427	0.1226	1.5852	0.113	0.19427
IM	IM	1.00000 [a]				
	VO	0.00916	0.0185	0.4942	0.621	0.00916
	JR	0.69402	0.0747	9.2899	< .001	0.69402
	OQ	0.74627	0.0830	8.9948	< .001	0.74627
	RD	0.78416	0.0754	10.3993	< .001	0.78416
	BP	0.26912	0.1256	2.1425	0.032	0.26912
VO	VO	1.00000 [a]				
	JR	-0.01636	0.0266	-0.6149	0.539	-0.01636
	OQ	-0.01442	0.0242	-0.5955	0.551	-0.01442
	RD	-0.00567	0.0135	-0.4192	0.675	-0.00567
	BP	-0.01320	0.0225	-0.5879	0.557	-0.01320
JR	JR	1.00000 [a]				
	OQ	0.86593	0.0385	22.4719	< .001	0.86593
	RD	0.84008	0.0396	21.1992	< .001	0.84008
	BP	0.27342	0.1103	2.4798	0.013	0.27342
OQ	OQ	1.00000 [a]				
	RD	0.95922	0.0234	40.9054	< .001	0.95922
	BP	0.41741	0.1076	3.8784	< .001	0.41741
RD	RD	1.00000 [a]				
	BP	0.35472	0.1105	3.2107	0.001	0.35472
BP	BP	1.00000 [a]				

[a] fixed parameter

From Table 4.5, PEOU (0.45435), SN (0.38430), IM (0.47421), JR (0.52910), OQ (0.58821), RD (0.56513) and BP (0.29872) revealed a significant positively strong relationship with PU using the significance level of p<.001. This suggests a robust and positive relationship between PU and the other constructs in the model.

Similarly, significant strong positive relationships of PEOU were also observed for SN (0.59226), IM (0.48784), JR (0.50402), OQ (0.57002), RD (0.52156) and BP (0.47738) at p<.001, thereby further affirming the interrelations between PEOU and other latent constructs. In addition, SN shows an important positive relationship with IM (0.66190), JR (0.59990), OQ (0.62757), RD (0.76212) and BP (0.19427) at p<.001. However, the covariance with VO was not significant (p = 0.999). This denotes that VO is not a part of this model and implies that SN has a positive relationship with all the other latent constructs except VO. Similar to SN, IM was found to have a significantly positive relationship with JR (0.69402), OQ (0.74627), RD (0.78416) and BP (0.26912) at the p<.001 level.

However, test of covariance reveals that no significant covariance was found between IM and VO (p = 0.621), which may indicate they are not related. Results from the research indicate a strong positive relationship among all the various latent construct items except VO for the IM construct. Therefore, inclusion of VO in the model might not be necessary, as it does not covariate significantly with the other constructs such as PU, PEOU, SN, IM, JR, OQ, RD or BP. Here, JR showed positive and significant covariances with OQ (0.86593), RD (0.84008) and BP (0.27342) inclusive of all at p<.001. This is evidence that JR had a strong positive association with the indicated constructs. RD and BP both demonstrated positive and significant covariances with OQ (0.95922 and 0.41741), respectively, both at p<.001. This is indicative of a significantly positive relationship between OQ and the attributes under examination. RD had a significant positive covariance with BP (.35472) in the p<.001, meaning a very strong positive relationship between RD and BP.

There were no other significant covariances in which BP was involved with another latent construct, thus indicating it is an endogenous variable in the model. This is because the model tests for BP as a resultant of the other constructs. This generally infers that a strong and positive relationship exists with PU, PEOU, SN, IM, JR, OQ and RD, thereby indicating their interconnectivity. In view of the lack of significant correlation with VO, this implies that it may be an independent construct.

4.4.4. Path Diagram

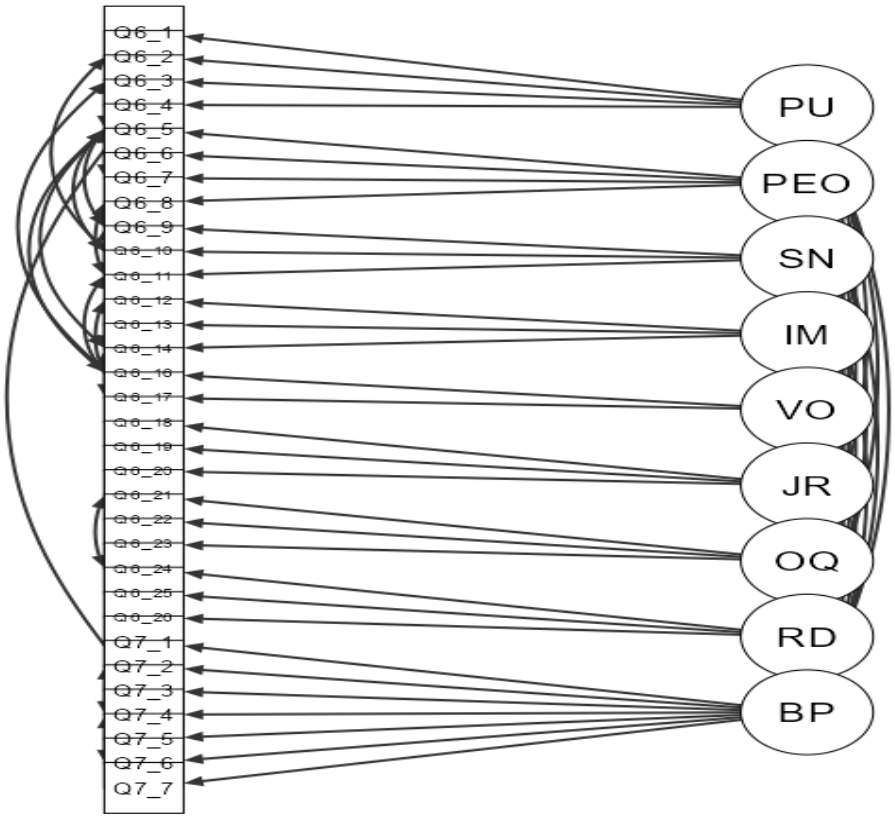

Figure 4.6: Path Diagram of Observed Variables and Latent Constructs

Figure 4.6 represents a visual structure of the observed variables showing Q6_1 to Q7_7 on the left-hand side and the latent constructs on the right-hand side visualised in circles. It gives a comprehensive view of the relationships between the different constructs and variables through providing clear comparisons. The results reveal strong and positive relationships between PU, PEOU, SN, IM, JR, OQ and RD with the endogenous variable BP in the model.

4.4.5. Results pertaining to Hypothesis 1

Based on the detailed results analysis above using CFA, it can therefore be determined that:

H1a: Perceived Usefulness (PU) is positively correlated with the usage of digital technologies is supported, as its factor loadings related to PU show consistently high values and are statistically significant with a p-value of <.001. This advocates that PU has a strong and positive relationship with the usage of digital technologies.

H1b: Perceived Ease of Use (PEOU) is positively correlated with the usage of digital technologies is supported, as its factor loadings related to PEOU show consistently high values and are statistically significant with a p-value of <.001. This advocates that PEOU has a strong and positive relationship with the usage of digital technologies.

H1c: Social Norms is positively correlated with the usage of digital technologies is supported, as its factor loadings related to social norms are significant, thus suggesting a positive relationship with the usage of digital technologies at a p-value of <.001.

H1d: Image (IM) is positively correlated with the usage of digital technologies is supported, as its factor loadings related to IM are consistently high and statistically significant, thus supporting a positive relationship between IM and the usage of digital technologies at a p-value of <.001.

H1e: Result Demonstrability (RD) is positively correlated with the usage of digital technologies is supported, as its factor loadings related to RD are significant, thus suggesting a positive relationship with the usage of digital technologies at a p-value of <.001.

H1f: Output Quality (OQ) is positively correlated with the usage of digital technologies is supported, as its factor loadings related to OQ are consistently high and statistically significant, thus supporting a positive relationship between OQ and the usage of digital technologies at a p-value of <.001.

H1g: Job Relevance (JR) is positively correlated with the usage of digital technologies is supported, as its factor loadings related to JR are significant, thus suggesting a positive relationship with the usage of digital technologies at a p-value of <.001.

H1h: Voluntariness (VO) is negatively correlated with the usage of digital technologies is supported, as its factor loadings related to voluntariness are significant, thus suggesting a negative relationship with the usage of digital technologies with p-values >.05.

From the above, it can therefore be concluded that the sub-hypotheses are supported from the analysis results, indicating that perceived usefulness, perceived ease of use, social norms, image, result demonstrability, output quality, and job relevance are positively correlated with the usage of digital technologies. The hypothesis related to voluntariness is also supported, suggesting a negative correlation with the usage of digital technologies. Therefore, Hypothesis 1 is consequentially supported by the results of the sub-hypotheses.

4.5 Structural Equation Modelling for Hypothesis 2

This section presents results from using SEM to evaluate the impact of digital technology usage on the business performance of SMEs in South Africa, and whether or not these results support hypothesis 2 and its sub-hypotheses. For this section the researcher has chosen to interpret a small selection of the output details and the reader can refer to the appropriate tables for the rest.

4.5.1. Model Information

Table 4.6: Model Information

Estimation Method	DWLS
Optimisation Method	NLMINB
Number of observations	73
Free parameters	200
Standard errors	Standard
Scaled test	Mean adjusted scaled and shifted
Converged	TRUE
Iterations	157
Model	PEOU=~Q6_5+Q6_6+Q6_7+Q6_8 SN=~Q6_9+Q6_10+Q6_11 IM=~Q6_12+Q6_13+Q6_14 JR=~Q6_18+Q6_19+Q6_20 OQ=~Q6_21+Q6_22+Q6_23 VO=~Q6_15+Q6_16+Q6_17 RD=~Q6_24+Q6_25+Q6_26 PU=~Q6_1+Q6_2+Q6_3+Q6_4 BP=~Q7_1+Q7_2+Q7_3+Q7_4+Q7_5+Q7_6+Q7_7

Table 4.6 above presents a detailed breakdown of the estimation method, optimisation method, model specifications, and some characteristics of the analysis conducted using SEM analysis. The table provides information on model characteristics such as the number of observations, free parameters, and convergence status. The information is relevant, as it contributes to the credibility, interpretability and replicability of the SEM analysis, and also provides a basis for assessing the quality of the model, understanding the characteristics of the data, and extracting meaningful insights from the results.

4.5.2. Overall Tests

Table 4.7: Overall Tests

Model tests

Label	X^2	df	p
User Model	475	459	0.292
Baseline Model	36414	528	< .001
Scaled User	648	459	< .001
Scaled Baseline	6436	528	< .001

In Table 4.7, the high p-value of 0.292 from the user model suggests the model might be a good fit with the data. On the other hand, the very low p-value (< .001) for the baseline model suggests the model is not a good fit. This is not surprising, as the corresponding baseline model is usually a simple or null model against which comparison of the user-shaped model is made. Furthermore, a high chi-square value demonstrates a significant departure from the expected data of the corresponding baseline model. Moreover, the p-value of the scaled user model is p<.001, indicating that it fits the data much better than the original user model. The scaled baseline model also has a low p-value (p<.001), signifying that it fits the data significantly better than the original baseline model. It can therefore be concluded that as compared to the baseline model, the user model fits the data better.

Table 4.8: Fit Indices

Fit indices

			95% Confidence Intervals		
Type	SRMR	RMSEA	Lower	Upper	RMSEA p
Classical	0.097	0.022	0.000	0.047	0.974
Robust	0.094				
Scaled	0.094	0.076	0.062	0.089	0.002

The SRMR in Table 4.8, which measures the average standardised difference between observed and predicted correlations, has a low value of 0.097, which indicates a good fit. On the other hand, the RMSEA index, which measures how well the model fits the population covariance matrix, has a value of 0.022, which is considered good, as it is below the typical threshold of 0.05 for good fit. The RMSEA p-value of 0.974 is non-significant as it is above 0.05, indicating that the model fits the data well.

Therefore, it can be surmised that based on the fit indices, the model has a good fit, especially when based on the classical fit indices of SRMR and RMSEA. The scaled fit indices provide further confirmation of good fit evidenced by the statistically significant low p-value of 0.002 for RMSEA.

Table 4.9: User Model vs Baseline Model

User model versus baseline model

	Model
Comparative Fit Index (CFI)	1.000
Tucker-Lewis Index (TLI)	0.999
Bentler-Bonett Non-normed Fit Index (NNFI)	0.999
Bentler-Bonett Normed Fit Index (NFI)	0.987
Bollen's Relative Fit Index (RFI)	0.985
Bollen's Incremental Fit Index (IFI)	1.000
Relative Noncentrality Index (RNI)	1.000

The values of all the fit indices in Table 4.9 suggest that the user model fits the data very well, as compared to the baseline model. Some of the indices, for example, CFI, IFI and RNI, with a value of 1 mean a perfect fit. The other models also show values close to 1, thus meaning a very strong fit. From this analysis, it can be observed that the user model is a reasonably good fit and also reasonably superior to the base model in representing the data, as revealed by the chi-square, RMSEA as well as the fit index p-values.

4.5.3. Estimates of Variables

Table 4.10: Estimates of Variables

Measurement model

				95% Confidence Intervals			β 95% Confidence Intervals			
Latent	**Observed**	**Estimate**	**SE**	**Lower**	**Upper**	**β**	**Lower**	**Upper**	**z**	**p**
PEOU	Q6_5	1.000	0.0000	1.000	1.000	0.907	0.858	0.956		
	Q6_6	1.085	0.0512	0.985	1.185	0.984	0.932	1.036	21.18	< .001
	Q6_7	0.946	0.0411	0.865	1.026	0.858	0.804	0.912	23.03	< .001
	Q6_8	0.922	0.0405	0.843	1.001	0.836	0.778	0.894	22.77	< .001
SN	Q6_9	1.000	0.0000	1.000	1.000	0.860	0.779	0.940		
	Q6_10	0.996	0.0517	0.895	1.097	0.856	0.781	0.932	19.28	< .001
	Q6_11	0.830	0.0478	0.737	0.924	0.714	0.641	0.787	17.38	< .001
IM	Q6_12	1.000	0.0000	1.000	1.000	0.802	0.728	0.876		
	Q6_13	0.906	0.0473	0.813	0.999	0.727	0.655	0.798	19.16	< .001
	Q6_14	1.131	0.0513	1.031	1.231	0.907	0.827	0.987	22.07	< .001
JR	Q6_18	1.000	0.0000	1.000	1.000	0.948	0.915	0.981		
	Q6_19	1.084	0.0315	1.022	1.146	1.027	0.995	1.059	34.46	< .001
	Q6_20	0.968	0.0243	0.920	1.015	0.917	0.882	0.953	39.90	< .001
OQ	Q6_21	1.000	0.0000	1.000	1.000	0.872	0.826	0.919		
	Q6_22	1.057	0.0343	0.990	1.124	0.922	0.882	0.962	30.85	< .001
	Q6_23	1.068	0.0336	1.002	1.134	0.932	0.890	0.973	31.75	< .001
VO	Q6_15	1.000	0.0000	1.000	1.000	0.731	0.613	0.849		
	Q6_16	1.071	0.1076	0.860	1.282	0.783	0.699	0.867	9.96	< .001
	Q6_17	1.371	0.1269	1.122	1.620	1.002	0.897	1.106	10.80	< .001
RD	Q6_24	1.000	0.0000	1.000	1.000	0.954	0.916	0.992		
	Q6_25	0.977	0.0270	0.924	1.030	0.932	0.894	0.969	36.14	< .001
	Q6_26	0.929	0.0301	0.870	0.987	0.885	0.835	0.936	30.89	< .001
PU	Q6_1	1.000	0.0000	1.000	1.000	0.923	0.881	0.964		
	Q6_2	1.027	0.0342	0.960	1.094	0.948	0.906	0.989	30.03	< .001
	Q6_3	1.075	0.0366	1.003	1.147	0.991	0.952	1.031	29.36	< .001
	Q6_4	0.990	0.0348	0.922	1.058	0.913	0.865	0.962	28.41	< .001
BP	Q7_1	1.000	0.0000	1.000	1.000	0.956	0.920	0.993		
	Q7_2	1.009	0.0364	0.938	1.081	0.965	0.928	1.002	27.75	< .001
	Q7_3	0.940	0.0289	0.883	0.997	0.899	0.859	0.940	32.54	< .001
	Q7_4	0.940	0.0281	0.885	0.996	0.899	0.860	0.939	33.43	< .001
	Q7_5	0.903	0.0288	0.846	0.959	0.863	0.822	0.905	31.37	< .001
	Q7_6	0.937	0.0284	0.882	0.993	0.896	0.856	0.937	33.01	< .001
	Q7_7	0.835	0.0301	0.776	0.894	0.799	0.751	0.846	27.73	< .001

The beta (β) co-efficient and their corresponding p-values were analysed to gauge the strength, direction and significance of the relationships between latent variables and their observed indicators. For Table 4.10, the researcher has explained in detail the interpretation for variables PEOU, SN, VO and their respective indicators only. The reader can further analyse the other variables based on the results in Table 4.10. For PEOU, all beta estimates are positive, have high values and are significant due to the low p-value of 0.001, indicating that the observed indicators are positively correlated to PEOU. The indicators for SN are also observed to be positively correlated with SN due to positive, high valued and statistically significant (p<0.001) beta and p-values. Moreover, VO betas and p-values are positive, strong and statistically significant with p-values of 0.001, indicating positive correlation between VO and its observed indicators. The rest of the variables and their respective indicators displayed similar results, indicating positive, strong and statistically significant relationships. It can thus be purported that the model is robust, with strong relationships between the variables and their indicators, thus providing a good foundation for further SEM analysis.

Table 4.11: Variances and Covariances

Variances and Covariance

				95% Confidence Intervals			β 95% Confidence Intervals			
Variable 1	**Variable 2**	**Estimate**	**SE**	**Lower**	**Upper**	**β**	**Lower**	**Upper**	**z**	**p**
Q6_5	Q6_5	0.17731	0.0000	0.17731	0.17731	0.17731	0.08820	0.2664		
Q6_6	Q6_6	0.03164	0.0000	0.03164	0.03164	0.03164	-0.07059	0.1339		
Q6_7	Q6_7	0.26401	0.0000	0.26401	0.26401	0.26401	0.17169	0.3563		
Q6_8	Q6_8	0.30062	0.0000	0.30062	0.30062	0.30062	0.20333	0.3979		
Q6_9	Q6_9	0.26098	0.0000	0.26098	0.26098	0.26098	0.12265	0.3993		
Q6_10	Q6_10	0.26670	0.0000	0.26670	0.26670	0.26670	0.13755	0.3958		

Variances and Covariance

				95% Confidence Intervals			β 95% Confidence Intervals			
Variable 1	Variable 2	Estimate	SE	Lower	Upper	β	Lower	Upper	z	p
Q6_11	Q6_11	0.49042	0.0000	0.49042	0.49042	0.49042	0.38592	0.5949		
Q6_12	Q6_12	0.35686	0.0000	0.35686	0.35686	0.35686	0.23883	0.4749		
Q6_13	Q6_13	0.47190	0.0000	0.47190	0.47190	0.47190	0.36786	0.5759		
Q6_14	Q6_14	0.17726	0.0000	0.17726	0.17726	0.17726	0.03155	0.3230		
Q6_18	Q6_18	0.10192	0.0000	0.10192	0.10192	0.10192	0.03927	0.1646		
Q6_19	Q6_19	-0.05541	0.0000	-0.05541	-0.05541	-0.05541	-0.12145	0.0106		
Q6_20	Q6_20	0.15884	0.0000	0.15884	0.15884	0.15884	0.09356	0.2241		
Q6_21	Q6_21	0.23876	0.0000	0.23876	0.23876	0.23876	0.15684	0.3207		
Q6_22	Q6_22	0.14985	0.0000	0.14985	0.14985	0.14985	0.07547	0.2242		
Q6_23	Q6_23	0.13180	0.0000	0.13180	0.13180	0.13180	0.05465	0.2089		
Q6_15	Q6_15	0.46604	0.0000	0.46604	0.46604	0.46604	0.29365	0.6384		
Q6_16	Q6_16	0.38751	0.0000	0.38751	0.38751	0.38751	0.25608	0.5189		
Q6_17	Q6_17	-0.00347	0.0000	-0.00347	-0.00347	-0.00347	-0.21295	0.2060		
Q6_24	Q6_24	0.09059	0.0000	0.09059	0.09059	0.09059	0.01789	0.1633		
Q6_25	Q6_25	0.13188	0.0000	0.13188	0.13188	0.13188	0.06153	0.2022		
Q6_26	Q6_26	0.21594	0.0000	0.21594	0.21594	0.21594	0.12710	0.3048		
Q6_1	Q6_1	0.14898	0.0000	0.14898	0.14898	0.14898	0.07316	0.2248		
Q6_2	Q6_2	0.10215	0.0000	0.10215	0.10215	0.10215	0.02306	0.1812		
Q6_3	Q6_3	0.01695	0.0000	0.01695	0.01695	0.01695	-0.06094	0.0948		
Q6_4	Q6_4	0.16603	0.0000	0.16603	0.16603	0.16603	0.07778	0.2543		

Variances and Covariance

				95% Confidence Intervals			β 95% Confidence Intervals			
Variable 1	Variable 2	Estimate	SE	Lower	Upper	β	Lower	Upper	z	p
Q7_1	Q7_1	0.08525	0.0000	0.08525	0.08525	0.08525	0.01531	0.1552		
Q7_2	Q7_2	0.06788	0.0000	0.06788	0.06788	0.06788	-0.00360	0.1394		
Q7_3	Q7_3	0.19156	0.0000	0.19156	0.19156	0.19156	0.11868	0.2644		
Q7_4	Q7_4	0.19110	0.0000	0.19110	0.19110	0.19110	0.11956	0.2626		
Q7_5	Q7_5	0.25483	0.0000	0.25483	0.25483	0.25483	0.18282	0.3268		
Q7_6	Q7_6	0.19633	0.0000	0.19633	0.19633	0.19633	0.12348	0.2692		
Q7_7	Q7_7	0.36208	0.0000	0.36208	0.36208	0.36208	0.28624	0.4379		
PEOU	PEOU	0.82269	0.0455	0.73358	0.91180	1.00000	1.00000	1.0000	18.09	< .001
SN	SN	0.73902	0.0706	0.60068	0.87735	1.00000	1.00000	1.0000	10.47	< .001
IM	IM	0.64314	0.0602	0.52511	0.76117	1.00000	1.00000	1.0000	10.68	< .001
JR	JR	0.89808	0.0320	0.83544	0.96073	1.00000	1.00000	1.0000	28.10	< .001
OQ	OQ	0.76124	0.0418	0.67931	0.84316	1.00000	1.00000	1.0000	18.21	< .001
VO	VO	0.53396	0.0880	0.36158	0.70635	1.00000	1.00000	1.0000	6.07	< .001
RD	RD	0.90941	0.0371	0.83672	0.98211	1.00000	1.00000	1.0000	24.52	< .001
PU	PU	0.85102	0.0387	0.77520	0.92684	1.00000	1.00000	1.0000	22.00	< .001
BP	BP	0.91475	0.0357	0.84481	0.98469	1.00000	1.00000	1.0000	25.63	< .001
PEOU	SN	0.48130	0.0350	0.41264	0.54997	0.61727	0.52917	0.7054	13.74	< .001
PEOU	IM	0.34298	0.0324	0.27952	0.40644	0.47152	0.38432	0.5587	10.59	< .001
PEOU	JR	0.45236	0.0350	0.38382	0.52090	0.52627	0.45120	0.6013	12.94	< .001
PEOU	OQ	0.48334	0.0338	0.41715	0.54952	0.61076	0.53250	0.6890	14.31	< .001
PEOU	VO	0.17303	0.0302	0.11385	0.23222	0.26107	0.17478	0.3473	5.73	< .001

Variances and Covariance

				95% Confidence Intervals			β 95% Confidence Intervals			
Variable 1	Variable 2	Estimate	SE	Lower	Upper	β	Lower	Upper	z	p
PEOU	RD	0.48780	0.0350	0.41919	0.55641	0.56395	0.48924	0.6387	13.93	< .001
PEOU	PU	0.47512	0.0303	0.41581	0.53443	0.56783	0.50559	0.6301	15.70	< .001
PEOU	BP	0.46809	0.0262	0.41671	0.51947	0.53958	0.49121	0.5880	17.86	< .001
SN	IM	0.62480	0.0402	0.54593	0.70367	0.90627	0.77702	1.0355	15.53	< .001
SN	JR	0.50575	0.0421	0.42332	0.58817	0.62079	0.51609	0.7255	12.03	< .001
SN	OQ	0.49661	0.0393	0.41949	0.57374	0.66211	0.55773	0.7665	12.62	< .001
SN	VO	0.41941	0.0444	0.33247	0.50636	0.66766	0.55262	0.7827	9.45	< .001
SN	RD	0.63617	0.0387	0.56035	0.71198	0.77600	0.67419	0.8778	16.45	< .001
SN	PU	0.46538	0.0360	0.39479	0.53597	0.58683	0.49592	0.6777	12.92	< .001
SN	BP	0.27928	0.0312	0.21805	0.34052	0.33968	0.26499	0.4144	8.94	< .001
IM	JR	0.61867	0.0347	0.55071	0.68663	0.81404	0.72111	0.9070	17.84	< .001
IM	OQ	0.58757	0.0343	0.52040	0.65473	0.83974	0.73905	0.9404	17.15	< .001
IM	VO	0.34296	0.0406	0.26337	0.42254	0.58524	0.46034	0.7101	8.45	< .001
IM	RD	0.64612	0.0365	0.57467	0.71757	0.84485	0.74438	0.9453	17.72	< .001
IM	PU	0.49099	0.0352	0.42192	0.56005	0.66367	0.56950	0.7578	13.93	< .001
IM	BP	0.36708	0.0302	0.30792	0.42625	0.47858	0.39983	0.5573	12.16	< .001
JR	OQ	0.72750	0.0290	0.67062	0.78439	0.87987	0.82230	0.9374	25.07	< .001
JR	VO	0.16264	0.0394	0.08541	0.23987	0.23486	0.12612	0.3436	4.13	< .001
JR	RD	0.81240	0.0274	0.75871	0.86608	0.89894	0.84777	0.9501	29.66	< .001
JR	PU	0.56273	0.0318	0.50047	0.62499	0.64369	0.58003	0.7073	17.71	< .001
JR	BP	0.36273	0.0301	0.30374	0.42172	0.40019	0.33779	0.4626	12.05	< .001

Variances and Covariance

				95% Confidence Intervals			β 95% Confidence Intervals			
Variable 1	Variable 2	Estimate	SE	Lower	Upper	β	Lower	Upper	z	p
OQ	VO	0.17985	0.0369	0.10756	0.25215	0.28210	0.17230	0.3919	4.88	< .001
OQ	RD	0.80418	0.0262	0.75278	0.85557	0.96652	0.91042	1.0226	30.67	< .001
OQ	PU	0.55004	0.0301	0.49103	0.60905	0.68338	0.61792	0.7488	18.27	< .001
OQ	BP	0.48169	0.0265	0.42975	0.53363	0.57724	0.51946	0.6350	18.18	< .001
VO	RD	0.18968	0.0387	0.11389	0.26546	0.27219	0.16625	0.3781	4.91	< .001
VO	PU	0.32832	0.0371	0.25557	0.40107	0.48705	0.39407	0.5800	8.85	< .001
VO	BP	0.13756	0.0251	0.08837	0.18676	0.19683	0.12854	0.2651	5.48	< .001
RD	PU	0.56166	0.0319	0.49923	0.62410	0.63845	0.57157	0.7053	17.63	< .001
RD	BP	0.51110	0.0288	0.45466	0.56755	0.56037	0.50236	0.6184	17.75	< .001
PU	BP	0.44781	0.0239	0.40101	0.49461	0.50754	0.46155	0.5535	18.75	< .001

Table 4.11 presents the analysis of the strength and relationship between model variables and indicators. It enables the understanding of covariance patterns, the identification of meaningful relationships between elements, overall fit and validity of the measurement model. For example, the covariance between indicators Q6_6 and Q6_7 is 0.26401, which is indicative of a positive relationship between them. Moreover, the standard error is 0.0000, which indicates high precision between the indicators. The indicators also have a p-value < 0.001, indicating that the covariance is statistically significant. Furthermore, there is a covariance of 0.50575 between SN and JR, representing a positive relationship between the two latent variables. A higher standard error of 0.0421 represents reduced precision between the variables in comparison with the indicators analysed earlier. Since SN and JR have a p-value of <0.001, the series coefficient for the two variables is still statistically significant and describes a pattern of strong and positive relationship for the variables. The

reader can peruse the above table for insights on the analysis of the other indicators and their associated variables. The analysis has provided invaluable insights into the relationships between the variables and between the indicators. The favourable covariances, estimates and p-values indicate the strength of the model and precision of the model.

4.5.4. Reliability Indices

5. Table 4.12: Reliability Indices

Reliability indices

Variable	α	Ordinal α	ω_1	ω_2	ω_3	AVE
PEOU	0.908	0.935	0.911	0.911	0.928	0.807
SN	0.770	0.836	0.790	0.790	0.797	0.661
IM	0.790	0.855	0.776	0.776	0.769	0.665
JR	0.933	0.976	0.935	0.935	0.933	0.932
OQ	0.885	0.931	0.887	0.887	0.894	0.827
VO	0.646	0.636	0.844	0.844	1.068	0.717
RD	0.893	0.934	0.906	0.906	0.930	0.854
PU	0.928	0.967	0.938	0.938	0.948	0.891
BP	0.944	0.961	0.954	0.954	0.982	0.807

Table 4.12 represents the reliability indices for the latent variables and offers insights into internal consistency and reliability of the measurement hypotheses, as well as about the dependability and consistency of the measurement instruments, i.e., the survey questions and how well they measure the underlying concepts. For this study, the analysis revealed that generally, Cronbach's alpha (α) ranged from 0.646 for VO to 0.944 for BP. All but one variable surpassed the 0.7 threshold that is considered acceptable, which means that all variables except VO can be viewed as having strong reliability in measuring the underlying latent variables. Additionally, ordinal alpha ranging from 0.636 (VO) to 0.976 (JR), and McDonald's Omega (ω_1, ω_2, ω_3) co-efficient also exhibited high values across all variables, while Average Variance Extracted (AVE) across all variables ranged above the accepted value of 0.5, further entrenching the robustness of the model and its reliability. This gives the measurement model credibility in how it has captured the intended concepts.

5.1.1. Ratio of Correlations

Table 4.13: Ratio of Correlations

Heterotrait-monotrait (HTMT) ratio of correlations

	PEOU	SN	IM	JR	OQ	VO	RD	PU	BP
PEOU	1.000	0.607	0.489	0.534	0.614	0.349	0.581	0.572	0.532
SN	0.607	1.000	0.901	0.586	0.669	0.757	0.757	0.612	0.342
IM	0.489	0.901	1.000	0.760	0.828	0.773	0.813	0.641	0.465
JR	0.534	0.586	0.760	1.000	0.883	0.331	0.914	0.642	0.394
OQ	0.614	0.669	0.828	0.883	1.000	0.378	0.972	0.678	0.572
VO	0.349	0.757	0.773	0.331	0.378	1.000	0.374	0.674	0.261
RD	0.581	0.757	0.813	0.914	0.972	0.374	1.000	0.657	0.555
PU	0.572	0.612	0.641	0.642	0.678	0.674	0.657	1.000	0.499
BP	0.532	0.342	0.465	0.394	0.572	0.261	0.555	0.499	1.000

The HTMT analysis in Table 4.13 examined the distinctiveness of constructs measured by latent variables. In general, values below 0.85 are considered to display adequate discriminant validity. Observing the values in the table above, it can be seen that generally, values across the majority of latent variables are below the 0.85 threshold, thus indicating satisfactory validity. For example, the HTMT ratios of all other variables when considered against PEOU are all below 0.85. It can therefore be suggested that PEOU is sufficiently distinct from the other latent variables.

5.1.2. Path Diagram

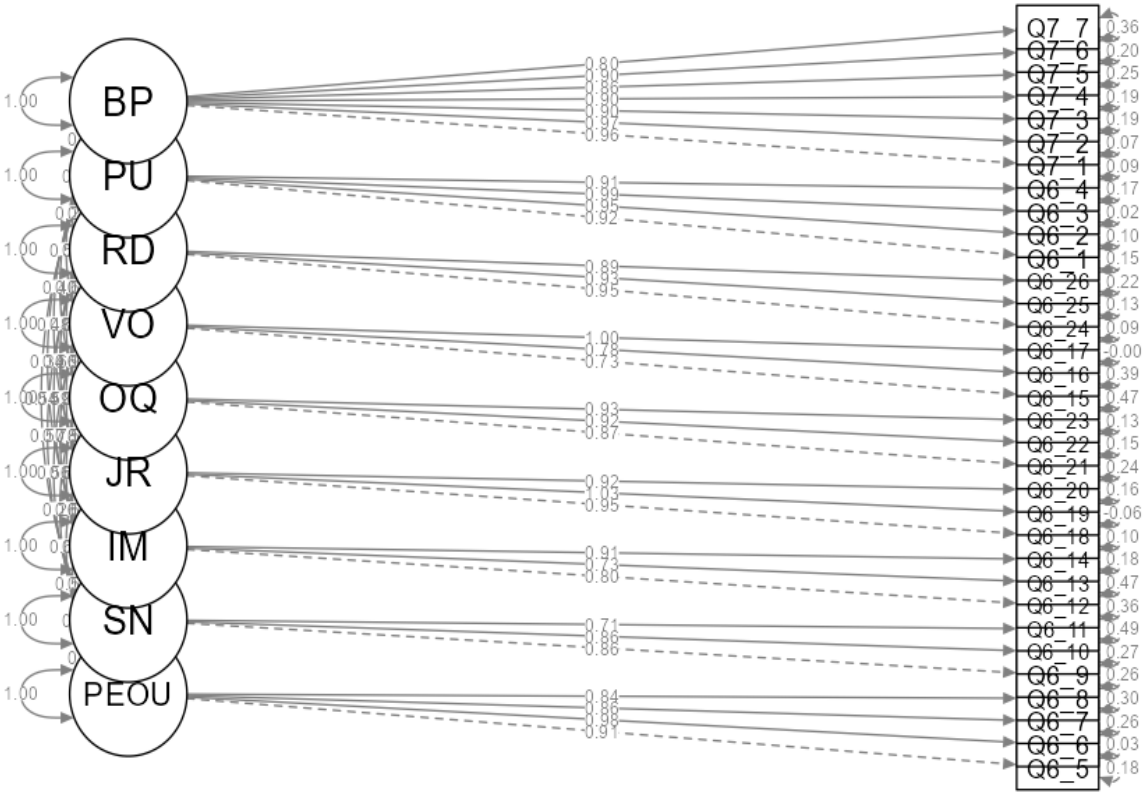

Figure 4.7: Path Diagram of Latent Variables and Observed Indicators

Figure 4.7 shows the relationship between the latent variables (on the left) and their respective observed indicators (on the right), displays the strength of these relationships, and also presents a visual representation of the influence amongst and between the variables and how they all contribute to the endogenous variable of BP. Furthermore, the factor loadings in the middle of the diagram demonstrate the strength and direction of the relationship between the latent variables and their observed indicators. Values above 0.7 generally demonstrate a strong relationship. It can be observed from the figure that all latent variables have a strong and positive relationship with their indicators as their respective values are above 0.7, thus strengthening the reliability and validity of the model.

5.1.3. Results pertaining to Hypothesis 2

Based on the detailed results analysis in the previous sections using SEM, especially results gleaned from the measurement model in Table 4.10 in Section 4.5.3, it can therefore be hypothesised that:

Hypothesis H2a – which states that the usage of digital technologies has a positive impact on revenue – is supported, as its beta value is 0.956 and the p value <0.001, hence being statistically significant as it creates a very strong positive relationship and causality between the use of digital technologies and revenue. In other words, more revenue is generated as more digital technologies are used, and by using one unit of digital technology in a business, this increases business performance by 0.956 units.

The information in Figure 4.8 below shows the level of increase in revenue experienced by the respondents. A total of 79% of respondents stated that revenue grew by 10% and more due to the use of digital technologies.

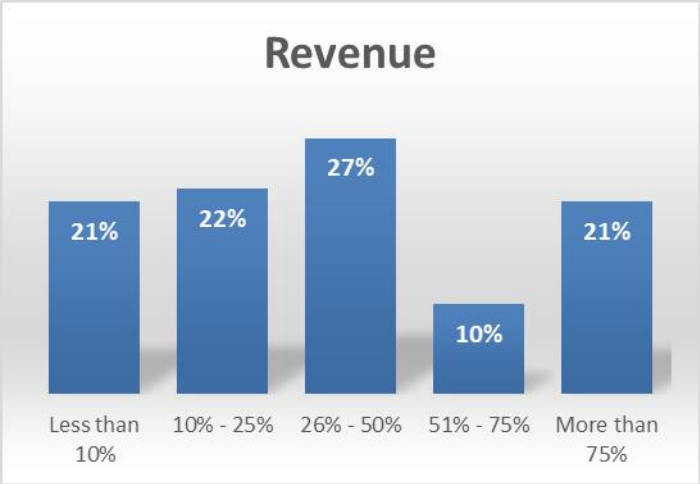

Figure 4.8: Revenue due to the Use of Digital Technologies

As hypothesis H2b shows a positive contribution to profit, and its beta value has a value of 0.965 and p-value is less than 0.001, which is a significant value, this

suggests that the use of digital technologies would have a strong positive impact with regard to profit. For every one unit of profit generated due to use of new technology, business performance would grow by 0.965. Figure 4.9 shows the impact of digital technologies on business performance, where 75% of respondents stated that profit had grown 10% or more due to the use of digital technologies.

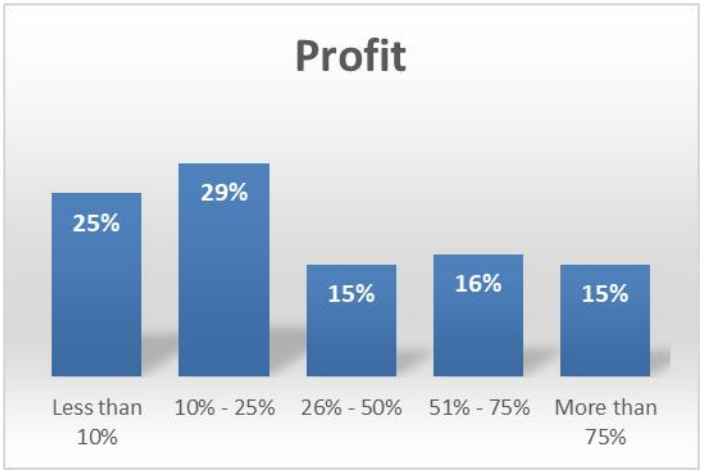

Figure 4.9: Profit due to the Use of Digital Technologies

The use of digital technology improves operational efficiency, according to hypothesis H2c, which is supported by its beta value of 0.896 and statistically significant p-value of <0.001. This shows that the usage of digital technologies and operational efficiency have a significant positive relationship and impact on each other. It can also be inferred that business performance rises by 0.896 for every unit of operational efficiency brought about by the use of digital technology. It is also important to highlight that, as illustrated in Figure 4.10 below, 89% of respondents stated that employing digital technologies in their businesses increased operational efficiency by 10% or more.

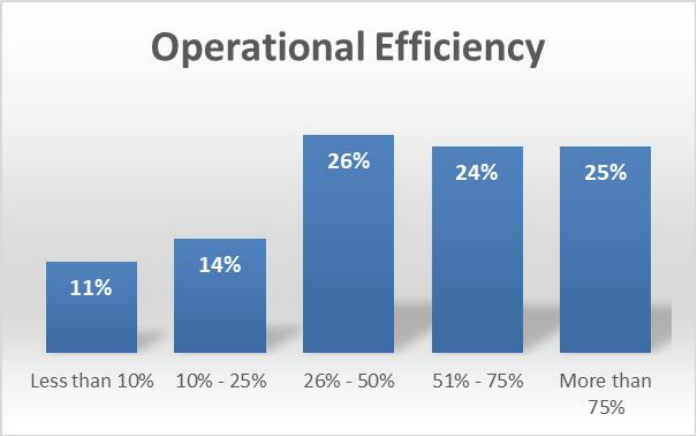

Figure 4.10: Operational Efficiency and Usage of Digital Technologies

The use of digital technology improves customer satisfaction, according to hypothesis H2d, which is supported by its beta value of 0.899 and statistically significant p-value <0.001. This shows that there is a direct and positive correlation between customer satisfaction and the use of digital technologies. It may also be inferred that business performance increases by 0.899 for every unit of customer satisfaction brought about by the usage of digital technology. A total of 81% of the respondents stated that since the business started utilising digital technology, customer satisfaction increased by at least 10% (see Figure 4.11).

Figure 4.11: Customer Satisfaction and Usage of Digital Technologies

The use of digital technology improves risk management, according to hypothesis H2e, which is supported by its beta value of 0.863 and statistically significant p-value of less than 0.001. This shows that the use of digital technology and risk management have a very strong, positive relationship and influence. It may be inferred further that business performance increases by 0.863 for every unit of risk management created by the usage of digital technology. Using digital technology has enhanced risk management by 10% or more, according to 79% of the respondents – see Figure 4.12.

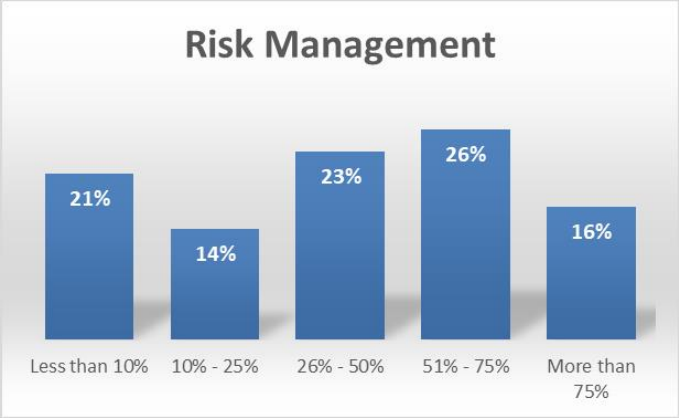

Figure 4.12: Risk Management and Usage of Digital Technologies

The use of digital technology has a positive impact on innovation, according to hypothesis H2f, which is supported by its beta value of 0.899 and statistically significant p-value <0.001. This indicates that innovation and the usage of digital technologies have a significant and positive relationship. It may be inferred further that business performance increases by 0.899 for every unit of innovation produced as a result of the use of digital technology. According to 88% of the respondents, the use of digital technology has increased innovation capacity by 10% or more, resulting in an improvement in business performance – see Figure 4.13.

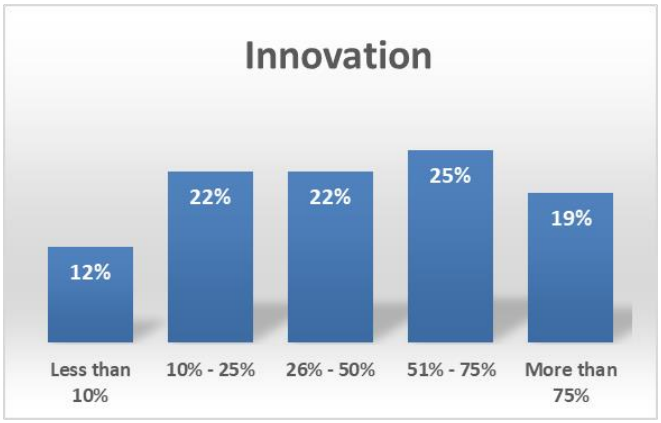

Figure 4.13: Innovation and Usage of Digital Technologies

Hypothesis H2g, which states that the usage of digital technologies has a positive impact on job creation, is supported due to its beta value of 0.799 and p-value <0.001, which is statistically significant. This suggests a strong and positive relationship and impact between the use of digital technologies and job creation. It can be further implied that for one unit of job creation generated due to the use of digital technology, business performance increases by 0.799. A total of 60% of the respondents stated that job creation in their businesses grew by 10% or more since using digital technologies – see Figure 4.14, while 40% stated that job creation grew by less than 10%.

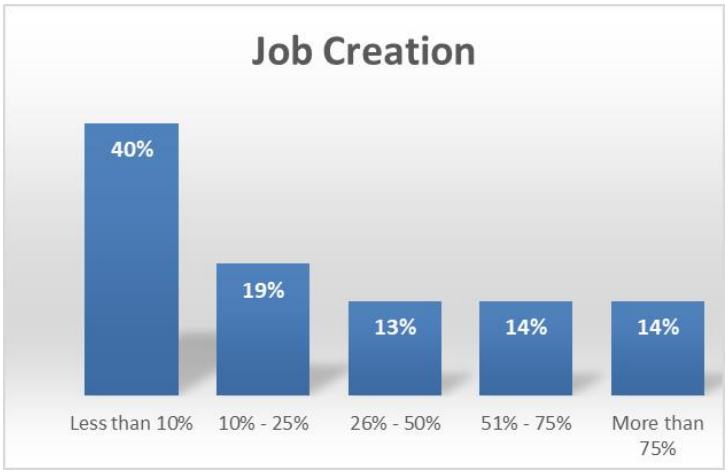

Figure 4.14: Job Creation and Usage of Digital Technologies

In summary, it can therefore be purported that Hypothesis 2: The usage of digital technologies has a positive impact on the following business measures of South African SMEs: revenue, profit, operational efficiency, customer satisfaction, risk management, innovation, and job creation, is supported, as evidenced by the supported sub-hypotheses of each business performance.

4.6 Summary of the results/findings

In summary, the results of the analysis using CFA and SEM showed that all the reliability indices for each latent variable displayed high internal consistency and reliability of the measurement constructs in the model, thus strengthening the validity of the measurement instrument in assessing the latent variables. It was also seen that the fit indices, i.e., CFI, TLI and RMSEA met the recommended thresholds, indicating that the model sufficiently represents the observed data. Furthermore, the HTMT ratio of correlations supports discriminant validity, meaning that the values of the latent variables are distinct and not highly correlated. This affirms the model's ability to distinguish between different constructs.

Additionally, results of SEM analysis of factor loadings and path analysis further demonstrate the strong positive relationship between latent variables and indicators through the favourable beta values. The hypotheses results related to the positive impact of digital technology usage on business performance are supported by the statistically significant and positive beta values and low p-values ($p<0.001$).

In conclusion, the combined CFA and SEM analysis results confirm the reliability and validity of the measurement model. The model solidly captures the relationship between latent variables and indicators, providing empirical support for the hypotheses related to the positive impact of digital technologies on business performance.

CHAPTER 5: DISCUSSION OF THE RESULTS/FINDINGS

5.1 Introduction

In research conducted by Malodia *et al.* (2023), it was found that SMEs have been hesitant in embracing digital transformation, in contrast to large businesses. Furthermore, existing literature and research has primarily focused on digital transformation within the realms of larger businesses and start-ups, leaving SMEs underrepresented in empirical research (Teng *et al.*, 2022; Malodia *et al.*, 2023). However, Teng *et al.* (2022) and Chen *et al.* (2014) presented a Chinese and Taiwanese perspective into SME research, respectively. Teng *et al.* (2022) found that the adoption of digital technologies catalyses digital transformation and enhances financial performance of SMEs.

Furthermore, Chen *et al.* (2014) in their study of SMEs in the Taiwanese textile industry found that the use of ICT by SMEs played a pivotal role in enabling SMEs to tap into new markets, acquire customer knowledge and refine product development processes. Malodia *et al.* (2023) in the study of Indian SMEs found that e-commerce, digital marketing and big data technologies are important in the success of the digital transformation of SMEs.

This study sought to provide a South African context on the plausibility of using digital technologies in SMEs digitally transforming their businesses to drive business performance.

5.2 Discussion pertaining to Hypothesis 1

Hypothesis 1 states that the usage of digital technologies is correlated with constructs of the extended technology adoption model (TAM2). Sub-hypotheses for the individual constructs were developed and tested to validate Hypothesis 1. The results in chapter 5 showed that the sub-hypotheses are supported, indicating that perceived usefulness, perceived ease of use, social norms, image, result demonstrability, output quality, and job relevance are positively correlated with the usage of digital technologies. Moreover, the hypothesis related to voluntariness is supported, suggesting a negative correlation with the usage of digital technologies. By implication, Hypothesis 1 is consequentially supported by the results of the sub-hypotheses.

The results of sub-hypothesis H1a support the idea that SMEs perceive digital technologies as useful. This aligns with the TAM2 model, which emphasises the importance of perceived usefulness in the adoption and use of technology. Venkatesh and Davis (2000) stated that persons perceive technology as useful to the extent that using it is free of effort in enhancing their job performance. This view can therefore be extended to SMEs perceiving the use of digital technologies as useful and significant to running their businesses provided that it requires minimal effort. The study by Sheng *et al.* (2022) supports the findings, as it postulates that digital technologies have changed various aspects of human life and business environments, and that for SMEs the usefulness of digital technologies is crucial to leverage their transformative capacity.

Furthermore, sub-hypothesis H1b results indicate that SMEs find digital technologies easy to use, which is consistent with ease of use being a crucial factor in the TAM2 model to determine adoption and usage of technology. This further aligns with perceived usefulness, as the easier a system or technology is to use, the more useful it is (Venkatesh & Davis, 2000). Moreover, easy-to-use digital technologies enable SMEs to align with the ever-changing entrepreneurship landscape and are crucial

for the ability of SMEs to adapt to the changing business environment. For sub-hypothesis H1c, the findings indicate that SMEs perceive that a level of influence exists from their stakeholders on their decision to adopt and use digital technologies. This aligns with the findings of Venkatesh and Davis (2000), whereby persuasive social influence from one's important stakeholders may lead to one's incorporation of that belief into one's own belief system. In the same way, SMEs can be swayed by mentors, partners or other significant stakeholders with regard to using digital technologies in their businesses.

Venkatesh and Davis (2000) in their study postulated that image is positively influenced by subjective norms due to important people in one's group believing that they should act or behave in a certain way, for example, thus elevating their standing in the group. This is true for SMEs as well, as evidenced by the findings of sub-hypothesis H1d, which states that image is positively correlated to the use of digital technologies by SMEs. This supports the notion that SMEs take image into account when adopting and using digital technologies in their businesses. Image could potentially enhance their market positioning, assisting in attracting customers, partners and investors. Zahra *et al*. (2022) found that digital technologies influence SMEs' standing with their customers and stakeholders, especially in terms of reaching them through digital channels.

The results of sub-hypothesis H1e on result demonstrability show that SMEs perceive positive and tangible results from using digital technologies. This is important, as the usefulness of a technology is based on its ability to enable gains attribution to it (Venkatesh & Davis, 2000). Failure to do so may lead to the technology being declared obsolete. Ancillai *et al*. (2023) note that digital technology on its own is valueless per se, stressing that value lies in how the technology interacts with a company's business model to yield positive outcomes and uncover news ways to create value. This is supported by the results of sub-hypothesis H1f on output quality, which further solidify the usefulness of digital technologies to SMEs as they prioritise output quality in their use of digital technologies. In so doing, this

ensures that they deliver high-quality products and services to their customers, as well as improving operational efficiency, customer satisfaction and ultimately impacting profit.

A digital technology's ability to be applicable to one's job is important for enabling one to perform a set of tasks the system can support (Venkatesh & Davis, 2000). For SMEs in this study, digital technologies were found to be relevant for their job functions. This is in support of sub-hypothesis H1g. Such applicability could lead to improved operational efficiency, better risk management, increased innovativeness, and the enabling of SMEs to leverage these technologies to perform tasks effectively. Lastly, the results from sub-hypothesis H1h on voluntariness reveal that non-mandatory usage of digital technologies allows SMEs to assess and evaluate the suitability of these technologies for their business needs. In this study, all respondents operate in a post-implementation phase where adoption has already taken place and the normative influence has thus subsided. Skare *et al.* (2023) note that digitalised organisations tend to fare better when shocks occur, as they are able to execute both immediate and ongoing crisis management, which then leads to better performance in comparison to their peers. This indicates that SMEs may prioritise digital technology usage beyond voluntariness, driven more by business imperatives than subjective norms.

5.3 Discussion pertaining to Hypothesis 2

Hypothesis 2 states that the usage of digital technologies has a positive impact on the following business measures of South African SMEs: revenue, profit, operational efficiency, customer satisfaction, risk management, innovation, and job creation. Sub-hypotheses for the individual constructs were developed and tested to validate hypothesis 2. The results of the sub-hypotheses reveal that the selected business performance constructs of revenue, profit, operational efficiency, customer satisfaction, risk management, innovation and job creation have a positive and

meaningful relationship with the usage of digital technologies. Therefore, hypothesis 2 is automatically supported by the findings of its sub-hypotheses.

Sub-hypothesis H2a states that the usage of digital technologies has a positive impact on revenue. The results supported the hypothesis, as revenue was found to have a significant relationship with the usage of digital technologies. This finding is supported by research conducted by Danilet (2022), who stated that the adoption of digital technologies has a direct impact on sales growth and company development. Teng *et al*. (2022a) also found that digital technologies had a significant impact on financial performance. Furthermore, to entrench the finding, Kumar *et al*. (2021) found that SMEs using digital technologies such as social media generated 78% more business than their counterparts who did not use digital technologies. Additionally, this results in digital-forward businesses seeing higher revenue and productivity when compared to their less digitally-inclined peers (Roman & Rusu, 2022). In another study by Skare *et al*. (2023), it was found that digital transformation (which is the high-level abstraction of digital technologies) was critical for new market creation and connecting SMEs to new customers. Therefore, from the literature it is clear that SMEs glean revenue benefits from using digital technologies.

Profit is an important business performance variable. In line with this, sub-hypothesis H2a, which states that the usage of digital technologies has a positive impact on profit, is supported by the study analysis results, which showed that there is a positive and significant relationship between the usage of digital technologies and profit. This is in line with Teng *et al*. (2022a), who found that digital technologies had a significant impact on financial performance. Other studies also found that adopting and using digital technologies can have a positive impact on competitiveness, productivity and performance for SMEs (Roman & Rusu, 2022). There is thus clear evidence that using digital technologies supports SME profit growth.

In order to be profitable, it is also important for SMEs to run efficient operations. Sub-hypothesis H2c posits that using digital technologies has a positive impact on

operational efficiency. Based on the research results, the hypothesis is supported. The literature also supports the finding, as demonstrated in the study by Danilet (2022), where it was found that integrating digital technologies into company technical infrastructure enables streamlining of processes. Furthermore, the integration of digital technologies can improve cost control through improved business processes. In so doing, these digital technology-driven processes improve overall business operations (Teng *et al*., 2022a). Roman and Rusu (2022) likewise state that at an operational level, the impact of adopting and using digital technologies leads to the reduction of transaction costs and the improvement in access to information, staff communication, suppliers and networks (Roman & Rusu, 2022). When analysed from a marketing lens, digital technologies also enable cost savings, along with less time and effort required for a business (Kumar *et al*., 2021). The study findings and literature appear to confirm that SMEs would be well placed to use digital technologies to drive intelligent and efficient operations to foster business growth.

The results for sub-hypothesis H2d, which states that the usage of digital technologies has an impact on customer satisfaction, align with literature, particularly that of Skare *et al*. (2023), who emphasised that digital transformation offers SMEs the opportunity to improve on meeting customer expectations. Qalati *et al*. (2022) stated that digital technology improves customer communication, brand awareness, marketing of products and services, and market research, and leads to increased sales, overall reduction in marketing costs and improved performance. In addition, digital technology was found to expand the absorptive capacity and stimulate innovation of new products and services to meet customer demands and needs, as well as to help explore potential market opportunities (Radicic & Petković, 2023). For long-term sustainability, SMEs need to ensure consistent and high-quality service to foster customer satisfaction and business growth.

Sub-hypothesis H2e states that the usage of digital technologies has a positive impact on risk management. Analysis results support the hypothesis, as a significant

and positive relationship between digital technologies and risk management was found. This suggests that using digital technologies contributes to better risk management. To further support the finding, Skare *et al*. (2023) in their study found that digital technologies helped SMEs better manage exogenous shocks; however, their study results were limited. Leveraging digital technologies to manage risk has the potential to provide valuable insights through data that may assist in mitigating risks and uncertainties.

Innovation and digitisation enable managers to identify novel innovations to meet current and future customer needs (Danilet, 2022). Additionally, innovation and digitisation assist to manifest new products, business models, processes and markets. Therefore, in this context, the adoption and usage of digital technologies by SMEs has become a necessity, as it has a direct impact on sales growth and company development (Danilet, 2022). The adoption and usage of digital technologies also has an impact on the competitiveness of businesses. In South Africa a study by Govuzela and Mafini (2019) discovered that innovative collaboration amongst SMEs enabled them to adapt to environmental changes and glean other benefits. Therefore, it can be purported that the supported results of sub-hypothesis H2f, which states that the usage of digital technologies has a positive impact on innovation, align with literature and show that using digital technologies can benefit SMEs in a multitude of ways that can drive business growth.

Lastly, the economic indicator of job creation was included in the hypothesis analysis as it is a critical part of the South African economy, which currently has a high unemployment rate. It is with this premise that sub-hypothesis H2g, which states that the usage of digital technologies has a positive impact on job creation, was tested. The results show that job creation has a positive and statistically significant relationship with the usage of digital technologies. Credit access and the ability to diversify financing options is a factor in stimulating SME performance (Roman & Rusu, 2022). Credit access stimulates business growth, which may lead to job creation to capacitate business. Furthermore, the adoption and usage of even basic

digital technologies can lead to job creation by SMEs (Roman & Rusu, 2022). Similar results were seen when Roman and Rusu (2022) analysed e-commerce-inclined SMEs, where despite business size, selling online led to increased value-add and SME employee numbers. Based on the study results and literature, there is compelling evidence to support digitalisation of SMEs to drive job creation in South Africa.

5.4 Conclusion

The results of this study through CFA analysis of the foundational constructs of the TAM2 model unravelled nuanced interplay among the constructs analysed. These constructs enabled the understanding of the intricate drivers of SMEs adopting and using digital technologies in their businesses. The results provided support for the hypotheses derived from TAM2 in the South African SME context. The results specifically showed positive correlations between the usage of digital technologies and the constructs of perceived usefulness, perceived ease of use, subjective norms, image, result demonstrability, output quality, and job relevance. These results underscore their importance of driving digital technology usage. However, voluntariness was found to have a negative correlation with digital technology usage. It may be that additional factors other than voluntariness play a role in South African SMEs using digital technologies.

The results of SEM analysis on the impact of digital technology usage on SME business performance displayed a compelling narrative of the transformative influence of digital technologies. Existing literature supported the findings of each hypotheses, revealing that a positive relationship exists between the business performance constructs of revenue, profit, operational efficiency, customer satisfaction, risk management, innovation and job creation. The findings corroborate existing literature which states that technology usage drives revenue and profit growth, while operational efficiency serves as a catalyst to reducing costs, improving customer satisfaction and enhancing intelligent decision-making. The findings

collectively highlight the need for SMEs to proactively and deliberately pursue the adoption and usage of digital technologies to drive business performance.

CHAPTER 6: CONCLUSIONS AND RECOMMENDATIONS

6.1 Introduction

Small and Medium Enterprises (SMEs) operate in a dynamic and ever-changing global landscape. As evidenced in the literature, SMEs contribute significantly to economies through innovation, growth and job creation. This chapter seeks to integrate the hypotheses findings with the research question posed at the beginning of this report. Through the analysis of both financial and non-financial measures, namely, revenue, profit, operational efficiency, innovation, customer satisfaction, risk management and job creation, the research unravelled the relationship between digital technologies and business performance for SMEs in South Africa. The findings enable the understanding of the impact of digital technologies on SME business performance, especially in South Africa, as posed by the research question.

Recommendations based on the research outcomes are outlined in this chapter with regard to providing potential avenues of focus for stakeholders and interested parties. Furthermore, suggestions for future research on this topic or adjacent topics are outlined based on the findings to further enrich research on SMEs and digital technologies.

6.2 Conclusions regarding research question 1

To answer the research question – What is the impact of digital technologies on SME business performance in South Africa? – firstly, model fit was established using CFA between the latest variables and indicators using the extended technology adoption model (TAM2) to understand the drivers of SMEs adopting and using digital technologies. The results of the analysis showed that a positive and significant relationship between the latent variables and indicators existed, thus establishing a solid and robust theoretical foundation to then analyse the business performance

measures. The results for hypothesis 1 and its sub-hypotheses indicate that SMEs have adopted and are using digital technologies fundamentally because they are deemed useful to their businesses, easy to use, are important to their stakeholders, boost their standing and image with stakeholders – thereby shaping market perceptions of the SME, enable SMEs to derive value from using digital technologies through value attribution, and enable effective task execution through the system's performance, driving quality outputs and competitiveness.

Additionally, the results show that SMEs adopt and use digital technologies if they are deemed to be relevant to the business and not simply used for the sake of being digitally inclined. The technology must be seen to drive operational efficiency, streamlining processes, and potentially reducing operational costs and increasing output. The results also showed that SMEs are using digital technologies voluntarily and not mandatorily. This may mean that other factors play a more dominant role in the usage of digital technologies for South African SMEs.

Further analysis on the business measures to prove or disprove hypothesis 2 and its sub-hypotheses was conducted. A positive correlation was found for the impact of using digital technologies and revenue and profit. This finding aligns with other research, which found that digital technologies impact financial performance positively and are associated with higher productivity and revenue, thus contributing to improved profitability for SMEs. This therefore indicates that SMEs would be well advised to consider a digitally-inclined business model that incorporates digital technologies into their businesses to drive top-line and bottom-line growth.

A positive correlation on the impact of using digital technologies and operational efficiency was found. This suggests that using digital technologies reduces operational costs and improves operational processes, access to information, communication and data-driven decision-making. For example, using cloud technology may substantially reduce capital expenditure (CAPEX) by eliminating the need for SMEs to possess their own IT infrastructure to manage operations. Cloud

technology enables agility and the ability to better manage costs through an operational expenditure (OPEX) posture where a pay-as-you-use model is adopted. This has significant upside for SMEs, as they scale up services as and when required and reduce them during low peak periods based on market demand.

The usage of digital technologies was also found to have a positive impact on customer satisfaction. Digital technologies have the potential, as demonstrated in the literature, to have a positive impact on customer communication through technology-based platforms such as social media, websites, vlogs and other tools. Such platforms enable faster responses to customer needs and enquiries, thus potentially positively impacting brand awareness, reach and equity, ultimately enhancing customer satisfaction. Effective customer engagement is critical for SMEs, especially with the limited resources they have, in order to maximise their return on customer investment and satisfaction. As SMEs grapple with growing their businesses, it is critical that they effectively manage risk and ensure that they are able to continue to operate. Digital technology was found to have a positive impact on risk management. Big data analytics, IoT, Edge computing, Cloud services and other digital technologies can aid in better risk management by enabling data collecting, storing, organising and analysis to gain invaluable insights on the business and build a risk profile and appetite so that risks can either be eliminated, managed or accepted.

The study results also show that innovation is positively impacted by the use of digital technologies. SMEs, as the literature states, are key drivers of innovation by devising new products and services, disrupting existing industries and creating new markets. It is therefore clear that adopting a digital posture is beneficial in driving innovation and growth for SMEs. Lastly, as the businesses grow, become sustainable, and innovate and build digitally-based business models, job creation is likely. The research results show that using digital technologies has a positive effect on job creation for SMEs. This is supported by the literature, which states that digitally-inclined businesses are more likely to create jobs than those that are less digitally

inclined. New skills, knowledge and capabilities are created through innovative breakthroughs and technology plays a key role in this. Ultimately, the study shows that SMEs need to incorporate digital technologies into their business models for parity with their counterparts, as well as for competitive advantage driven by future fit and purposeful adoption and usage of digital technologies.

6.3 Recommendations

For SMEs to thrive and make an even bigger contribution to the South African economy and job creation, the use of digital technologies must form part of their business foundations and models. SMEs require meaningful support from policy makers, support organisations and the private sector in general. The following recommendations are made to help entrench digital technology usage among SMEs:

1. Policy Makers

- Help develop and promote digital literacy initiatives to enhance digital literacy amongst SMEs and provide guidance through skills development for owners and staff for the effective adoption and usage of digital technologies.
- Through policy and regulatory frameworks, foster an enabling environment for SMEs to adopt and use digital technologies. Draft and legislate policies that provide incentives, tax breaks, and streamline regulatory processes to make it easier for SMEs to adopt and use digital technologies.
- Partner and invest in digital infrastructure to improve consistent and countrywide reach and access for SMEs. Keep driving the reduction in data costs and internet connectivity, and reduce the existing digital divide.

2. SMEs

- Incorporate digital technologies in business models and strategies and adopt and use technologies that are fit for purpose and meet unique needs.
- Invest in ongoing training and development of owners and staff to effectively use digital technologies to drive operational efficiency and return on technology investment.
- Partner with like-minded counterpart SMEs to share resources, knowledge and experiences to accelerate the learning curve and mitigate risk associated with technology adoption.

3. Other Parties

- Finance houses can design SME-focused finance packages to enable digital technology adoption, taking into account SME-specific financial constraints and risk profiles.
- Knowledge sharing platforms can be created for SMEs to share knowledge, information, best practise and experiences in adopting and using digital technologies.
- Government can drive initiatives that promote the adoption and usage of digital technologies among SMEs. Seminars, webinars and awareness campaigns are some of the initiatives that can be undertaken to drive the message.

6.4 Suggestions for further research

There is still much scope for further research on SMEs, their dynamics, ecosystem and digital maturity. Potential research in cross-industry or cross-sector comparison on the adoption and usage of digital technologies might be useful to gain insights on the nuanced patterns, challenges and opportunities unique to each industry. Additionally, a longitudinal study on the impact of digital technology usage by SMEs could provide invaluable insight on the evolution of benefits and challenges over time

and the sustainability of technology-driven improvements. Lastly, a study on the digital divide affecting the ability of SMEs to access digital technologies due to geographical location and demographics could elucidate whether SMEs have equal opportunity to adopt digital technology based on the aforementioned characteristics.

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APPENDIX A: INSTRUMENT

Questionnaire Survey

SECTION A

Please indicate your answer by ticking (✓) on the appropriate box

1. **Please indicate how long the business has been operating:**

Less than 1 year	1 – 2 years	3 – 5 years	6 – 10 years	Older than 10 years

2. **Please indicate the industry/sector the business is operating in**

Technology	Non-Technology

3. **Please indicate ownership of the business**

Man/Male Owned	Woman/Female Owned	Male and Female Owned	I'd rather not say

4. **In which province is the business located?**

Eastern Cape	Free State	Gauteng	KwaZulu-Natal	Limpopo	Mpumalanga	North West	Northern Cape	Western Cape

SECTION B

Digital Technologies being used in your business. You can choose more than one technology

Email	
Website	
Social Media	
Mobile Apps/Payments	
Cloud Services	
Internet of Things (IoT)	
Big Data Analytics	
Artificial Intelligence (AI)/Machine Learning/Bots	
Robotics	
ERP/CRM/SCM/HCM	
Blockchain	
Other	

SECTION C

Please take note that: 1 = Strongly disagree, 2 = Disagree, 3 = Somewhat Disagree, 4 = Neutral. 5 = Somewhat Agree, 6 = Agree, 7 = Strongly Agree.

		1	2	3	4	5	6	7
PU1	I believe that digital technologies are useful for my business							
PU2	I believe that using digital technologies will improve the performance of my business							
PU3	I believe that using digital technologies is advantageous for my business							
PU4	I believe that using digital technologies is useful for my business because of the sector/industry it operates in							
PEOU1	I find it easy to understand and use digital technologies in my business							
PEOU2	I find it effortless to interact with and use the digital technologies in my business							
PEOU3	I find digital technologies to be easy to use							
PEOU4	I find it easy to get the digital technologies to do what is expected							
SN1	People I trust believe using digital technologies is good for business success							
SN2	My peers in the business community are using digital technologies to improve their businesses							
SN3	I feel pressure from my peers to use digital technologies in my business							
IM1	I believe that using digital technologies will improve the image of my business							
IM2	It is important that my business is seen as being up to date with the latest technology							

IM3	I believe that using digital technologies will make my business more competitive							
VO1	My business is using digital technologies voluntarily							
VO2	I have been pressured by other businesses to use digital technologies in my business							
VO3	I have been pressured by my employees to use digital technologies in my business							
JR1	Digital technologies can help improve task execution in my business							
JR2	Digital technologies can help improve efficiency in my business							
JR3	Digital technologies can help improve productivity in my business							
OQ1	I believe that using digital technologies can improve the quality of our products and services							
OQ2	I believe that using digital technologies can help us meet our customer's expectations							
OQ3	I believe that using digital technologies can help improve the timely delivery of our products and services							
RD1	I believe that using digital technologies will bring positive and tangible results to the business							
RD2	I believe that using digital technologies will help the business grow its top line and bottom-line							
RD3	I believe that I can easily demonstrate the benefits of using digital technologies in my business							

SECTION D

		Less than 10%	10% - 25%	26% - 50%	51% - 75%	More than 75%
BP1	To what extent do you believe that using digital technologies has contributed to an increase in revenue?					
BP2	To what extent do you believe that using digital technologies has contributed to an increase in profit?					
BP3	To what extent do you believe that using digital technologies has contributed to an increase in customer satisfaction?					
BP4	To what extent do you believe that using digital technologies has contributed to an increase in innovation?					
BP5	To what extent do you believe that using digital technologies has contributed to an increase in effective risk management?					
BP6	To what extent do you believe that using digital technologies has contributed to an increase in operational efficiency?					
BP7	To what extent do you believe that using digital technologies has contributed to an increase in new jobs created in your business?					

APPENDIX B: COVER LETTER

Dear Participant

My name is Mfanasibili Emmanuel Mdhluli. I am undertaking a research study as part of my studies for a Masters of Management in Digital Business (MMDB) with the Wits Business School at the University of the Witwatersrand. This study seeks to explore the perceived impact of digital technologies on SME business performance in South Africa.

To achieve this, an electronic questionnaire survey has been developed, and is attached in the link below. I would be extremely grateful if you would answer the questions openly and objectively. Participation in this survey is voluntary and you have the right to participate or not. It should take no more than fifteen minutes to complete and is anonymous and confidential. The information you provide will be used for data analysis purposes only to fulfil the requirements of the course.

All data will be kept anonymous and confidential. The data will be analysed using appropriate computer software and the findings of the project will assist in better understanding the impact of digital technologies on SME business performance, especially in South Africa.

Thank you very much for your time and participation.

Sincerely,

Mfanasibili Emmanuel Mdhluli
University of the Witwatersrand
Final-year MMDB student

APPENDIX C: ETHICAL CLEARANCE

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/DB1984260/698
This certificate is only valid with a legitimate ethics protocol number and signed by the Researcher (below).

Project title	Exploring the perceived impact of digital technologies on SME business performance in South Africa
Investigator / Researcher	Mr Mfanasibili Mdhluli
Nature of Project	MM (Digital Business)
Decision of the Committee	Approved, provided stakeholders and participants are guaranteed anonyn and confidentiality.
Issue Date of Certificate	15/08/2023
Expiry date	Date of submission of the project / research report
Chairperson	Dr Pius Oba ☎ +27 11 717 3976 +27 82 733 6587 ✉ pius.oba@wits.ac.za

Declaration by Researcher

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

I fully understand the conditions under which I am authorized to carry out the abovementioned research and 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.

Emmanuel Mdhluli
Signature

7th September 2023
Date: