Assessing technological challenges in black-owned SMMEs in selected provinces in South Africa

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ABSTRACT

Most scholars agree that SMMEs are analytical instruments that contribute to the growth of a nation's economy, regardless of whether the nation's economy is developed or in a developing phase. However, technology adoption by SMMEs in developing nations is confronted with setbacks due to the complexity of the environment regarding the implementation requirements. These challenges have not been adequately addressed by previous researchers, therefore this has triggered the interest of the researcher to investigate and identify the challenges experienced by these organisations. Numerous factors are believed to have an impact on the sustenance of SMMEs and subsequently technology has been identified as one of the critical resources that enable all businesses to proliferate and gain a competitive advantage, regardless the size of the organisation.

Successful implantation of technological systems will assist small businesses to improve their business knowledge and thereby improve their profitability and sustenance opportunities. This research study seeks to identify and examine the technological challenges that affect the business performance of SMMEs in selected provinces in South Africa, focusing on Limpopo and Gauteng in particular.

The chosen research paradigm for this study was quantitative. Questionnaires were distributed to owners and managers of SMMEs to complete. The outcome of the empirical study unearthed the list of the technological challenges that owners and managers of small businesses experience, namely technological competencies, technological insecurities, technical support, reliability of the technology and the efficiency of technology.

Conclusions were drawn based on the empirical data gathered, and recommendations made to owners and managers of SMMEs in selected areas, for possible exploits to address the identified technological challenges that are perceived to halt the opportunity to detect, embrace, adapt and fully utilise existing technology to their benefit.

KEYWORDS

Technological challenges, technology adoption, technological accessibility, technological competences, technological insecurities, technological support, SMME sustainability, skills development, entrepreneurship, competitive advantage, reliability of technology, usability of technology, business environmental challenges.

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DEDICATIONS

This mini-dissertation is dedicated to the following people that occupy a special place in my heart:

- My late dad, John Nthangeni Mabulele;
- My mom, Margaret Ndanganeni Mabulele;
- My lovely wife, Vhutshilo Ephodia Mabulele; and
- My three cute daughters: Tsiko, Mukhethwa and Vhugala.

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LIST OF KEY ABBREVIATIONS USED IN THIS DOCUMENT

GDP	Gross Domestic Product
SMEs	Small and Medium Enterprises
SMMEs	Small, Medium and Micro Enterprises
ICT	Information and Communication Technology
IT	Information Technology
PCs	Personal Computers

CHAPTER 1

NATURE AND SCOPE OF THE STUDY

1.1 INTRODUCTION

Small and medium-sized enterprises (SMEs) have been identified as a critical instrument that contributes to the growth of a nation's economy; this is also the case in those nations that are in their developing phase (Tarute & Gatautis, 2014:1220). James and Van Belle (2014:2) have identified technology as a critical resource that enables SMMEs in both developing and developed countries to proliferate and to gain a competitive advantage. However, Ogunyemi and Johnston (2012:105) cite that the adoption of information technology in small business organisations remains constrained due to a deficiency of technology cognisance. Ogunyemi and Johnston (2012:105) argue that the lack of knowledge of technology will likely influence the reluctance of SMMEs to invest in technology, because those organisations can barely allocate sufficient budget to improve technology upgrades. Furthermore, Mubaraki and Aruna (2013:158) assert that the growth of SMMEs is being-hampered by numerous factors, including the availability of funds, insufficient managerial capabilities, resources, statutory requirements, competition and technology.

Technology has emerged as the critical tool at the centre of business performance improvement, and owners of organisations are compelled to consider this whenever they review the literature on entrepreneurship (Wayne & Ramiro, 2016:350-351). However, Kurnia, Choudrie, Mahbubur and Alzagoul (2015:1906-1918) confirm that small business organisations located in emerging countries are sluggish to embrace and implement technology in their business operations. Furthermore, Kurnia *et al.* (2015:1906-1918) echo that the slow movement to adopt technology by many SMMEs is due to hostile social conditions, economic factors, technology and instability of the political conditions of many nations that are underdeveloped.

According to Suriyapperuma, Yajid, Khatibi and Premarathne (2015:48), the use of technological resources improves the business performance of SMEs and also assists these businesses to gain a competitive advantage over their rival organisations. Lekhanya (2017:1) supports this view by emphasising that besides advancing operational performances, SMEs also significantly contribute to the growth of the national economy.

Bushe (2019:210) states that adoption of technology is vital to enhance small businesses to endure harsh conditions, survive competition, improve businesses' financial performance and for the realisation of future opportunities of SMEs in South Africa. Some of the challenges that hinder the growth SMEs are attributed to their failure to improve their technology. This trend has an adverse effect to the growth of the South African economy (Chimucheka & Mandipaka, 2015:310).

Mubaraki and Aruna (2013:158) claim that small businesses have on numerous occasions been found to be using technology that is not suitable for their specific needs, due to limited funds that force them to hire technology or to partner amongst themselves to ease financial burdens. Chimucheka and Mandipaka (2015:310) state that regardless of the availability of access to the Internet, the lack of electricity in rural areas and load shedding in urban areas continue to threaten businesses' ability to adapt to the use of technological resources. Furthermore, small businesses continue to experience difficulty gaining access to critical information on market trends due to their financial positions. Only a handful of small businesses are able to afford technological information resources such as computers, WiFi routers, telephones and photocopy machines (Lekhanya, 2014:2722).

According to Chesbrough (2013:6), the manner in which small businesses do not understand the importance of technology and innovation is mirrored in the allocation of their budgets, where "proposals to improve technological resources are given less attention and are mostly not perceived to have high financial risk impact by financial organisations". Suriyapperuma *et al.* (2015:48) further mention that small business entities that embark on "technological" business opportunities stand a chance to succeed when compared to rival businesses that stick to their traditional ways of doing things.

The outline for the remainder of the chapter incorporates the problem statement, the primary and secondary objectives, and the scope of the study. The scope of the study involves the sector of the study and the geographical demarcation of the study under review. The empirical study comprises of and clarifies the research instrument, the research participant description, the methods with which information was collected, the statistical analysis strategies, as well as ethics and moral standards considered. The chapter ends with the limitations and the design of the entire research study.

1.2 PROBLEM STATEMENT

Kurnia *et al.* (2015:1906-1918) indicate that technology has emerged as the critical instrument required to improve business effectiveness, productivity and overall performance. Dlodlo and Dhurup (2013:53) maintain that the technology that has emerged as most significant globally is the Internet, and that it has outgrown television and telephone in terms of the market share it has gained. Boateng and Essandoh (2014:13) argue that SMMEs are often considered as more flexible organisations, better suited to adapt to new technological innovations which improve business competitiveness. However, SMMEs located in emerging countries are more sluggish to embrace and implement technology in their business operations than in developed nations, and generally lack knowledge of the advantages of adopting technological resources (James & Van Belle, 2014:2). Goldstuck (2017:38) claims that small businesses in South Africa are not vehemently using the Internet in the same manner as in other African nations.

Small business entities are considered and acknowledged to be the analytical instrument that drives an economy's development aspirations in both developed and developing countries (Aigbavboa & Thwala, 2014:771). In recent times, technological improvement has become an essential element that is critical for the organisation's competitiveness (Mubaraki & Aruna, 2013:156). For SMEs to forge success in the present worldwide economy, organisations need to manage changes emerging from the business environment, for example technological change and competition. In this manner organisations need to produce focused items and improve their services to stay abreast of changes in the business environment (Whelan & Teigland, 2013:178-179).

Mubaraki and Aruna (2013:156), mention that it is almost impossible for small businesses to avoid the risks caused by the changes in technology, especially for those businesses that aspire to improve and continue to maintain their success, and to those entrepreneurs who have the ambition to gain a competitive advantage and gain entry into new markets. Technology impacts on the economic development of South Africa and the full adoption of technology in SMMEs will enhance their directional knowledge and skills in simplifying the processes (Iritie 2011:1-2). Nevertheless, SMMEs' awareness and competencies to adopt technological improvement is found to be inadequate (Boateng & Essandoh, 2014:13).

Successful implantation of technological systems will assist small businesses to improve their business knowledge and therefore improve their profitability and sustenance opportunities

(Wayne and Ramiro 2016:350-351). However, Iritie (2011:1-2) argues that many setbacks have confronted technology adoption by SMMEs in developing nations, due to the complexity of the environment regarding the implementation requirements. These challenges have not been adequately addressed by previous researchers.

The aim of this study is to systematically identify and examine the technological challenges that affect the business performances of SMMEs in South Africa.

1.3 RESEARCH QUESTIONS

The following questions are addressed by the study:

- What is the perception of SMME owners and managers of the importance of using technology?
- What benefits does technology hold for business success?
- How does adapting to the usage of technological platforms impact SMMEs' business performance?
- How often do small businesses upgrade their technological systems?
- Why is it beneficial for the management of small businesses to use technological systems to run their operations?
- Why is it crucial for SMMEs to have an information technology support desk?
- Why are SMMEs not taking advantage of technology?

1.4 OBJECTIVES OF THE STUDY

The study's research objectives are divided into primary and secondary objectives.

1.4.1 Primary objective

The primary objective of this study seeks to identify and examine the technological challenges that affect the business performance of SMMEs in selected provinces in South Africa.

1.4.2 Secondary objectives

In order to accomplish the primary objective, the following secondary objectives were formulated:

- To conceptualise the technological challenges and their impact on SMMEs' business performance, according to the existing literature.
- To assess attitudes towards access to technological tools.
- To assess the attitudes of black-owned SMMEs managers towards the technological knowledge, skills and resources on their business performances.
- To assess the usability of technological tools.
- To compile a draft of suggested solutions to combat the effects of the most severe technological challenges on SMEs.

1.5 SCOPE OF THE STUDY

The scope of the study comprises of the field of study as well as the businesses under investigation.

1.5.1 Field of study

The field of study falls within the subject discipline of entrepreneurship and information technology. This study predominantly focuses on the challenges faced by SMMEs that are influenced by technological factors and possible future opportunities.

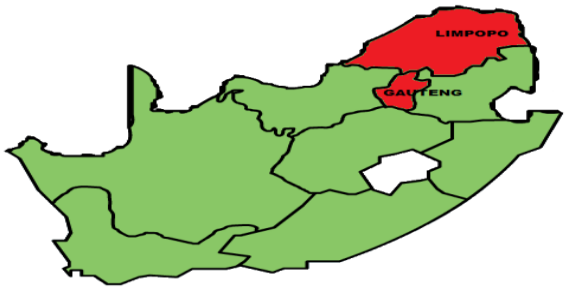
1.5.2 The sector of the study

The study is not limited to a specific industry and cuts across all industries within the SMME sector.

1.5.3 Geographical demarcation of the study

In order to achieve the research objectives, the researcher intends to conduct an empirical research study within South Africa, focusing only on two provinces, namely the Gauteng and Limpopo provinces. The geographical demarcation of the study under investigation is indicated in Figure 1.1 below.

Figure 1.1: Map portraying the area where the study was conducted within South Africa



Source: https://www.southafrica.to/provinces/provinces.htm

The geographical location of the study was chosen because of its convenience, since the researcher originated from the Limpopo Province, and is currently based in the Gauteng Province, which is the economic hub of South Africa.

1.6 RESEARCH DESIGN AND METHODOLOGY

1.6.1 Research design

According to Mashau (2016:6), a research design is an action plan that gives an indication of how a researcher aims to undertake their research method intended to provide a solution to the research problem. According to Martelli and Greener (2015:46), a research design is an approach planned for the exploration of a research topic.

The study follows the following five (5) steps in the research process:

Figure 1.2: Research Process Model

Source: Manning (2017:1)

1.6.2 Research philosophy

According to Chipeta (2019:81), a research philosophy alludes to the arrangement of convictions concerning the possibility of the reality of the situation being investigated. It is the

fundamental significance of the possibility of data. The expectation formed by a research philosophy provides the reasoning on how the study will be conducted (Saunders, Lewis & Thornhill, 2009:106-135). There are two critical ontological structures that serve as guides to the research study process for exploring positivism and constructionism (Antwi & Kasim, 2015:218). Bryman (2016:17) states that positivism acknowledges that the reality exists freely from the thing being considered. Practically speaking, this implies that the significance of phenomena is steady between subjects. Furthermore, Bryman (2016:17) avers that constructionism recommends that the intrinsic significance of social occurrences is made by each spectator or group.

According to Schaffer (2016:1-4), positivism contends that the study ought to serve as a systematised approach, adjoining the exact empirical observations of a participant's behaviour patterns. This is in order to unearth and give confirmation of the agreed, unpremeditated regulations that can be utilised with the primary purpose of being envisaged in the overall patterns of human movement. Furthermore, Schaffer (2016:1-4) argues that positivist research expands mostly in studies that have to do with the natural sciences.

Therefore, this study adopts the positivist research philosophy, since the study has an inseparable tie to sciences.

1.6.3 Research strategy

Wedawatta, Ingirige and Amaratunga (2011:1) describe the research strategy as the approach that offers the researcher the complete pathway of the study, including the chosen methods to be undertaken in the research.

There are two distinctive approaches commonly used and are outlined underneath: the deductive and the inductive approach.

1.6.3.1 Deductive approach

The deductive methodology builds speculation or theories upon a prior hypothesis and thereafter plans the research approach to test it (Alan, 2014:206-217). Consequently, the deductive approach is most reasonable when the positivist methodology is considered as the favoured technique, since it permits the definition of speculation and the factual testing of

anticipated outcomes, should there be an acknowledged dimension of likelihood (Makarfi, 2017:25).

1.6.3.2 Inductive approach

The inductive approach is portrayed as a move from the more precise to the wide-ranging (Alan, 2014:206-217). According to Makarfi (2017:26), this particular approach indicates that perceptions are the starting point for the researcher, and patterns are expected to be searched from the data. Furthermore, Muza (2018:118) argues that this approach lacks a specified structure in which the data collected is based and how the main body of the research study can be formulated once the required data has been collected and made available.

This method is even more commonly used in qualitative research, where the absenteeism of a model that guides the research process could be advantageous to minimise the biases of the researcher during the data collection stage (Austin and Sutton 2014:436-440).

For this study, the researcher considered a deductive approach which is predominantly suitable to the positivist approach.

1.6.4 Research methodology

McMillan and Schumacher (2014:275) state that the research study can be conducted through three different approaches, namely quantitative, qualitative and mixed research approaches.

Bryman *et al.* (2016:31) deliberate on quantitative research being that method in which the statistical data, which concerns the correlation that exists between conception and the study by means of which it is deductive, fancies positivism, and takes on the objectivist origin of the social reality acquired during the study. This can be scrutinised by means of mathematical base techniques. Austin and Sutton (2014:436-440) on the other hand depict quantitative research design as “the methods that are being used to test the general objectives by means of probing the relationship between variables that can be measured in order to analyse the amount of data with statistical techniques”.

Yilmaz (2013:311) defines qualitative research as that nature of the study that generates research outcomes which are not concluded through the use of the statistical method. He

further defines the mixed research methodology as the combination of quantitative and qualitative methodologies.

In line with the objectives of the study, a positivist quantitative research configuration is deemed appropriate to identify and examine the technological challenges that affect the business performance of SMEs in selected provinces in South Africa.

In this study, data was gathered through the review of literature and empirical studies.

1.6.4.1 Literature review

An empirical research study was done through previously conducted research to create a well-introduced technological academic learning and its relations with the performance of SMMEs, in order to reflect the significance of embracing technology. The review of the previously conducted research is the significant justification of the introduced concept of the technological challenges faced by SMMEs, and the evaluation of whether technology increases the probability of small businesses to grow and sustain the organisation. The researched topics include the following: definition of technology, the definition of SMMEs in a South African perspective, the effect of technology on SMMEs' business performance, SMMEs' readiness to adopt technology, SMMEs' technological orientation, and the relationship between SMMEs' business performance and technology.

The list of sources to be accessed consists of the following:

- Scientific databases, e.g. EbscoHost, GoogleScholar, ScienceDirect, LexisNexis and Research Gate
- Internet-based sources
- Relevant published articles
- Electronic academic journals
- Paperbacks and E-books
- Supplementary studies, essays and dissertations

1.6.4.2 Empirical study

In this section of the research, an indication of the study and the approach to be followed will conclude the quantitative study. Included is the usage of a survey questionnaire, as a measuring instrument to study the population and sample. An empirical study is conducted through a research data collection tool. The survey questionnaire consists of four sections, namely biographical information, access to technological tools, knowledge, the skills and resources of owners and managers of SMMEs, and their attitudes towards the usability of technological tools of SMMEs. It further elaborates on the method considered for data collection and statistical procedures. The researcher administered a questionnaire to owners and managers of SMMEs in the Gauteng and Limpopo provinces.

1.6.5 Study population

Welman *et al.* (2011:52) define the target population as the full set of elements (persons or items) with collective characteristics from which a representative sample is taken as a target of respondents. For the purpose of this study, the research population was black-owned SMEs in the Gauteng and Limpopo province of South Africa. The extent of the research to be conducted on the study was limited to owners and shareholders of SMEs and those officials holding managerial positions within SMEs that are based in the Gauteng and Limpopo provinces.

1.6.6 Sampling

The primary purpose of the research study was to identify, determine and examine the experiences, views and opinions of the targeted owners and management of SMMEs in South Africa.

According to Mashau (2016:1-13), purposive sampling is a non-likelihood investigation strategy whereby members are chosen in light of the individual judgment of the scholar, concerning how they can improve the significance of the research problem. The purposive sampling method was applied in this research for the purpose of the collection of data from the targeted population (SMMEs) in both the Gauteng and Limpopo provinces.

Sampling comprised of 300 individuals who were owners and management of SMMEs, and 164 completed the survey questionnaire.

1.6.7 Time Horizons

Serrador (2013:1) define the time horizon as the outline indicating the amount of time planned for the execution of a project from start to end. Furthermore, two kinds of time horizons are identified and described within the research onion: the cross-sectional and the longitudinal (Saunders, Lewis & Thornhill, 2009:106-135). The cross-sectional time horizon is a framework wherein the data to be analysed needs to be collected. It is mainly used in a case where the exploration is focused on a specific occurrence at a specified time frame. A longitudinal time horizon for data collection refers to the collection of data repetitively over an extended period and is used where an essential factor of the research is examining change over time (Barber, Kusunoki, Gatny & Schulz, 2016:105). This time horizon is more useful to study the change and development from the data that was initially collected.

The time horizon to be used for this study is the cross-sectional horizon.

1.6.8 Data collection

1.6.8.1 Primary data

According to Denscombe (2014:7-12), a well-designed survey is perceived to be a great tool that gives academics an excellent opportunity to interact and engage with a larger population in their effort to obtain data in a manner that is uncomplicated and affordable; it also provides an opportunity to receive anonymous feedback based on their individual experiences. The distribution of the questionnaire method is considered to be a more appropriate approach for gathering adequate data from the targeted population. Like many others, scholars support the general consensus that the survey tool is commonly linked with the deductive approach, which is well-known, and the usual approach in most studies within the business and the management fraternity (Muza, 2018:118).

The collection of data was through the distribution of questionnaires. The survey was distributed to senior managers as well as business owners of small and medium-sized entities in both the Gauteng and Limpopo provinces.
A review technique was accordingly utilised to deduce the relevant information through the distribution of questionnaires amongst the chosen small companies.

1.6.9 Statistical analysis

The selected sample results derived from the collected data was sent to the service providers who render the statistical consultation services at the North-West University in Potchefstroom, for coding and analysis with the program, *Statistical Package for Social Sciences* (SPSS). The descriptive statistic techniques that were used for the data analysis are:

- Demographics such as age group, educational level, number of employed permanent employees, industry, age of business, legal status and areas where data was collected.
- Mean, and the standard deviation were used to describe the basic features of the data in the study.
- In order to put the reliability of each chosen element to the test, Cronbach Alpha coefficients were utilised.

The relationships amongst the six (6) main technological challenges that SMMEs face shall be performed using correlation analysis. It should be noted that regression analysis is not necessary in this study, because neither of the factors have a causal effect on each other

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1.7 LIMITATIONS OF THE STUDY

Gaining information from a private institution is usually tricky because their information is perceived to be sensitive with warrants to be safeguarded. The other concern of small businesses to share sensitive information and ideas is due to the fear of competition, since their market is usually not that big.

Helm and Jones (2016:1825-1835) argue that the probability of passive responsiveness from the target populations due to concerns over privacy and confidentiality on the subject matter of this study and how such data would be kept private, controlled, managed, and circulated, is imminent. An agreement letter for non-disclosure of private information was designed and shared with the targeted population.

Since only businesses in the Gauteng and Limpopo provinces were considered for this study, the derived conclusion may not be representative enough, since businesses from different provinces may be experiencing challenges that are different. As a result, this study may omit some critical details that could have influenced the researcher to come to different conclusions and recommendations.

It could be very challenging to encourage and inspire prospective participants to contribute rigorously and vibrantly in furnishing the required information onto the supplied questionnaires (Morebodi, 2015:4).

The challenge remains for the respondents to understand the contents of the research data collection instrument tool, as intended by the researcher.

1.8 SIGNIFICANCE OF THE STUDY

Limited research is conducted in South Africa on technological challenges faced by SMMEs, particularly in the Gauteng and Limpopo provinces. The importance of this research study is to identify and examine the technological challenges that affect the business performance of SMEs in South Africa.

This research study is a valuable apparatus to those who run small and medium-sized enterprises. It supplies data from which to derive the researched results necessary for the decision-making process, with respect to fiscal and advancement frameworks for survival and technological improvement. The research study results plan to empower SMMEs to develop, especially in South Africa. Emanating from a local economic and advancement point of view, this examination gives a comprehension of what should be done to achieve more alluring conditions for business enterprise improvement and support through the adoption of technological systems in South Africa.

In view of this study, SMMEs in South Africa are being considered as an engine to drive the development of South Africa's economy, that would result in the realisation of improved economic growth, which will enable better employment opportunities, reduce poverty, improve people's living style, and a harmonious environment that would encourage individuals to start more small businesses (Tarute & Gatautis, 2014:1220).

This research study is a valuable instrument for business owners, organisation experts, future entrepreneurs or even scholars to enhance their knowledge base and find pathways to get some accommodating contemplations of thoughts and speculations created by the study. This might be useful to assist business owners to settle on instructed decisions at whatever point they are confronted with challenges posed by technology.

1.9 LAYOUT OF THE STUDY

The layout of the study is provided in Figure 1.3. The study is divided into five chapters which are summarised below.

Figure 1.3: The layout of the study

Source: Own compilation

Chapter 1 - In this chapter, the scope of the research study which comprises of the problem statement, is introduced to the reader. The reader is also informed of the research purposes, key research objectives, and additionally, the limitations of the study. Furthermore, this chapter provides the reader with an indication of the research problem and outlines the plan to attain the solution to the problem.

Chapter 2 – This Chapter studies the literature and future opportunities for SMEs in South Africa. The literature review further provides an indication of previous studies conducted on SMEs innovation and technology, the role of SMEs in South Africa, and technological challenges faced by these SMEs. The review of the literature also reflects on the prospects of future opportunities for SMEs, as a result of the successful adoption of technological developments. This approach is necessary for recognizing the existing theories and providing insight into the structure of the development of SMEs in South Africa.

Chapter 3 - In this chapter, the research methodology and data collection design approach, with particular reference to a quantitative approach, is discussed. The sample unit and size are

identified and the anticipated methodologies for data collection are explained. Moreover, the conclusion of this chapter includes the identification of a list of research questions.

Chapter 4 - This chapter includes the data analysis and interpretation of the results, and the data gathered through the survey questionnaires conducted is analysed and presented. Also included in this chapter is the description of how the data is administered into essential outcomes and translated into a format that the reader can understand.

Chapter 5 - In this chapter, conclusions and recommendations are outlined. Additionally, conclusions drawn regarding the enablement of those elements that restrict the intended solutions to the primary research question, the secondary research questions and the research hypothesis to be stretched on, are included. Furthermore, recommendations on the mitigation plan of the research problem are made and other opportunities for future study of the subject matter, identified.

CHAPTER 2
LITERATURE REVIEW

2.1 INTRODUCTION

Small, micro, and medium enterprises (SMMEs) are considered the critical organs of the state to enhance its efforts to tackle issues of unemployment, poverty alleviation initiatives, improvement of economic growth, reasonable sharing of the nation's wealth and the general improvement of economic growth (Fatoki, 2014:922). Regardless of the significant role that SMEs play in modern economies around the world, SMEs continue to experience challenges that hinder the adoption of emerging technology, even though the uprising of the Internet and information and technology communication channels transformed the dynamics of how day to day business activities are conducted (Dahnil, Marzuki, Langgat & Fabeil, 2014:119). In order to maintain economic growth sustainability, it is of paramount importance for developing economies to prioritise the SME sector and develop means to stimulate job creation aspirations, the progression of continuous technological innovation, improved productivity, development of genuine business acumen of owners/managers of the SMEs, and the formation of mergers and partnerships with larger organisations within the industry (Gbandi & Amissah, 2014:327).

A few variables which have an influence on SMME manageability have been distinguished by earlier research, and accordingly, SMME manageability has received consideration from both neighbourhood and national Governments (Siwangaza, 2013: iii). Accordingly, organisations are required to partake vibrantly in markets worldwide, utilising the most recent technology and continuously innovating and rejuvenating technology. Businesses have to position themselves in a manner that will help them gain an edge over their rival organisations in the global markets (Moghavvemi, Hakimian & Feissal, 2012:25). The study conducted by Abdullah, Shamsuddin, Wahab and Hamid (2012:15) identifies technology to be one of the tactical assets required by the owners/managers of the SMEs for maintaining the competitive edge over rival organisations, irrespective of the dimension. Furthermore, Abdullah *et al*. (2012:15) indicate that the difficulties faced by SMMEs as a result of globalisation and vital partnerships are some of the factors that influence the support for implementing technology amongst SMEs.

Failure to adopt and embrace technology has been identified as one of the significant contributors that prevent SMMEs to flourish (Ramayah, Swee Ling, Taghizadeh & Rahman, 2015:150). Iritie (2011:2) mentions that invention and technology continue to be the critical tools

that can increase the production rate and the overall business performance, provided that these tools are implemented effectively and at the right time.

Tulenheimo (2015:471) maintains that SMMEs experience challenges that propel some small businesses to collapse every time, when the adoption of emerging technology is not implemented appropriately and timeously. Iritie (2011:2) maintains that the organisation that aims to grow exponentially and gain a competitive advantage needs to invest more money in the improvement of technology. However, despite the level of skills and knowledge of technology by the personnel in emerging countries, the majority of organisations continue to struggle with the adoption of emerging technology (Janitaa & Chong, 2013:573).

Cascio and Montealegre (2016:349) draw attention to the fact that we live in times where technology drives the world. It is mainly information and communication (ICT) technology that is changing the traditional way of doing business and the methods of rendering business transactions, even the way businesses interact with their customers. Barley (2015:31) adds that even though emerging sophisticated technology, such as digital technology, has been growing at an alarming rate, to become the critical resources, there is limited research conducted on the assessment of technology and its impact on how people and businesses conduct their business activities.

Cascio and Montealegre (2016:349) highlight that there is an emerging technology called ubiquitous computing, which does not concentrate on a single technology, but replicates evidence of communicated information and the environment where computer devices are integrated with different resources such as individuals, information, computer equipment and the physical environment. Wooldridge (2015:29) reiterate that the outcome of these resources connected together, brings about a new dynamism in which the world becomes hyper-connected and information is shared amongst the multitude, through an Internet connection. Landers and Goldberg (2014:284) point out that emerging technology such as social media plays a massive role in transforming the manner in which businesses handle the transfer of information. Landers and Goldberg (2014:284) further elaborate that it must be noted that the use of the word social media does not signify a specified technology, but instead refers to one of the technology with the same attributes that are available for use by organisations.

To remain forceful in a worldwide economy, organisations need to conform to a routinely changing condition to address their customers' demands. Remaining competitive refers to

proceeding to progress as a business and making changes to both systems and innovation to improve a forceful advantage over rival organisations (Agostino & Delaney, 2015:3).

Malepe (2014:1) alleges that SMMEs in both developed and underdeveloped nations ought to continually invest vibrantly in the adoption of emerging technology in order for them to survive the holistic conditions in an industrialised economy. The overreliance of organisations on technology to conduct their day to day activities, the assessment of what types of challenges are brought on by technology, and the prospect of future opportunities for SMMEs, triggered the interest of the researcher to conduct this study (Cascio & Montealegre 2016:350).

This chapter comprises predominantly of examinations of secondary sources, for example, books, diary articles, unpublished propositions and theses, papers and web sources, for example sites. Additionally, this chapter provided a synopsis of the background of the SMMEs in the republic of South Africa, as well as globally. This chapter will also cover literature review on technology and its impact on the performance of small businesses in South Africa and around the globe. Finally, the literature review helped with gaining an intensive comprehension of the research problem that was being explored; it was a critical element in setting up an appropriate experimental research approach, and shaped the foundation on the establishment of the data collection instrument.

2.2 DEFINITION OF KEY CONCEPTS

Technology: Accordingly, as defined by Carroll (2017:1), technology can be either defined as anything that is at all times innately smart, a task understood solely by creative human beings, or a design invented or found that fills a specific need (Also see sub-heading 2.9).

Small and medium-enterprises: According to Malepe (2014:1), SMMEs are measured according to the number of employees, turnover and its statement of financial position, compared to big companies (Also see sub-heading 2.3).

Table 2.1 Key abbreviations used in this document

Abbreviation	Meaning
SMEs	Small Medium Enterprises
SMMEs	Small, Medium and Micro Enterprises
ICT	Information and Communication Technology

IT	Information Technology
PCs	Personal Computers

Source: Own compilation

2.3 DEFINING SMMES

To define what SMEs are all about can be challenging, as the term includes a wide array of definitions globally (Berisha & Pula, 2015:18). Ardjouman (2014:180) affirms that providing a comprehensive definition of small and medium enterprises (SMEs) is never an easy job to do. While defining SMEs, nations and organisations frequently utilise their own judgment, choosing the total estimated asset value of the organisation, number of hired individuals, and/or turnover created annually (Sitharam & Hoque, (2016:277).

In the Republic of South Africa, the National Small Business Act 102 of 1996 (South Africa, 1996) changed by Act 29 of 2004 (South Africa, 2004) classifies the types of small businesses into four 4 different categories, which comprise of the following: survivalist business enterprises; exceptionally small business entities; small business entities; and medium-sized business undertakings (Cant & Wiid, 2013:708). In South Africa, like most countries around the world, the term SME or SMME is usually used conversely; there is no underlying meaning for these terms (Bhorat, Asmal, Lilenstein & Van der Zee, 2018:6).

According to Bhorat *et al*. (2018:2) SMMEs have different categories which include those organisations formed by individuals who employ no one else and work by themselves; this class of SMME is known as “Own-account” enterprises; organisations with minimum 1 employee and maximum 4 (this is apart from the owner) are known as “Micro” enterprises; companies that employ a minimum of 5 and a maximum 9 workers are known as “Small” enterprises; companies with more than 10 employees but less than 50 workers are known as “Medium” enterprises; and lastly, companies with 50 employees or even more are known as “Large” enterprises. Therefore, the description of SMMEs covers the inclusion of “Own-account”, “Micro”, “Small” and “Medium” businesses, taking into account all organisations with employees not exceeding 49.

Bouazza *et al*. (2015:102) reveal that most studies conducted confirm that there is no standard definition for SMEs because different individuals, organisations and nations have defined it differently and in accordance to their stipulated requirements. Whereas Cant and Wiid (2013:708) define SMEs as a single business undertaking controlled and owned by a single

individual or more, including branches or entities, owned where the organisation has the majority control of the assets, including the majority voting rights in existing industries or subsectors of the nation's economy, stated in the manner that fits into the description of SMEs by meeting the minimum requirements as outlined and gazetted (Government Gazette of the Republic of South Africa, 2008).

Etuk *et al*. (2014:657) affirm what other researchers have stated, namely that the definitions of SME are different and depend on the country's specifications. In light of the job of SME in the nation's economy, procedures, policies and arrangements, prearranged by specific agencies or other foundations, more individuals should be enabled to create SMEs. Al-Alawi and Al-Ali (2015:2) hold the same view that SMEs residing in underdeveloped countries are defined differently from those in developed countries.

Table.2.2 The definition of micro, small and medium-sized enterprises (SMEs) as outlined by the European Commission.

Enterprise category	Number of employees	Annual turnover	Yearly book balance
Micro	10	≤€ 2 million	≤€ 2 Million
Small	50	≤€ 10 million	≤€ 10 Million
Medium-sized	250	≤€ 50 million	≤€ 43 Million

Source: Ardjouman (2014:180)

For the purpose of this study, the adopted definition of small and medium-sized enterprises (SMEs) will be from the South African context. Outlined in Table 2.3 below is the definition of SMMEs and their categories according to The National Small Business Act.

Table 2.3: Definition of SMMEs as outlined in the National Small Business Act.

Enterprise Size	Number of Employees	Annual Turnover (in South African Rand)	Gross Assets, Excluding Fixed Property
Micro	Minimum of 1 but limited to 5 (1 < 5)	Equal or less than R150 000	Limited to R100 000
Very Small	More than five but limited to 20, depending on the industry (1 ≤ 20)	Maximum number range between R200 000 and R500 000, depending on the industry	Over R100 000 but limited to R500 000, depending on the Industry

Small	Between 1 and limited to 50 (1 ≤ 50)	Up to R2 million but limited to R25 million, depending on the industry	Over R500 000 up to between R2 million and R4.5 million, depending on the industry
Medium	Fewer than 100 to 200, depending on the industry	Less than R4 million to R50 million, depending upon the industry	Less than R2 million to R18 million, depending on the industry

Source: Falkena, Abedian, von Blottnitz, Coovadia, Davel, Madungandaba, Masilela and Rees (2015:26)

2.4 BACKGROUND OF SMMES IN SOUTH AFRICA

In South Africa, like in all the economies around the world, SMMEs are known for their significant role of being the stimulus for worldwide economies, economic growth and enablers of job creation (Fatoki, 2014:151). In spite of the SMMEs' remarkable role in the global economy, SMMEs are generally recognised for facing constraints and acknowledging the obstacles in embracing emerging and sophisticated technology, despite the fact that the insurgency of the Internet and interaction channels has transformed the manner in which individuals do business these days (Dahnil *et al*., 2014:119). Olukayode, Osman, Hussein, Ismael, Masoud and Mansor (2014: 28-31) articulate further that the inadequacy to incorporate technological information and communication technology abilities, or even the implementation of strategies by small businesses that are based in rural areas, have been identified as some of many challenges faced by most SMEs. This also threatens their possibilities for growth.

With the South African economy in its current state of stagnation, the challenges are growing, and the Government needs to make rigorous decisions to address these challenges (Moos, 2014:43). Maye (2014:1) argues that the introduction of the ministry for Small Business Development by the South African Government shows the intention of the Government to grow the SME fraternity, although the department has not done much thus far. As a result, the Government needs to incentivise and speed up the pace of technological innovation and application. Small businesses in South Africa have a propensity to underperform. In light of the SMEs utilising technology which is not propelled, these outcomes that the SMEs are uncompetitive in connection to more prominent firms, are not suprizing (Jere, Jere & Aspeling, 2015:260).

The South African Government must interfere and also loosen up some of the statutory requirements for small businesses, with a view to encourage entrepreneurs to form more entities, so that these SMEs can survive and become more prominent entities capable of producing sustainable job opportunities for the citizens that are disheartened by the lack of proper job opportunities in the country (Mutyenyoka & Madzivhandila, 2014:65-72). According to UNICEF New York (cited by Lekhanya, 2014:1564), the Republic of South Africa has made some enormous strides and is currently taking the lead as an innovator on the African continent in societal interacting, by creating platforms where views are expressed and content formation are provided. However, it is not known whether the report includes black-owned SMEs that are based in rural areas of South Africa (Lekhanya, 2014:1564).

2.5 IMPORTANCE OF SMMES IN THE ECONOMY

As indicated by Wang (2016:167), there is abundant proof that economic activity moved from larger-scale firms to smaller firms, starting in the 1950s. To this day, the importance of the SMEs and their role in the economy cannot go unnoticed (Wang, 2016:167).

Globally, Small and Medium Enterprises (SMEs) have been distinguished as gainful contributors to the comprehensive development of economic growth (Cant & Wiid, 2013:707). SMEs are known and recognised worldwide as the pillars of contemporary markets, therefore playing a significant part, mostly in those nations known as developing economies (Ardjouman, 2014:180). Ngek (2014:253) elaborates on what other authors observed, in that SMEs are widely considered to be the critical part of the nation's economic sustenance. Therefore, SMEs are critical tools to accelerate the aspirations of emerging countries in terms of stimulating economic development. The same viewpoint is supported by Dhanah (2017:10), who states that in South Africa, like in most developing countries, SMMEs are gradually becoming the significant drivers to stimulate economic growth and creation of employment opportunities.

In South Africa, previous studies revealed that SMEs' makeup is 80% of newly created jobs in informal organisations, supplies employment to around 70% of the work force and contributes about 34% of the GDP (Van Scheers, 2016:349). Leboea (2017:49) states that the contribution of small and medium enterprises is extensive in the economic development of South Africa and also plays a significant role in advancing national and individual prosperity.

A view expressed by Kongolo (2010), and cited by Ngek (2014:253) asserts that SMEs contribute significantly to job creation and offer the majority of employment positions in an

economy, which eventually translates to a significant contribution towards the improvement of the national income. Consequently, Savrul (2015:123) confirms that small-sized business organisations assume an essential part of the economy, contributing to progressive entrepreneurial movements, by offering new job opportunities and empowering industry development. Williamson *et al*. (2013:11) argue that BRICS economies provide SMEs with opportunities to enhance their innovative skills through the utilisation of technology in participating in economic growth. Therefore, SMEs contribute significantly to skills development and knowledge on the best ways technology can be used.

Households' living standards are improved as a result of the existence of small businesses and the contribution of SMEs in providing stability for social cohesion. The economic development of the communities in which they operate is of considerable significance (Dahnil *et al*., 2014:119). The development of labour supply, inciting lower wages, agreeing with an extended dimension of the training intervention, considering variations in customer taste, slackening of the prerequisites, and the expanded prospects of persistent advancement as well as innovative cognisance, reaffirm that SMEs are the answer to strengthening the economy (Bouazza, 2015:109). The opportunities for new job creation and social progression contributes positively towards economic growth, hence it is valued highly. Small businesses are considered a critical constituent to a successful formula in achieving economic growth (Wang, 2016:167).

For SMMEs to work successfully and in a manner that surpasses the larger scaled companies, more workforces and fewer resources are required for starting up as opposed to larger scaled firms (Etuk *et al*., 2014:660). The author declare that the degree of the administrative structure of SMEs furnish proprietors with chances to actualise inventive administration procedures which empower them to adjust quickly to changes that are understood and driven by market requests, in a way that is quicker than the more prominent scale firms in various areas (Krause & Schutte, 2015:166). This affirms the notion that the role of SMEs is of paramount importance and at the centre of economic growth, in both developing as well as developed economies (Etuk *et al*., 2014:659).

SMEs provide excellent opportunities to create and nurture raw talent, due to their size and the nature of their transactions, which are less complicated compared to the nature of the transactions of their larger counterparts (Grater, Parry & Viviers, 2017:12). SMEs are the perfect environment where large potential can be unearthed, moulded and unleashed into greatness, due to their nature which is not too restrictive on innovation exploits (Jere, Jere & Aspeling, 2015:260). According to Bouazza (2015:102), numerous research studies conducted recently

gave an indication that SMEs have achieved a considerable success rate when it comes to inventions, compared to the larger scale firms. The statement made above confirms the importance of SMEs and the role that they play to stimulate economic growth.

However, SMEs around the globe remain plagued by difficulties that prevent small companies from growing, despite the significant importance of their contribution to economic growth (Maye, 2014:2). These conditions make it difficult for small-sized businesses to stay focussed in the decision-making processes that are critical to their sustainability aspirations (Moos, 2014:43).

2.6 TECHNOLOGICAL CHALLENGES FACED BY SMMES THAT AFFECT THEIR SUSTAINABILITY

Ramdani, Chevers and Williams (2013:739) reiterate that one of the influential and determining factors for the adoption of new technology by SMEs and technology utilisation remain the cost of technology implementation. Many researchers maintain their reasoning that small businesses with less financial capabilities will most likely delay the adoption of technology and may refrain from using new technology, especially if the implementation costs are perceived to be expensive (Fatoki, 2014:155).

Matlay and Weathead (2013:279) point out that the majority of small and medium-sized enterprises in most African countries encounter challenges in acquiring financial assistance from financial institutions to support their technological aspirations. So, basically, the contentious conclusion is that the implementation and utilisation of emerging technology may probably be regarded as unaffordable by those SMMEs that are failing to secure the required funding to execute the scope (Matlay & Weathead, 2013:279). Paul and Pascale (2013:1) reveal that the crafting of technology and innovation strategies is another big challenge most SMMEs encounter, which is due to a lack of technological skills and the necessary funding requirements.

Besides the external factors such as technological infrastructures which are very influential in the adoption of technology, the end-users and the staff have been identified to be the critical contributors, (originating internally) that have an impact on the decision to adopt or to refrain from technology adoption (Ghobakhloo *et al.*, 2012:39). Business conditions and global economy dynamics are likewise significant for incorporating such factors, as the outside determinant is additionally pertinent for a future study path (Dahnil *et al*., 2014:124).

2.7 ENVIRONMENTAL CHALLENGES DERAILING SMMES TO ADOPT TECHNOLOGY

Variables that impact the success of organisations originate from both inside and outside the business environment. Internal factors are factors that are generally controllable by the firm and include a shortage of the executives' experience, absence of useful abilities (e.g., arranging, sorting out, driving and controlling), poor staff preparation and advancement, and negative attitude towards clients (Ghobakhloo, Hong, Sabouri & Zulkifli, 2012:39).

According to Duan *et al*. (2012:291), factors originating from outside the business environment are factors that generally cannot be controlled internally and incorporate: the non-accessibility of a logistics value chain and unaffordable cost of the circulation of goods and services, rivalry, increased working capital, budget constraints and increased mistakes, The requirement for self-improvement by the proprietors of new SMEs should be honoured, particularly on the part of the business. The board's abilities need to be sharpened through training interventions (Abdul, 2018:5). According to Fatoki (2014:926), owners/managers of most small businesses need to consider accepting accountability to make sure that they acquire the necessary knowledge through training interventions and other available methods. Therefore, it is their responsibility to create a great atmosphere that is conducive for the enhancement of entrepreneurial abilities through training and designed development programmes (Abdul, 2018:5).

Giovanni and Mario (2013:48) state that the organisation's capacity and the business environment are vital influencers to technology adoption, and that it eases the processes and context to be followed. Muraya (2009:127) maintains the view that existing factors that originate from outside the organisation such as the service providers, customers, interference from Government officials and competition from rival companies remain the significant factors that impact the adoption of technology and its utilisation by the majority of small businesses. Ardjouman (2014:182) proposes that SMEs need to identify the existing environmental and organisational challenges of the business in order to ensure that the technology to be adopted is suitable for the type of business.

However, Leboea (2017:69) reveals that most SMEs in South Africa lack the necessary capabilities to manage the change that exists as a result of the dynamic environments in which the SMEs operate. This is believed to be one of the internal factors that threaten small businesses' sustainability and aspirations to reach new heights.

2.8 DEFINING BUSINESS ENVIRONMENTAL FACTORS

Business environmental forces refer to those influences existing in an environment where the business operates, such as persistent demands by clients/service providers, anxiety inserted by rivalry organisations and the sustenance from the external environment that has an impact on the decision to adopt technology (Alamro & Tarawneh, 2011:504). Sitharam and Hoque (2016:278) define the business environment as those elements originating from both the orginisation's internal and external environments, which directly influence the sustainability and overall business performance of the organisation. Agrerah *et al*. (2015:54) affirm that an environmental framework gives a detailed overview of the company set up and also outline how the organisation intends to run its business activities. Moreover, Agrerah *et al*. (2015:54) assert that the environmental factors include firms, competitors, the state, clients and service providers that exist in the community where the businesses operate.

Moghavvemi *et al*. (2012:28) indicate that consensus exists in most literature studies with regard to the foremost challenges behind the reluctance of SMEs in technology adoption.

2.8.1 Macroeconomic factors

According to Tulenheimo (2015:471), emerging technology cannot be adopted unless there is a general interest by customers that will lead to benefits flowing to the business. Consequently, Tulenheimo (2015:471) affirms that the criticality of some models that are built that will deteriorate as a result of customers who do not have a better understanding of how those facilities can be utilised. Accordingly, clients are unlikely to pay for items if they do not know the value it will add to their lives. Tarutėa and Gatautis (2013:3) concur with the conclusions from prior studies that identify the facilities, societal deficiencies, traditions, values, political, legislature and the statutory constraints that are the determinants that drive the decisions to adopt new technology.

2.8.2 Microeconomic factors

The research conducted by Rahayu and Day (2015:148) in Indonesia reveals that there are numerous elements that influence the implementation of technology, such as anticipated gains, the willingness to adopt technology, owners' innovation capabilities, owners' awareness of information technology and owners' knowledge of emerging technology. Additionally, Rahayu and Day (2015:148) point out that the outcome of their research indicates that the factors

mentioned above significantly influences the implementation of technology by Indonesian SMEs.

Tulenheimo (2015:471) highlight that the attitudes of owners and individuals occupying senior positions are vital for the adoption of emerging technology, since they are more likely to consider the implementation of technology when they are aware and fascinated by the proposed benefits from refined products as a result of new technology. Tarutėa and Gatautis (2013:3) also identify that owners'/managers' attributes, the organisation's attributes, the expected rate of return on the organisation's investments and the cost to implement the right technology play a huge role in terms of whether to adopt new technology or not. Moghavvemi *et al*. (2012:28) observe that the owners/managers of small businesses are reluctant to implement new technology that appears to be complicated, especially if they are still battling to understand the existing ones. Therefore, this reveals that the lack of resources or even a shortage of technical skills could cultivate challenges for SMEs whenever the need to formulate and implement technological improvement turnaround strategies internally, arises.

Gumel (2017:3) asserts that SMMEs are likely to encounter challenges that may derail the possibility of the realisation of success, due to a lack of the required skills and knowledge from owners and managers. The most significant predicament faced by owners of SMMEs is to attract individuals with the right type of qualifications, skills and verifiable experience as managers, and further empower them with the relevant individual development plan to equip these individuals to improve their critical thinking capabilities (Gumel, 2017:3).

2.9 DEFINING TECHNOLOGY

Even though the words innovation and technology are used interchangeably and as synonyms, technology alludes to a venture for an instrumental activity that decreases the vulnerability in cause-impact connections, while engaged in getting the ideal outcome for the owners/managers (Godin, 2015:18). Technology is about the integration of people's thoughts on particular things (Anderson, 2011:1).

Carroll (2017:1) argues that technology has been defined differently by many researchers with the view to improve the understanding of what technology entails. However, Skrbina (2015:223), observes that technology, - as defined before the educational method, led by Greek philosophers such as Socrates - involves discoveries of an unusual norm that ignite the willpower to create something.

The terminology of technology has been defined differently by many researchers (Wahab, Rose & Osman, 2012:62). Nonetheless, the usage of the term technology and the embodiments of its importance in describing numerous conceptions, only became famous a century and a half ago (Carroll, 2017:1). Moreover, the resilience of the foundation laid by these previous pieces of literature made it possible to describe technology in a manner that makes it easy to understand. However, Brey (2009:268), points out that people have the ability to distinguish between man-made things and those that transpire as expected, even though it remains challenging to come up with a precise definition for technology.

According to Mackenzie and Wajcman (cited by Wahab *et al*., 2012:62), technology can be defined as the collaboration of humans or objects, the manner in which objects are made and the significance linked with the physical objects. According to Pfeiffer (cited by Lusch and Nambisan, 2015:170), technology is the utilisation of science which is viewed as helpful by elevating advantages to the general. It has three aspects, which are, goods or services, human activities that create goods or services, and capabilities to enable technical activities (Lusch & Nambisan, 2015:170).

Cascio and Montealegre (2016:351) define technology as the act of gathering procedures, ways and means, or approach the employed to produce goods and services, or to achieve set goals, such as regular reports or research studies. Moreover, technology can be the understanding of sophisticated systems, procedures, etc. or also entrenched in types of machinery, computer equipment and manufacturing mechanisms, which require humans to drive and control the mechanisms of such tools, with limited understanding (Cascio & Montealegre, 2016:351).

As suggested by Carroll (2017:1), technology can be defined as either anything that is at all times innately smart, like a task understood solely by intelligent human beings, or a design invented or found that fills a specific need. Anderson & Anderson (2011:1) define technology as those thoughts about formed or man-made things.

2.10 TYPES OF TECHNOLOGY

Cascio and Montealegre (2016:350) point out the technology that is changing the fundamentals of how business transactions are undertaken globally and the factors that influences it as: cloud computing, gigantic data and knowledge-based instruments, sensing devices, artificial intelligence machinery, innovative automation, drones, and environmental sustainability-driven

technology. Furthermore, the key factors of these technology' enable individuals as well as firms to improve the way they do business and use less time than before (Cascio & Montealegre, 2016:350). However, Murray (2015:6) argues that innovative technology does not always benefit organisations but can also jeopardise firms' growth and sometimes even push organisations to resist change brought on by new technology. Furthermore, Murray (2015:6) states that the perception of owners and managers of SMMEs is that they will assess the benefits of adoption of sophisticated technology and evaluate how it can improve the overall business performance, or otherwise suffer the consequences of disruption from the rival companies who took advantage of the technology at the earliest stages.

According to Cascio and Montealegre (2016:350), emerging technology that is disruptive are influenced by the nature of the ever-changing technological development that affects the manner in which work and business are conducted over time and in the future. Duan *et al*. (2012:291) pointed out that for the purpose of this study, the term technology will describe the technology that is aligned with firms that have specific aspirations of achieving specified goals. Leavitt and Whisler (cited by Chumba, 2016:4) state that emerging technology should be referred to as information technology, due to the lack of a common name for a cluster of new technology. Chumba (2016:8) points out that the classification of information and communication technology includes the hardware and software, business system applications such as the SAP payroll system, ERP systems, e-learning, e-payment systems, and e-commerce.

2.11 SMMEs' AWARENESS OF EXISTING BUSINESS TECHNOLOGICAL PLATFORMS

A view expressed by Aryeetey, Baah-Nuakoh, Duggleby, Hettige, and Steel, 1994, cited by Leboea (2017:54), suggests that SMMEs in South Africa, like in most developing countries worldwide, encounter enormous difficulties when it comes to the accessibility of suitable technology, data collection techniques, and existing processes.

Boyabatl, Leng and Toktay (2016:3) argue that a deficiency of technology consciousness and its cost are considered to be at the centre of decision-making initiatives, to either adopt or utilise technology, to the majority of small businesses. There are various elements contained in the deficiency of technology awareness, for instance failure to comprehend the benefits of technology adoption, shortage of support structures, and infrequent effects of new technology (Rahayu & Day, 2015:142).

2.12 SMMEs' READINESS TO ADOPT EXISTING TECHNOLOGY

According to Ndayi Zigamiye (2014:246), the perspective of an organisation is perceived as one of the factors that have the potential to influence SMMEs' decision to adopt technology. From the study conducted by Puklavec, Oliveira and Popovič (2013:198), it is clear that technology readiness is one of the authoritative settings proposed as a determinant factor that impacts SMEs' to embrace web-based business. Technology readiness alludes to what degree the innovation framework, pertinent frameworks and specialized aptitudes in business can bolster Internet business appropriation (Rahayu & Day, 2015:145). Technology readiness comprises of both innovation framework and IT personnel, thus both are required if the organisation needs to make e-business a fundamental part of the value chain (Abdollahzadegan, Che Hussin, Gohary & Amini, 2013:72). Therefore, organisations are likely to adopt new technology when their technology readiness is at its most advanced stage, and *vice versa* (Rahayu & Day, 2015:145). Additionally, the size of an organisation is considered to be another element that influences the determination to either implement new technology or delay (Gumel, 2017:4). This is on the grounds that firm size is relative to the capacity of the business to invest specific assets, such as finance and personnel management (Gumel, 2017:4). More prominent organisations enjoy the advantage of having capabilities and more resources, which will most likely work in their favour whenever the need to improve and implement new technology arises (Ghobakhloo *et al*., 2012:37). Developing economies would most likely find these costs to be not within their reach, and may decide against adopting new technology (Elbeltagi, Al Sharji, Hardaker & Elsetouhi, 2013:25). Therefore, the remedy to address the affordability issue is to implement less expensive technology solutions.

2.13 FACTORS INFLUENCING TECHNOLOGY ADOPTION BY SMMEs

Staniewski (2016:5152) mentions that the experience of owners and managers is envisaged as the most influential contributor behind the success rate of SMMEs. Therefore, the level of knowledge of technology is critical for expediting the adoption of technology by SMMEs. Rahayu and Day (2015:145) reaffirm that superior knowledge of technology - such as e-commerce - by the owners and managers of SMMEs, increases the likelihood of organisations to consider the allocation of resources such as a budget for technology developments, and funding of management initiatives aimed at adopting emerging technology. Therefore, SMMEs require great and transformational leadership qualities as necessary critical factors, in order to improve their sustainability and to fast-track the implementation of technology.

Kurnia, Houdrie, Mahbubur and Alzagooul (2015:4) affirm that the environment in which business organisations exist somehow has an effect on the SMMEs' readiness to adopt emerging technology. Additionally, Kurnia *et al*. (2015:5) indicate that there are two types of environmental factors, namely the internal and external factors that influence the adoption of emerging technology. The external factors that may exert pressure and force adoption of technology include the pressure that comes from both clients and service providers, and even rival organisations competing for the same market share, (Kurnia *et al*., 2015:18). Pentina, Koh and Le (2012:66) point out that SMEs may be forced to adopt certain technology such as social media, due to the demands made by customers and other relevant stakeholders, who would expect to interact with organisations through particular technological platforms.

Rahayu and Day (2015:145) also indicate that clients and service providers possess power that may compel SMMEs to adopt certain types of technology in order to retain and improve a competitive advantage, or even to maintain existing trade partnerships. Carroll (2017:1) maintains that small businesses recognise technology as an enabler for surviving competition from rival organisations. SMEs will, at times, be compelled to implement and embrace certain technology, when rival organisations begin to utilise technology that give them a competitive edge (El-Gohary, 2012:1). Thus, firms could be forced into a corner in terms of the adoption of technology, so that even when they do not foresee any benefits, just accept it in order to retain their competitive edge.

Hansen and Penasa (2014:2) point out a strategy once employed by Wal-Mart, when the company compelled all its service providers to utilise the RFID chip tracking technology, which is wireless and support WIFI Bluetooth technology. Duan, Deng and Corbitt (2012:302) attribute the perception that the likelihood of SMMEs to adopt particular emerging technological developments is very high, particularly when their counterparts are exerting enormous pressure. Duan *et al*. (2012:302) accentuate that the main reason for SMMEs to adopt technology is to sustain their competitive edge over rival small businesses.

As widely known, owners and managers of small businesses are the ones that exercise the controlling powers when it comes to decision-making; hence managers and owners play critical roles in deciding whether or not to adopt emerging technology (Nguyen & Waring, 2013:824).

According to Shah, Nazir, Zaman and Shabir (2013), financial institutions are reluctant to grant financial assistance to SMMEs with less financial muscle, therefore most small businesses find it challenging to get their loan requests approved due to the unaffordable interest rates offered,

sureties, and mortgage guarantees. Bouazza, Ardjouman and Abada (2015:104) add that credit regulations and required guarantees demotivate organisations from trying to access sufficient funds from financial institutions, to fund their initiatives to adopt emerging technology. Therefore, the SMMEs' financial limitations may restrain them from taking advantage of the benefits that come with the implementation of technology in the organisation. Bouazza *et al*. (2015:104) further indicate that organisations would probably be quick to adopt and implement specific technology, particularly when it is perceived to be less expensive.

It suggests that the manager who has technology cognisance fancies looking for an answer that has never been attempted and is therefore more hazardous (Rahayu & Day, 2015:145). Consequently, the more inventive the SMEs' proprietors are the higher the probability of their intention to adopt new technology (Ghobakhloo & Tang, 2013:754). In addition to this, proprietors' IT capability and experience are likewise distinguished as determinant components of the implementation of new technology by small and medium-sized enterprises in emerging nations (Gumel, 2017:4). Thus, the lack of information technology skills could derail the timing of technology adoption by SMEs and cause unnecessary problems (Ghobakhloo *et al*., 2012:52). In the event that the SME proprietor has a more prominent capability and more informed knowledge of IT, they will be particular about embracing IT, and it will lessen the vulnerability and hazard in that innovation adoption (Rahayu & Day, 2015:145). More importantly, it accepts that if the manager/proprietor grasps the capability and focal points of emerging technology adoption, they might be increasingly satisfied to embrace such innovation (Elbeltagi *et al*., 2013:30).

Fatoki (2014:925) points out that failure to conduct the proper investment analysis and a lack of budget provision to fund operational activities, have been discovered to be other factors that have a bearing on the success of SMMEs. Therefore, these factors will probably have a bearing on the implementation of technology by most SMMEs. Dahnil *et al*. 2014:119 assert that contrasted with a more significant partnership, most SMEs see the boundaries of implementing information technology into their business activities as a costly activity, associated with threats, sophisticated methodology, specialised ostracising, and increased customer administration. Giovanni and Mario (2013:37) further indicate that a lack of sufficient funds might have a direct negative impact on technological influences such as training intervention, development, repair costs, data frameworks, and software applications.

As indicated by Mingaine (2013:17), outside forces like other rival companies are one of the noteworthy indicators that have a robust effect on SMEs when it comes to the decision-making

about new technology adoption and the utilisation thereof. The researchers contend that in the absence of these outside forces, numerous SME proprietors may see the implementation and utilisation of emerging technology as a misuse of the company's assets (Mingaine, 2013:18).

According to Duan *et al*. (2012:301) the size of SMMEs are continually recognised as an essential contributing factor to embracing and implementing technology in most literature studies. In addition, more prominent firms are more likely to embrace emerging technology as opposed to smaller sized ones, because of their stronger financial position and the specialized ability they possess to be able to go out on an extremity with emerging innovation.

2.14 IMPACT OF TECHNOLOGICAL CHALLENGES ON SMMEs' BUSINESS PERFORMANCE

Leboea (2017:69) points out that most SMEs in South Africa lack leaders who possess the capabilities to manage change. Furthermore, Leboea (2017:69) proceeds to mention that the capacity to manage change is of paramount importance and is also crucial for attaining success by SMEs. Agostino and Delaney (2015:9) insist that unexpected changes brought about by technology may have a significant influence on the political affairs of small businesses. Technology has a significant role to play in the progression of organisations. According to Leboea (2017:69), the existence of technology in small businesses will empower organisations to take advantage of existing opportunities such as the improvement of turnovers, since technology is understood to provide significant empowerment to organisations in that regard.

Information technology positively affects a company's overall performance in the territory of productivity, concerning part of the overall industry and incentives such as the reduction in operating expenses, accelerated speed of transportation by providers, better coordination of companies inside the value chain, a closer and more customised relationship among personnel and exchanging accomplices, better correspondence with clients, a more significant piece of the pie and innovative business prospects, access to learning and market data, and an apparatus to encourage new operating methods for the executives and shareholders of the company (Moghavvemi *et al*., 2012:27).

Ardjouman (2014:180) states that businesses require better utilisation of information and communication technology for survival, especially now that it is the digitalisation era. Furthermore, Ardjouman (2014:180) affirms that the probability of small businesses to grow

faster becomes certain when technology is embraced and adopted accordingly in the running of day to day business activities by SMEs.

2.15 AVAILABILITY AND ACCESSIBILITY OF TECHNOLOGY TO SMMEs

According to Sun and Wang (cited by Lekhanya, 2014:2718), a small business that is located in remote or rural areas continues to experience additional difficulties that include the inability to gain access to broadband Internet and a shortage of trained and knowledgeable personnel and facilities built for the use of emerging technology. They, in any case, ought to at first focus on setting up websites so as to empower worldwide access to the organisation's data (Ramayah *et al*., 2015:150). According to Hinson, van Zyl and Agbleze (2014:59), websites supply an organised communication channel through which companies are able to interact with all related stakeholders as well as media houses. Websites furnish the world at large with a pathway by which companies can be found and better comprehended. In addition, Hinson *et al*. (2014:59) assert that a website is viewed as a critical resource that enables communication between the organisation and its related stakeholders, through which the organisation will be able to serve the customised needs of the customers and meet the customers' expectations.

Moreover, having online proximity is necessary for a business to boost their income greatly by means of online exercises that incorporate the utilisation of websites (Ramayah *et al*., 2015:150). As referenced by researchers, SMEs can enhance their businesses by using the Internet and online exercises, to at the end of the day understand the extent of the effect that the Internet has on their development techniques (Ramayah *et al*., 2015:150). Limited access to emerging technology and low administrative aptitudes which might be because of a shortage of required assets such as a sufficient budget to acquire pertinent innovation and contract experienced staff - can be remedied if SMEs are appropriately subsidized (Gbandi & Amissah, 2014:328).

2.16 PERCEPTIONS OF SMME STAFF, MANAGERS AND OWNERS OF THE ADOPTION OF TECHNOLOGY

Talukder, Quazi and Djatikusumo (2013:1689) define attitude as an individual's sentiments on whether the actual conduct and usefulness of technology have a positive or adverse bearing. According to Sandra, Eadaoin and Bella (2012:1) self-efficacy of SMME owners/managers will definitely have an impact on and boost the confidence of these managers to adopt new technology. Individuals who are extrinsically and inherently motivated and feel highly confident

about their skills to explore new technology, or to figure out how to utilise newly installed technology, are probably going to encounter less uneasiness when that new innovation is presented (Hausberg, Hülsdau, Moysidou & Teuteberg, 2017:1401).

Mohammed, Almsafir and Alnaser (2013:408) point out that the other determining factor is the anticipated economic benefits of the newly installed technology. In addition, the second consideration from owners/managers of most SMMEs is the fulfilment of the pre-projected economic benefits that the newly installed technology will provide to the organisation or even to these leaders personally (Mohammed *et al*., 2013:408). Therefore, the more the company owners or managers become convinced of the economic benefits for the business, the higher the likelihood of adopting such new technology (Ghobakhloo & Tang, 2013:759).

In the event that the newly installed technology empowers individuals at work, it should encourage self-inspiration and prosperity, improve critical components of self-assurance hypotheses, improve profitability, advance employment fulfilment, initiate authoritative responsibility, and create citizenship practices among employees (Eskelinen *et al*., 2017:16-17). Moreover, Eskelinen *et al*. (2017:17) add that sentiments of persecution happen when newly installed technology prompts an absence of independence, proficiency, and relatedness. Eventually, these will result in causing unnecessary anxiety, deter staff morale, and encourage rebellious conduct which may lead to the reduction of production (Elias, Smith & Barney, 2012:455).

In order for the SMME owners/managers to avoid such stressful conditions a training and development plan for their personnel should be offered and encouraged (Bhorat *et al*., 2018:11). Furthermore, SME owners/managers need to consider investing in the establishment of research and development initiatives, development of staff through continuous training interventions and other relevant inducements (Talukder *et al*., 2013:1692). The argument for the importance of technological capabilities is supported by Bouazza *et al.* (2015:108), who maintain that technological abilities remain one of the biggest problems experienced by most small businesses in Africa. It is necessary that the owners and managers of these SMMEs receive training during the adoption of technology in order to improve their skills and knowledge. This argument is supported by Duan *et al*. (2012:301), as he maintains that the critical resources required by SMMEs to sustain competitiveness over larger organisations are technological abilities.

Ghobakhloo *et al*. (2012:36) identify three significant hindrances that may influence the timing of the implementing and utilising of technology by small and medium-sized organisations. These identified hindrances include factors such as elements that are caused by external factors, a firm willingness to embrace technology, and the anticipated returns of new technology (Ardjouman, 2014:182). Additionally, the authors contend that the anticipated returns of technology adoption by SMEs remain a significant consideration in the decision making process, of whether the technology will be adopted and used continually.

The outcome of a research study conducted in West African countries by Ghimire and Abo (2013:35), reveal that other researchers state that the decision of most small and medium-sized businesses still depend much on their owners/managers when it comes to the decision to adopt and utilise emerging technology. However, the most significant challenges that most small and medium-sized enterprises' owners/top management experience, are a lack of the necessary technical knowledge of the technology and the fact that they are not up-to-date with emerging information technology (Ghimire & Abo, 2013:35). The budget allocation for investment in technology may therefore be compromised, since these owners/managers lack insight of the future benefits of adopting new technology and may decide against allocating more funds towards web-based business dealings (Boyabatl *et al*., 2014:1). Furthermore, Ramayah *et al*. (2015:153) assume that leadership with advanced knowledge of information technology, are likely to see it appropriate to apportion sufficient funds towards investing in technology development and innovation.

According to Thong and Yap (2011:429), the likelihood of most SMME owners/managers considering the implementation and usage of emerging and sophisticated technology, depends on their level of knowledge of such technology. Therefore, SMMEs are unlikely to adopt and use technology that they barely know. In the research conducted by Mingaine (2013:17), it was discovered that most employees with limited knowledge of technology are unlikely to see the need to implement and utilise emerging technology.

Due to the vulnerability of African SMEs, the owners/managers of these SMEs need to maintain their positive mental attitudes and improve their knowledge about the significance of online business transactions, as the SMEs counter with strategies to mitigate the challenges caused by the lack of resources (Ramayah *et al*., 2015:153).

2.17 BENEFITS OF ADOPTING AND UTILISING TECHNOLOGICAL PLATFORMS

A complete survey of the research done on governance and technology, reasons that academics have in general indulged in technology, either as a logical perspective significant to the authorisation procedure or as instruments that pioneers and supporters can use to speak with one another (Potosky & Lomax 2014:118). Likewise, a previous survey communicated the disillusionment with the degree to which initiative analysts have consolidated innovation into the investigation of administration (Gardner *et al*. 2010:1). All the more as of late, Barley (2015:33) sees that a mind-boggling, flexible, changing, and consistently extending arrangement of Internet instruments, data, and media are adjusting how we act in circumstances where we already would have acted in an unexpected way.

Enakrire and Ocholla (2017:2) argue that before the diffusion of the Internet, for instance, it was challenging to promptly impart information, or to acquire immense quantities of data without visiting a library or a store. Chumba (2016:21) avers that with the diffusion of the Internet, SMEs can interact with their customers and service providers without having to meet physically. According to Talukder and Yeow (cited by Talukder *et al*., 2013:1686), the Internet is a tool that assists firms to exchange information, enhance skills transfer, and improve understanding in a manner that is more efficient and productive. In addition, individuals can access data which was not easily found in the past, without much difficulty (Chumba, 2016:21).

Bouazza *et al*. (2015:109) affirm that when technological capacities improve, small businesses can increase their production capabilities and profitability significantly. Furthermore, Bouazza *et al*. (2015:109) suggest numerous methods that can improve SMEs' profitability, provided that these are employed effectively, for instance research and development spending, and technology and skill concurrences with local businesses and organisations from across the country's borders. Agostino and Delaney (2015:3) reiterate that the introduction of technology has enormous benefits for SMEs, which include improved productivity, better quality, help with offering items for sale to the public faster and increase the range of abilities of workers. Enhanced communication and affordable prices and can assist SMEs to initiate the development of new inventions through the implementation of technology (Eskelinen, Rajahonka, Villman & Santti, 2017:16). Hence the implementation of technology such as information and communication technology (ICT), is perceived as a significant condition for empowering SMEs. Companies should consider ICT as a significant part of their businesses, to be utilised to exploit worldwide markets (Tarutėa & Gatautis, 2013:2).

Agostino and Delaney (2015:4) predict that most SMMEs that are considering investing in technology such as telecommuting, that will improve their engagement and participation with staff based at different branches. Mohammed e*t al*. (2013:407) maintain that the successful implementation of technology provides prospects of igniting the desire of the employees to participate and work together as a team amongst themselves on collaborative projects that require inclusive participation through information sharing applications, on in-house intranets and the Internet. Chumba (2016:22) reiterates that technology has broken down the boundaries caused by teams of the company working in isolated areas, since with technology such as teleconferences and video conferencing, individuals no longer have to travel long distances to attend meetings. The owners/managers of companies are nowadays able to receive feedback or input from all their teams all over in the shortest time possible. Therefore, the management, together with the whole staff have an opportunity to work with flexibility at their convenience, but are are still able to work jointly and communicate with each other, all at once.

According to Agostino and Delaney (2015:4), emerging technology possess the capability to assist organisations in keeping in touch with market dealings, particularly shifts in customers' needs, to ensure that they react very fast whenever it is necessary to do so. Alawi and Al-Ali (2015:2) concur with the view that the implementation of technological platforms assists organisations to interact with potential clients, existing clients and service providers through the use of facilities such as the Internet instantly, offering an overview of products and services to be sold, provide their clients with post-sales support services, and gather market information about their customers' preferences as well as their buying patterns while advertising their products and services. In the same perspective, Groves, Kayyali, Knott and Van Kuiken (2013:2), point out that, with the help of technology, some grocery outlets scrutinise the data loaded on customer loyalty cards in order for them to establish the frequency of purchases made by specific clients, enhance their interest in related products, and offer them customised products. Therefore, besides profit maximisation, the organisation stands to improve customer fulfilment through the implementation of technology.

Furthermore, Chumba (2016:4) maintains that keeping abreast of emerging technology gives an organisation the edge to always stay ahead of its counterparts and in an excellent position to take advantage of the opportunities and gaps that are yet to be tapped into by other rival companies. Therefore, the inability of an organisation to remain relevant to customer expectations and market place changes may lead to an organisation surrendering their competitive edge to other rival companies (Duan *et al*., 2012:301).

Affeldt (2013:1) cites Venkatraman and Henderson (2004), stating that information technology is the crucial mechanism that should enable SMMEs to move with the market patterns and maintain their current standpoint compared to their rival companies, understand their customers' demands and preferences, observe their interactions with service providers, and take charge of their set strategic goals. The correct utilisation of emerging technology can assist SMEs to improve their reactiveness and flexibility in dealing with the changes and challenges that exist in the targeted markets (Affeldt, 2013:1).

Nübler (2016:9) points out that the benefits that digital information technology bring to organisations are the increased capacity to enable massive data files to be transferred at a very affordable rate, and access to worldwide markets provided by Internet platforms where customers' needs can be met through the supply of appropriate goods and services.

Furthermore, organisations progressively use emerging technology such as cloud computing to contract out IT activities to specific suppliers of IT services, which enable firms to concentrate on their core business activities (Abdollahzadegan *et al*., 2013:71). Fortunately, this provides SMMEs with an opportunity to decrease costs, contend, create employment opportunities, and reduce obstructions in this section, for potential business people who have specialised mastery in a specific space (Rambe & Mpiti, 2017:105).

The overflow of advanced innovations into administration divisions, improvement of calculations, learning programming, and the worldwide dissemination of computerised ICT frameworks in rising and developing nations, are required in order to upgrade the pertinence of the administration in worldwide exchange and worldwide supply chains (Nübler, 2016:9).

Alamro and Tarawneh (2011:504) observe the view that the other benefits of utilising technological platforms by SMMEs include a decrease in management workload, enhancement in how communication is handled, and improvement in the accessibility of critical information and goods to be used. Pentina *et al*. (2012:75) point out that the benefits of the correct implementation of technology include the following: improved brand cognisance, accessible platforms to spread messages to potential customers faster and cheaper, and the opportunity to obtain and review the feedback from customers on the goods and services that they received.

According to Alamro and Tarawneh (2011:504), e-commerce benefits are, diminished cost, loosening of regulatory weight, improved effectiveness, better correspondence, quick access to data, successful promotion of goods and services, an increased number of clients, improved

interaction with clients, opening of new branches and workplaces, improvement of the organisations' reputations, better presence and commitment to international markets.

Mbatha (2013:12) affirms that one of the advantages of using emerging technology such as Internet business selection is that an SME can conquer geographical confinements. For instance, a physical store is restricted by the topographical territory that it can support. In addition, Mbatha (2013:12) opines that clients can get easy access to business offerings and its value propositions published on the organisation's website instantaneously, a boundless number of times, whenever the need arises – day or night.

2.18 BARRIERS HINDERING EARLY TECHNOLOGY ADOPTION BY SMMEs

Elbeltagi *et al*. (2013:25) point out that change is referred to as the likelihood of an incidence, which is unavoidable in the existing setup and characterised by global influences. This emerges from the forces that exist within the business environment, such as trade-in, and is a requirement for organisations with aspirations to prosper (Ramdani *et al*., 2013:739). In order for an organisation to stay focused and maintain its competitive status, it is fundamental for them to have the option to redesign their instruments and methods and have these progressions acknowledged by their staff (Kurnia *et al*., 2015:18).

Factors that continue to result that most SMMEs are sluggish and behind in terms of the adoption and use of information technology, as compared to their counterparts from developed countries, have been singled out. These include factors such as a lack of required resources (capacity and funding constraints), a shortage of the required skills and knowledge of the benefits of successfully adopting technology, and how to put it to good use (Moghavvemi *et al*., 2012:28).

Sakai (2012:2) discovers that most small businesses are of the view that having a technology support desk and knowledge of basic computer literacy are the critical factors that lead to the view that technology is a necessity and has an impact on the implementation and utilisation of said technology. Over and above that, the following have been identified as additional factors that impact the decision to implement technology by most SMEs, which is the operational structure, manpower headcounts, and the culture in which business activities are conducted within the organisation (Ramayah *et al*. 2015:150). In addition to that, Alamro and Tarawneh (2011:504) affirm that other barriers hindering the successful implementation of technology and its use, include the following: a lack of the required knowledge of information by the staff; failure

to comprehend emerging technology; a shortage of technological cognisance; little or no creativeness; no willpower from the owners/managers; failure to manage time; the absence of clients' readiness; a shortage of financial support and trust from financial institutions; increased fake and fraudulent emails; and losses incurred by street vendors as a result of untrustworthy suppliers.

2.19 FACTORS INDUCING SMEs' RESISTANCE TO TECHNOLOGY ADOPTION

Tulenheimo (2015:473) reiterates that policies regarding statutory compliance and rights play an essential part in terms of the timing to implement emerging and sophisticated technology. Cascio and Montealegre (2016:356) assert that the state of mind of the employees might develop a fear of the unknown or become oppressed, particularly when the implementation of technology result in a deficiency of self-sufficiency, skills, and understanding. Consequently, unnecessary stress develops, personnel become demotivated, and non-productive behaviours may creep in to hinder technology adoption unless the personnel are adequately trained.

According to Aeppel (2015:1), workers with the perception that they may be deemed redundant, are always reluctant to embrace the implementation of new technology due to their fear of job losses. Furthermore, Aeppel (2015:1) asserts that the overall number of job losses has definitely not decreased over time as a result of new technology. Agostino and Delaney (2015:9) indicate that the introduction of emerging technology may threaten employees' job security, especially those individuals who are comfortable with the current culture, operations, and production systems. Due to the implementation of emerging technological platforms, changes may emerge regarding the segregation of duties, and workload allocation. It may also trigger the need to develop the current staff through training intervention and to hire additional staff (Agostino & Delaney, 2015:9). Consequently, previous studies reveal that employees with career ambitions will most likely embrace new technology and will be motivated to learn about technology willingly. They will attain fulfilment, and therefore they will consider new responsibilities as a means of job enrichment, whilst other staff may not be willing to accommodate and embrace technological challenges (Hausberg et al., 2017:1400).

Agrerah *et al*. (2015:53) affirm that most SMMEs in emerging economies find the cost of implementing new technology devastating and in most instances out of their reach. In order to address this challenge, solutions that are more affordable must be employed (Tulenheimo, 2015:473). Agostino and Delaney (2015:3) state that some challenges are likely to creep into an

emerging technology that is introduced by an organisation without the proper training and supervision of staff.

Leboea (2017:54) discovers that the barriers preventing SMEs to improve the utilisation of technological platforms are not only budget constraints, but also the limited level of knowledge about the importance of adopting the technology by owners and managers of SMEs. Leboea (2017:54) points out that owners and managers of most SMEs lack the appropriate knowhow of emerging technology and the capacity to select the technology that is most suitable and fit for purpose of their production of goods and services.

Leboea (2017:54) indicates that the effectiveness of innovation is dependent on the activeness of research and development, in particular concerning SMEs in the industrialised sector. Leboea (2017:54) further points out, that SMEs that do not embark on vigorous research and development are at high risk to become obsolete or fall behind their rivals in terms of innovation and technology.

The information technology innovation studies conducted in the past conclude that the resolution to adopt new technology is driven by technological forces, such as the difficulty in deployment, suitability, anticipated benefits, secrecy, the safety of information concerns, and the development of technology (Ahmadi-Javida, Jalali & Klasen, 2017:3).

2.20 THE COMPLEXITY OF TECHNOLOGICAL PLATFORM IMPLEMENTATION BY SMME's IN SOUTH AFRICA

A definition articulated by Rogers, 2003:257 (cited by Ramdani *et al*., 2013:738) defines complexity as the aggregate value through which development is generally seen as hard to comprehend and utilise. Furthermore, Ramdani *et al*. (2013:738) claim that complication of sophisticated technology is that it makes organisations more acceptable for fruitful execution and thus escalate the risks related to implementing their choice. Management must ensure that the technology is current and can be used with ease. Simplicity in bringing together the human element and technology is critical (Hancock 2014:149), and its effectiveness is measurable in terms of the amount of time spent on completing an activity, efficacy (number of errors obtained), and the gratification of the end-user (Gillan & Bias 2014:182). The first thing to be considered when employing technology is whether it is currently in use, attention has to be drawn to the capacity of the instrument or the equipment that must produce the anticipated results, and to meet the prospective requirements (Tulenheimo, 2015:472).

Pentina *et al.* (2012:66) claim that the model used to examine the level of acceptance of new technology by owners, managers and employees, states that the decision to implement emerging technology are driven by the discernments of its simplicity to utilise, as well as the benefits thereof.

The empirical evidence from numerous studies affirms that innovative business strategies have been transformed entirely through the use of Internet technology, which also paves the way towards an electronic economy (Lecic-Cvetkovic *et al*., 2015:1). Along these lines, the direction of the business toward the worldwide market infers a mix of information and communication technology (ICTs), with web innovations supplying an information stream without spatial requirements (Ramayah *et al*. 2015:151). Nonetheless, the previous study affirms the critical role contributed by ICT as an important element for developing the day to day operations of small businesses (Mbatha, 2013:12). Therefore, it is of paramount importance that the level of the staff's knowledge of Internet technology be evaluated in order to guarantee the continuity of technology implementation, in order to assist SMMEs to maintain their relevance in terms of the demands of emerging business practises (Ramayah *et al*., 2015:150).

2.21 THE COMPATIBILITY OF TECHNOLOGICAL PLATFORMS WITHIN THE CULTURE OF RUNNING A BUSINESS IN SOUTH AFRICA

Ramdani *et al*. (2013:738) define the compatibility of technology with an organisation as the extent to which technology is viewed to be in alignment with the organisation's values, existing practises, and the requirements of prospective adopters. In addition, Ramdani *et al*. (2013:738) affirm that the successful implementation of emerging and sophisticated technology can bring an enormous transformation to how an organisation conducts its work activities. Therefore, the compatibility of changes brought about by technology must be in harmony with the organisation's set-up, principles and philosophies.

The study conducted by Ramdani *et al*. (2013:737) found that the technological factors that impact technology adoption by SMMEs include the economic benefits, compatibility, complexity, trial ability and observability. According to Moghavvemi *et al.* (2012:32), compatibility can be defined as the degree with which information technology improvement is found to be aligned with the prevailing standards, preceding practices and requirements of prospective implementers. Bhorat *et al*. (2018:11) observe that compatibility relates to the simplicity of the utilisation of emerging technology, such as Internet banking applications. Therefore,

owners/managers of SMEs without optimism and a lack of specific skills for the utilisation of certain technological tools might not find it easy to adopt and utilise information technology innovation (Bhorat *et al*., 2018:11). The research on the technological factors conducted by Mndzebele (2013:475), also discovered a progressive correlation between compatibility and complexity in relation to the impact and the degree of technology adoption by firms.

Mndzebele (2013:473) describes compatibility as the extent to which the technology intended to be adopted is deemed to be suitable for the technological resources, philosophy, significance, and production activities that are already implemented in the organisation. Furthermore, Morteza *et al*. (2011:1238) accentuate that firms usually find innovation and technology acceptable once it is relevant and aligned with the fundamental values of the firm, can fulfil the requirements of the firm and is in consensuses with the firm's business culture. Rahayu and Day (2015:145) point out that flexibility between the company's policies and innovation advancement will enhance the compatibility of technology development, and it will be easier to envision in increasingly commonplace settings.

According to Dahnil *et al*. (2014:123), the technology compatibility of the associated business environments amongst SMMEs is a factor that impacts the development of technology.

2.22 PROSPECTIVE TECHNOLOGICAL OPPORTUNITIES FOR SMMEs IN SOUTH AFRICA

Nübler (2016:5) affirms that the utilisation of types of machinery, robots and PCs in the manufacturing processes is relied upon to diffuse broadly into all parts of the economy. Artificial Intelligence, humanoid, portable, and communitarian robots will eventually be created and utilised in both small and big organisations.

Agrerah, Gadhwar, Gdwar and Hassana (2015:51), cited by Keating, Coltman, Fooso-Wamba and Baker (2010:1672), state that continuous technological improvement is generally recognised as a powerful stimulus for business rejuvenation and economic development. Therefore, it is of paramount importance that SMMEs embrace the adoption of emerging technology on a continuous basis.

Agrerah *et al*. (2015:51) aver that the majority of organisations are implementing new technology, such as radio frequency identification (RFID), due to demands to comply with environmental legislatures. However, Alawi and Al-Ali (2015:2) emphasise that RFID technology

enhances the capacity to improve productivity, the gathering of information and the transmission of information to the relevant stakeholders.

Unfortunately, the challenges faced by most African SMMEs remain the primary reason why Africa can hardly get to a level where it can be considered as a developed economy. Ardjouman (2014:179) expresses the view that the only way for African countries to overcome these predicaments will be if they shift their focus to promote the development of SMME sustainability through the implementation of technology in the running of SMME operations.

Moghavvemi *et al*. (2012:34) affirm that information technology is a critical tool for driving SME aspirations to realise growth and improved economic capabilities from their methods of reengineering processes, cost-cutting, proficiency and efficiency.
Pentina *et al.* (2012:75), assert on the significance for organisations to comprehend the technology adoption requirements and how technology can improve productivity. Social media is also becoming a vital tool to help small businesses become more marketed. Social media platforms are growing to become critical tools for the advancement of business communication, and a solution to SMMEs that have been experiencing challenges that include the implementation of technology which are preventing them to snatch opportunities that are critical for enabling their overall business performance (Judie, 2015:17-18). However, a lack of sufficient resources, misunderstanding, and limited knowledge to comprehend the development of new technology, definitely have a negative impact on the success of SMMEs (Dahnil *et al*., 2014:124). Ross (2016:247) asserts that the working environment will, in the near future, have people instructing robotic machines or the robotic machines will be instructing humans.

2.23 SUMMARY

This chapter provides a great deal of consistent strides necessary to conceptualise the effects of technological challenges and their impact on small, medium and micro enterprises' performances according to the existing literature. Additionally, definitions of SMMEs, technology and types of technologies according to different sources were clearly introduced and deliberated on. The reviewed literature profusely maintains that SMMEs remain the most critical organ that contributes to the growth of the nation's economy. The literature on the background of South African SMMEs and the technological challenges that they are facing was reviewed.

The theoretical basis of the study further deliberated on the importance of the exploration and implementation of emerging technologies. The benefits of implementing emerging technologies

were discussed. The reviewed literature revealed that adopting new technologies improves SMMEs effectiveness, minimises operational costs, and widens the probability to improve the market share, both locally and even worldwide. From the literature study, it appeared that the conduciveness of the business environment is a critical enabler an effective implementation of emerging technologies. Other identified factors that play an important role in deciding whether to adopt new technologies or not are the following; accessibility and awareness of technology, the readiness of SMMEs, availability of suitable skills and knowledge, complexity of technological tools and barriers to adopt new technologies.

In conclusion, several researchers have reiterated that SMMEs that implement the most superior technologies can be relied upon to develop exponentially as compared to a firm of the same size with inferior technologies.

CHAPTER 3
RESEARCH METHODOLOGY

3.1 INTRODUCTION

The review of the literature in Chapter 2 authenticates the identification of technology as one of the tactical assets required by the owners/managers of SMMEs, for these organisations to flourish and maintain their competitive edge over rival organisations, irrespective of their size. The prevailing literature reviewed revealed that the challenges that are encountered by SMMEs include the slow adoption and use of technological tools to run operations. This chapter gives an overview of the realistic ways and techniques utilised to collect the data for the experimental part of this study.

This section gives an outline of the techniques that were utilised in leading this study. The chapter covers the following: the proposed research structure, the populace, examining strategies, estimation and instrumentation, techniques for information accumulation and strategies for analysing the collected data. The scholar chose to utilise a survey questionnaire as the preferred instrument to gather information from the chosen respondents. The conclusion of the chapter includes discussions on the limitations of this specific study. A summary is also provided. The method used by the researcher is the quantitative research technique.

Elmonds and Kennedy (2013:20) point out that the quantitative research method alludes to the utilisation of methodical strides of logical strategy, simultaneously utilising the quantitative approach to study the various impacts on particular factors. Survey questionnaires were dispersed among owners and individuals occupying managerial positions in small and medium-sized entities across all sectors, including construction, services, grocery stores, manufacturing, motor service centres and panel beaters. The technique used for information accumulation and the design of the questionnaires are illustrated in this chapter. At the end of this chapter, the information handling technique, information interpretation and assessment of the outcomes are all examined.

3.2 RESEARCH DESIGN

According to Elmonds and Kennedy (2013:20), a research design is an action plan that indicates how a researcher aims to undertake the research method intended to provide a

solution to the research problem. Once the variables of the area of the study are known and established, the next step is to design the research in a manner which ensures that the necessary data is collected and scrutinised to ensure that the objectives of the study are accomplished.

According to Elmonds *et al.* (2013:20), the quantitative research technique is alluded to as a deductive procedure and has an element of inventiveness in its approach. The process and method for consideration are dependent on the study outcomes. The instrument intended for gathering quantitative data during this study was developed, and the structured questionnaire was deemed appropriate for the collection of the necessary data.

The designed questionnaire comprises of four sections, with a section requiring the demographic information of the respondent, utilised to make comparisons between the groups. The other three sections enquire about technology, and the respondents were required to respond concerning their attitudes towards access to technological tools, their attitude towards their knowledge, skills, and resources, and lastly, their attitudes towards the usability of technological tools in their businesses.
For this study, the unit of analysis comprised of owners and managers of SMMEs in the Gauteng and Limpopo provinces.

3.3 RESEARCH METHOD – QUALITATIVE VS QUANTITATIVE METHODS

Creswell (2014:4) writes that the quantitative study is centred on making the analysis and the generation of numerical information by utilising experiential evidence collected from the practical situations encountered during the process of data collection. The outcomes of research studies originating from a quantitative process are usually well-organised. Harrison and Reilly (2011:7) reaffirm that the main reason for the utilisation of a quantitative methodology is to address questions concerning where, who and how, while a qualitative technique is a methodology that focuses on the why and how questions.

Almeida, Faria and Queirós (2017:382-383) also provide a summary of the benefits and shortcomings of the quantitative research technique as shown in Table 3.1 below.

Table 3.1: Benefits and shortcomings of a quantitative research approach

Benefit(s)	Shortcoming(s)
• Designing a survey is very cost-effective. • Reduces time spent to the minimum, which permits the researcher time to consider the conduct of the framework more rapidly. • More suitable for a broader scale study. • The extent to which two variables relate can be conclusively determined effortlessly. • Numerous statistical tests and systems can be utilised.	• Unwavering quality of information is subject to the nature of answers and the overview's structure. • Requires excessive time, which is costly. • It is challenging to imitate similar circumstances of the research study. • The approach may have deficiencies concerning the data validity from either internally or externally. • The approach necessitates the utilisation of specific statistical programming.

Source: Queirós, Faria & Almeida (2017:382-383).

3.4 RESEARCH APPROACH

McMillan and Schumacher (2014:275) affirm that the research study can be conducted through three different approaches, which are the quantitative, qualitative and mixed research approaches. Hassali, Saleem, Farooqui and Aljadhey (2014:2) point out that the quantitative method is beneficial for non-experimental expressive plans that hope to indicate reality and can be used to gather data on discernment, demeanour, conduct, information and the conviction of the participants reacting on the survey questionnaire.

To get a grasp on the technological challenges confronting SMMEs and the direct influence on the overall performance of business organisations, the necessary data was collected through the distributed questionnaires. The data was analysed to arrive at the attainment of the research objectives.

The research approach adopted for this study is quantitative. A positivist quantitative research configuration was utilised to carry out this study.

3.5 STUDY POPULATION

According to Welman *et al*. (2011:52), the target population is defined as a comprehensive set of features (persons or substances) with some similar attributes characterised by the selection

criteria recognised by the researcher, or the entire group of people or objects through which the researcher seeks to simplify the study outcomes.

The extent of the research conducted on the study was limited to owners, shareholders of SMMEs and those officials holding managerial positions within these SMMEs based in the Gauteng and Limpopo provinces, across all sectors.

3.6 SAMPLE SELECTION

The sample was acquired from some areas of the Gauteng and Limpopo provinces. A rundown of the executives and managers of the SMMEs, whose participation were requested for the study, was incorporated. According to a view expressed by Bickman and Rog cited by Mosia (2018:21), at whatever point you have to make a decision about when and where to watch, whom to converse with, or what data sources to concentrate on, you are confronted with a sampling decision.

The sampling choice and the time assigned for sampling the area for this instance was common sense. The quantity of the sample to be assembled and broken down was restricted to the time frame apportioned for the expected returned date of the completed questionnaires. Maree (2007) cited by (Mosia 2018:21) reaffirms that it would be suicidal to initiate the process of analysing data before determining whether the sample size is big enough and representative of all the groups to ensure that the sample delivers excellent research outcomes.

The researcher likewise concurs that the time, reasonableness, and budget have to be considered. These components can prompt a researcher to minimise the extent of the initial scope of the research study, for instance, to a provincial report rather than a nationwide report. Sampling hypotheses warrant objective outcomes, paying little attention to the populace size, given that the sample size is greater than 30 (n>30). The decision to take 100 samples for this study was considered on the same basis, namely that it was believed to appropriately represent a more significant population. The likelihood inspecting is a methodology where the samples are gathered in a procedure, with the aim to provide every one of the people in the populace with an equal chance of being chosen (Almalki, 2016:290).

3.7 RESEARCH PROCESS

3.7.1 Data collection

The distribution of the designed questionnaires was done to owners of SMMEs and individuals serving in managerial positions within selected SMMEs in the Gauteng and Limpopo provinces. The preferred language used in the design of questionnaires was English, and the method used for circulating the questionnaires to the identified respondents was by means of e-mail, courier services and personal delivery. The first page of the questionnaire includes a letter, which explains the rights of the respondents and surety of the confidentiality of the information they provided.

Some owners and managers of SMMEs could not return the distributed questionnaires, due to their availability and busy schedules, resulting in a minimal number of completed questionnaires. Both printed out (hard copies), and soft copies of the survey questionnaires were circulated. An aggregate number of 200 hard copies of the survey questionnaires were disseminated. Approximately fifty were sent through email to the entrepreneurs and individuals occupying managerial positions in these SMMEs.

A selection of entrepreneurs were approached and invited to participate in the study, they extended the invitation to their counterparts from different industries, and they also assisted in identifying new black-owned companies that were willing to participate in this academic research. The designed survey questionnaires were disseminated using different methods which included; hand delivery, email, and via the postal service to reach the intended targeted audiences. The demographic areas considered for this study were the Gauteng and Limpopo provinces.

3.7.2 Data analysis

Quantitative data was gathered to gain the perception of the targeted population, and was subjected to analysis. The collected data in its entirety was gathered from the entrepreneurial fraternity comprising of the owners and managers of SMMEs, and was taken through a process where the information attained were analysed and interpreted. The interpretation of the outcome derived from the collected data was set up by decoding designs, clarifications, data streams, suggestions, patterns and regularities.

The data collected was taken through the analysis process using the Statistical Package for the Social Science (SPSS) version 25, as proposed by Almalki (2016:290). This automated program is crucial in assisting the researcher with the computation and the presentation of the information. The demonstration of the data takes a percentage of nature.

According to Pallant (2007:52), a descriptive statistic is crucial whenever a decision has to be made. The statistical strategy is perceived to be reasonable enough to address specific research questions. Descriptive figures and the fitting inferential insights were utilised to find the significance in the information. The gathered data was examined to calculate the frequencies and proportions. The technological tool used in this process was the Special Package of Social Science as well as Microsoft Excel. Chapter 4 of this study indicates the significance of the collected data according to the decoded statistics and displays it as results utilising tables, diagrams and charts.

3.7.3 Statistical analysis

The data gathered from the sample selection process was sent to the Statistical Consultation Services at the North-West University in Potchefstroom for statistical analysis, data mining, coding and assessment, using the specialised computer software package, Statistical Package for Social Sciences (SPSS) (SPSS, 2015).

The descriptive statistical methods that were utilised for the analysis of data include:

- Graphic measurements, used to depict the basic features of the data in a research study, for instance mean and standard deviation.
- Cronbach Alpha coefficients utilised as a measure to assess the dimensionality of the selected scale through employing aspect analysis.
- Multiple linear regressions, used to calculate the correlations and the strength of the correlations between the dependent variable of technology adoption and the independent variable of entrepreneurial alignment. The multiple linear regressions analysis was calculated.

3.7.4 Data collection technique and tools

To validate and reflect on the principal goals of the research study, a survey questionnaire was considered. Due to how the study's research questions were structured, descriptive data was

gathered. Concerning the data collection instrument, the researcher opted to utilise a well-thought-out questionnaire survey to collect desired data from all respondents who were interested in partaking in the research study. Essential data information acquired from the review of the literature was utilised to create a paradigm of the study questionnaires. The designed questionnaires were distributed through email to the identified respondents, some were hand-delivered, and arrangements were made to collect all completed questionnaires from the participants (Ferell *et al*., 2015:91). To evaluate the consciousness of the research participants, the researcher had to assess the awareness of the respondents; the primary data was thus sourced by the researcher directly from the respondents. The demographic area where the data was collected from included regions such as the Vhembe and Capricorn municipalities in the Limpopo Province, as well as the Gauteng Province in its entirety.

3.7.4.1 Primary Data and the Collection Tool Instruments

Primary data refers to all essential information that is gathered with the supreme goal of finding the solution to the designed research problem under scrutiny. Denscombe (2010:18-197) points out that the standard techniques used as collection instrument tools include interviews, questionnaires, and observations. The researcher limited the data collection techniques to questionnaires as the primary instrument for the collection of data.

3.7.4.2 Questionnaire Technique

A survey questionnaire is a research data collection tool that comprises of a progression of inquiries or potentially explanations intended to induce answers, which can be changed into proportions of factors under scrutiny. For instance, a researcher may be keen on evaluating the acknowledgement and observation towards the adoption of emerging technology and the use of technological tools by SMMEs. Questionnaires were distributed through the use of email, the postal services and hand-delivery. Participants were requested to answer sequential questions and/or indicate character and attitude proclamations, intended to inspire feedback, which were then converted into extents of the components under scrutiny. Through arranging the responses, data on the understanding and awareness of owners/managers of SMMEs regarding the adoption and implementation of emerging technology was collected, and the necessity for change in the technology adoption policy was highlighted.

The designed, structured questionnaire had a cover letter that clarified the primary objectives of the research, what the researcher wanted to achieve, as well as the guidelines on how the questionnaire was supposed to be completed.

The questionnaire has been regarded as the most prominent strategy for information gathering in research studies since ancient times. It is regarded as the appropriate method for a research study aimed at covering a wide range population. The benefit of using questionnaires is that the desired information is collected in the quickest possible time as compared to gathering data through conducting interviews. This method is believed to have fewer probabilities for a researcher to influence the outcome. This is possible due to the privacy and confidentiality of its nature, which reduces the pressure on the participants. The questionnaires were the researcher's preferred tool, as this study opted to acquire the data necessary to address the posed research questions via a survey. The questionnaires were intentionally designed to focus on the entrepreneurial fraternity, i.e. owners and managers of SMMEs in the areas selected for the study.
The manner in which the questionnaire was structured assisted in maintaining standardisation and improving the comparability of responses during the evaluation of the data gathered.

The benefits realised by the researcher as a result of using the survey questionnaire as the data collection tool as acclaimed by Denscombe (2010:169) are:

- The survey questionnaires were found to be inexpensive since they provided a substantial volume of research data at a very affordable rate in terms of resources, cash and time invested.
- The data collected through the questionnaire was free from contamination caused by deviations. It provided standardised responses from the participants and the information could not be influenced by interpersonal influences.

The respondents had, in some instances, utilised both crosses (X) and check marks (√) to indicate their perspectives concerning the particular statement, to not cause confusion. The arranged responses of the questionnaires uncovered the inclinations of reactions since the researcher had offered predetermined choices.

Appendix A shows the layout of the questionnaire that was delivered to and completed by the participants.

3.8 VALIDATION AND RELIABILITY

McMillan and Schumacher (2014:125) contend that validity is the degree to which the study's discoveries precisely speak to what is indeed occurring in the circumstance. They likewise reference that, an impact or test is substantial on the off chance that it shows or measures what the researcher ponders or claims it does. Welman, Kruger and Mitchell (2011:137) affirm that the reliability of a test is the degree to which consequent groups would give comparable outcomes.

It was fundamental that the researcher acquired every honest response and those reasonable methodologies employed. This was essential to prevent the study from being an artless trick that acknowledged everything that was said without needing any proof.

The basis of the research study was established on empirical research and depended on the real situation. It is likewise founded on recognition, conclusions and the experience of individual respondents. The collection of data and the research method was constructed based on the entrepreneurs' views, feelings and their understanding which was in line with the feedback provided from the survey questionnaire. The data was free from any form of manipulation by external forces. The researcher read the surveys from the respondents and interpreted the information gathered from the study to derive from it a general feeling of all the thoughts obtained.

The information was composed with the intent to figure out general topics and connect them in order to generate a decent comprehension of the primary research objective investigated by this study. Cronbach's alpha coefficient was utilised. It prescribes an inducement that is somewhere in the range of 0.7 and 0.8 for the unwavering quality and consistency of any items. An estimation of 0.7 is in line with the globally adequate standard. A low coefficient may imply that the survey is not appropriately configured, and does not associate firmly.

The researcher improved the unwavering quality by determinedly recording the information from the surveys. Moreover, the researcher was intentionally aware of the philosophies acquired in Chapter 2, therefore the inquiries were adjusted to respond to the research questions and accomplish the primary goals in a manner that would yield similar ends, should another assessment be sought after by contemporary analysts. The survey was developed and the accompanying techniques were utilised to examine the data that was gathered:

- Reliability and validity analysis.
- Descriptive analysis.
- Significance tests.

To ensure that the reliability and validity of the study are achieved, multiple sources were reviewed to authenticate the data collected.

3.9 ETHICAL CONSIDERATIONS

Greener and Martelli (2015: Online) reaffirm that the emphasis on ethics is about values, obligations and moral-ethical choices that impact decision making, acceptable behaviour and standards. To add on to that, Cooper and Schindler (2008:35) reiterate the importance of the research design to guarantee that the research study process does not pose any risk of causing physical damage, distress, pain, shame, or compromise the confidentiality of private information. There are specific processes and conducts to abide by throughout the research study process.

The Code of ethics was considered to ensure that all partakers in this research study were free from any hazardous exposure. In this study, certain ethical matters were addressed. The researcher provided clarity to all participants concerning the purpose of the study before they started completing the questionnaires. The reasoning behind this action was to guarantee that all participants are well informed about the objectives and requirements of the research study. The ethical clearance was arranged by requesting permission to conduct a study, following the university's requirements.

All participants in the study were presented with a consent form, which they had to sign before they could participate in the research study. The consent form was essential to provide a guarantee of privacy and confidentiality, to the participants regarding the information to be divulged during the research study process. The researcher made all participants of the study aware of their rights to privacy and that they were free to turn down the invite to partake in the research study. This was deemed obligatory to ensure that their partaking in the study was done voluntarily and not forcefully. Moreover, all participants were made aware of their right to pull out of the study whenever they felt like it. It was also explained to them that the research for the study will not be used on an isolated basis but only applied as a critical part of the significant collection of the results.

The plagiarism declaration form was prepared and signed by the researcher to express the intention to recognise previous researchers wherever it is necessary. During all stages of the research process, the utmost moral norms were adhered to and acknowledged. A degree of sensitivity was practised at all times, whenever the researcher was having an interaction with the study participants.

3.10 RESEARCH LIMITATIONS

The most intrinsic limitation was the shirking of businesses in all regions in the gathering of data according to the full boundary territory of both Gauteng and Limpopo. The impact of this study has its obstacles as were spelled out in the shortcomings of the survey and questionnaire method, which offers an opportunity for future study explorations.

The following limitations were perceived:

- The study conducted was centred only in the Capricorn and Vhembe regions of the Limpopo Province, since the idea to access all five major regions of the Limpopo Province was not viable. Therefore, the conclusion made may not be representative enough since businesses from different regions within the Limpopo Province may be experiencing challenges that are different. As a result, this study may have omitted some critical details that could have influenced the researcher to make different conclusions and recommendations.
- The data collection also did not include all areas of the Gauteng Province, due to insufficient resources from the researcher, leading to failure to reach all corners of the province.
- Insufficient time and budget constraints to undertake a more comprehensive and all-inclusive quantitative empirical research study.
- Only SMMEs from within the Republic of South Africa conducting their business in accordance with the statutory requirements prescribed by the South African local authorities were considered for this study; the outcome narrates predominantly to the South African status quo and ought to be decoded along these lines.
- It was very challenging to encourage and inspire prospective participants to contribute rigorously and vibrantly in the study through the completion of the supplied questionnaires.

- Due to the level of education of the individual owners and managers of SMMEs, the probability of failure to comprehend the questionnaire questions in a manner intended by the researcher continue to exist.
- During the data collection process, there were instances where participants may not have shown enthusiasm to participate, and in some cases concealed information that had the potential to undermine the position of their organisations.
- The decision to use the quantitative methodology may generally cloud the truth of a marvel, since it belittles and disregards the non-quantifiable elements, which might be significant altogether.

3.11 RESEARCH CHAPTER SUMMARY

A questionnaire research procedure was used as a data-gathering methodology because of the type of research study and its focal points, which improved the authenticity and trustworthiness of the data. Samples were gathered from the Capricorn and Vhembe regions in the Limpopo Province as well as the Gauteng Province at large. Owners of SMMEs and individuals holding managerial positions were identified and chosen using probability and non-probability procedures. The accompanying section in Chapter 4 comprises of understandings, examinations and the introduction of discoveries made from the analysed data. The returned completed questionnaires were analysed using the Statistical Package of Social Science (SPSS), and the data collected was scrutinised to institute the conclusions of this research study. The outcomes of the research process are subsequently exhibited to address the research questions and objectives indicated in the first chapter of this research

CHAPTER 4
EMPIRICAL RESULTS AND DISCUSSION

4.1 INTRODUCTION

The previous chapter presented applicable methodology and analytical techniques that are relevant to this study, which is aimed at assessing the technological challenges in black-owned SMMEs in selected provinces in South Africa. The data for the study was gathered using a structured questionnaire (Appendix A). This chapter covers, in broad terms, the response rate, reliability analysis, descriptive statistics as well as inferential statistics to answer the main research questions of the study.

4.2 DEMOGRAPHICS OF PARTICIPANTS

This section provides demographic profiles of the participants according to age groups, qualifications, industry, businesses' legal status, and provinces. A total of 164 questionnaires were completed in full and returned for analysis, compared to the total of 300 that were distributed. This represents a response rate of 54.7%.

The majority of the respondents were represented by the 30 to 39 year age group and accounted for about 45.7% to the total, while those that were younger than 30 years contributed about 25.6% to the total. The 40 to 49 year age group accounted for 22.0% of the total while the 60+ group contributed only 1.2%.

The majority (32.7%) of the respondents had a university degree, while 20.2% had diplomas. Only 19% were postgraduates, whilst 13.7% only had Matric certificates.

A total of 33 (20.4%) respondents were in the construction industry, while 19.8% was in the services industry. Respondents in agriculture accounted for 14.8% of the total, whilst the rest contributed less than 10% to the total number of respondents.

Company (private) businesses contributed 39.6% to the total, while partnerships accounted for 25.6% of the total. The other businesses contributed less than 10% each to the total number of respondents. A total of 135 (81.8%) respondents were based in Limpopo, while 16.97% was

based in Gauteng. Only one (1) respondent was based in another province outside the two mentioned above.

Table 4.1: Demographic information of respondents

Item	Category	Frequency	Percentage
Age group	≤ 29	42	25.6
	30–39	75	45.7
	40–49	36	22
	50–59	9	5.5
	60+	2	1.2
	Total	**164**	**100**
Qualification	Lower than matric	8	4.8
	Matric	23	13.7
	Certificate	16	9.5
	Diploma	34	20.2
	University degree	55	32.7
	Postgraduate degree	32	19
	Total	**168**	**100**
Industry	Automotive	6	3.70
	Agriculture	24	14.81
	Clothing	16	9.88
	Construction	33	20.37
	Food	16	9.88
	Real estate	1	0.62
	Retail	6	3.70
	Wholesale	7	4.32
	Manufacturing	14	8.64
	Services	32	19.75
	Other	6	4.30
	Total	**161**	**100**

Business's legal status	Sole Proprietorship	1	0.61
	Partnership	42	25.61
	Company (private)	65	39.63
	Company (public)	10	6.10
	Close Corporation X	15	9.15
	Co-operative	14	8.54
	Business Trust	4	2.44
	Franchise	12	7.32
	Others	1	0.61
	Total	**164**	**100**
Provinces	Limpopo	135	81.82
	Gauteng	28	16.97
	Other	1	0.71
	Total	**164**	**100**

4.3 DESCRIPTIVE STATISTICS

This subsection presents descriptive statistics that better clarifies the technological challenges in black-owned SMMEs in selected provinces in South Africa. The analysis is based on quantitative data that was gathered using a survey questionnaire. The data for the study on the technological challenges experienced by black-owned SMMEs was based on a 5-point Likert scale.

The perceptions of the participants were rated as follows: (1) strongly disagree, (2) disagree, (3) neutral, (4) agree, and (5) strongly agree. According to this scale mean scores of between 1 and 2.4 are indicative of unfavourable perceptions while scores of between 2.5 and 3.4 are indicative of neutral perceptions. Mean scores of between 3.5 and 5.0 are indicative of favourable perceptions of the technological challenges of black-owned SMMEs.

Three primary constructs are measured in this study, including attitudes towards access to technological tools for the business, attitudes towards knowledge, skills and resources of the business, and attitudes towards the usability of technological tools in the business. The analysis of data using descriptive statistics follows in the subsequent subsections.

4.3.1 Attitude towards access to technological tools for the business

Perceptions of participants on the access to technological tools for the business are shown in Table 4.2. Participants expressed moderate responses to two (2) aspects that included

difficulties with gaining access to information technology tools to conduct business and caution with replacing important people-tasks with technology as new technology is viewed as not reliable. The above-mentioned attributes recorded average mean scores of 3.0 and 3.2, respectively, compared to the maximum possible score of 5. However, the remaining attributes recorded high (3.5 and above) mean scores. This is indicative of general positive attitudes towards access to technological tools for businesses.

A measure of the spread of participants' attitudes towards access to technological tools was measured using standard deviation, as shown in Table 4.2. It was observed that there was generally a high degree of divergence between the opinions of participants on the access to technological tools. The associated standard deviations were more than 20% of the means, as shown. In particular, opinions of the relationship between the number of new ideas generated and the number of new ideas successfully implemented were highly varied, with a standard deviation that was 80.9% of the mean.

Skewness is a measure of the symmetry of distribution, while kurtosis measures the heaviness of the tail of a distribution (Leedy & Ormrod, 2014). Both skewness and kurtosis give a measure of normality of the distribution. According to Creswell and Clark (2011), the data is normal if skewness in within -1 and +1 and kurtosis is within -3 and +3. The skewness and kurtosis for this study are in the normal ranges of 1 and 3, respectively, as shown in Table 4.2. However, the data related to the relationship between the number of new ideas generated and the number of new ideas successfully implemented, are not normally distributed, as the skewness and kurtosis are outside the normality range.

Table 4.2: Attitude towards access to technological tools

Attribute	Mean	Std. Deviation	%Std. Dev / Mean	Skewness	Kurtosis
Our business currently has information technology tools that are fully utilised.	3.5	1.15	32.5	-0.507	-0.436
Our business has had difficulties getting access to information technology tools required to conduct our business.	3.0	1.14	37.3	-0.193	-0.709
Our business has acquired the necessary information technology tools.	3.6	1.03	29.1	-0.469	-0.400
Funding, infrastructure, Internet connection availability, training, etc. are the barriers to gaining access to technology.	3.6	1.14	31.5	-0.515	-0.523

There should be caution in replacing important people-tasks with technology because new technology is not reliable.	3.2	1.04	32.1	-0.298	-0.436
Our business regularly introduces new services/products/processes.	3.5	1.15	33.0	-0.381	-0.594
Our business places a strong emphasis on new and innovative products/services.	3.7	1.07	29.0	-0.669	-0.087
Our business is continually pursuing new opportunities.	3.8	1.11	29.3	-0.582	-0.603
The confidence level in our ability to use technological tools to enhance the smooth running of our business is high.	3.7	1.05	28.6	-0.578	-0.282
In our business, there is a strong relationship between the number of new ideas generated and the number of new ideas successfully implemented.	3.9	3.17	80.9	11.255	139.397
Our business places a strong emphasis on continuous improvement of products/service delivery.	3.9	0.95	24.1	-0.736	0.107
Our business has a widely-held belief that innovation is an absolute necessity for the business's future.	3.9	0.97	24.7	-0.772	0.226
Technological tools are useful and enhance the smooth running of the business by managers/owners.	4.1	0.97	24.0	-1.014	0.668

4.3.2 Attitude towards the knowledge, skills and resources of the business

The perceptions of the participants on the knowledge, skills, and resources of the business are shown in Table 4.3. Participants expressed positive responses on 4 aspects, that included access to a help desk or support services to answer questions about using technological tools, adequacy of experience to use the information technology tools available, confidence to use technological tools to enhance the smooth running of businesses and the feeling that information technology tools have been of help to businesses. The above-mentioned attributes recorded high with favourable mean scores of at least 3.5, compared to the maximum possible score of 5. However, respondents expressed moderate attitudes towards the remaining attributes that were associated with their attitudes to the knowledge, skills and resources of the business. The mean scores for the remaining attributes were moderate and between 3.2 and 3.4, as shown.

A measure of the spread of participants' views on the knowledge, skills and resources of the business was measured using standard deviation, as shown in Table 4.3. It was observed that there was generally a high degree of variance on the opinions of participants on the knowledge, skills and resources of the business. The associated standard deviations were more than 20% of the means as shown. Skewness and kurtosis were within the defined normality ranges of -1 and +1 and -2 and +2 respectively. This was an indication that the data associated with knowledge, skills and resources of the business was typically distributed.

Table 4.3: Attitudes towards knowledge, skills and resources of the business

Attribute	Mean	Std. Deviation	%Std.Dev / Mean	Skewness	Kurtosis
I taught myself to use most of the IT tools our company uses.	3.3	1.27	38.2	-0.356	-0.947
I was taught to use most of the IT tools our company uses by IT experts.	3.4	1.15	34.2	-0.382	-0.650
The company's staff and I have attended training, educational courses or classes before we could use technological tools.	3.4	1.25	36.9	-0.336	-0.946
Our company has access to a help desk or support services to answer questions about using technological tools if the need arises.	3.5	1.20	34.6	-0.537	-0.585
I rely on the manuals and demonstrations as opposed to help desk or support services.	3.3	1.22	36.8	-0.324	-0.754
I feel more comfortable and trust my ability to use manual tools more than information technology tools.	3.2	1.12	34.9	-0.008	-0.702
I have adequate experience to use information technology tools available in our business.	3.7	1.05	28.6	-0.809	0.333
I have confidence in my ability to use technological tools to enhance the smooth running of our business.	3.8	0.95	25.1	-0.747	0.783
I have performed some of the functions manually in the past, and I feel that information technology tools have been a help.	4.1	0.89	21.8	-0.140	1.846

4.3.3 Attitude towards the usability of technological tools in the business

The perceptions of the participants on the usability of the technological tools in the business are shown in Table 4.4. Respondents expressed moderate responses on the design of technology systems for use by ordinary people and the barriers to gaining access to technological tools. The above attributes recorded average scores of 3.2 and 3.4 respectively, compared to the maximum possible score of 5. The remaining attributes associated with the usability of technological tools in the business recorded high and favourable scores of 3.5.

A measure of the spread of the participants' views on the usability of technological tools in the business was measured using standard deviation, as shown in Table 4.4. It was observed that there was generally a high degree of variance on the opinions of participants on the usability of technological tools in the business. The associated standard deviations were more than 20% of the means as shown. Skewness and kurtosis were within the defined normality ranges of -1 and +1 and -2 and +2 respectively, except for the complicated usefulness of new technology.

Table 4.4: Attitudes towards the usability of technological tools in the business

Attribute	Mean	Std. Deviation	%Std.Dev / Mean	Skewness	Kurtosis
Some of our staff sometimes thinks that technology systems are not designed for use by ordinary people.	3.2	1.26	39.1	-0.206	-1.003
Employees are often encouraged to be abreast with technology developments to enhance innovation in our daily business operations.	3.7	0.91	24.5	-0.266	-0.464
In our business, technological tools are being used comfortably and without constant supervision.	3.7	0.96	26.3	-0.554	0.218
The efficiency (doing things right) of our business has improved over the past few years due to the usage of technological tools.	3.8	1.01	26.5	-0.690	-0.153
New-technology products are more convenient to use.	3.7	1.00	27.1	-0.682	0.473
Technology gives our business more control over the day-to-day activities.	3.9	0.97	24.8	-0.809	0.476
In our business, we find new technology to be mentally stimulating	3.6	1.00	27.9	-0.533	0.150
In our business, we find learning about new technology to be as rewarding as the technology itself	3.9	0.97	25.1	-0.649	0.064
Our business keeps up with the latest technological developments in the area of interest.	3.6	1.02	28.5	-0.407	-0.183
In our business, we believe that technology makes our overall performance to be more efficient.	3.8	1.07	28.2	-0.620	-0.383
Our business has barriers to gaining access to technological tools.	3.4	1.16	34.3	-0.379	-0.731
Technology gives our business more freedom of mobility	3.8	0.95	24.8	-0.464	-0.256
New technology is often too complicated to be useful	3.6	3.41	95.0	10.825	132.152
In our business, we believe that technology enables the team to conduct business activities more quickly.	4.1	0.99	24.4	-0.945	0.379

4.4 VALIDITY OF THE QUESTIONNAIRE

After numerous exploratory factor analyses were run, the researcher could not extract a perfect model, but there was a clear indication of the critical constructs measuring the technological challenges faced by black-owned SMMEs. These constructs make sense in practice, and therefore, formed the basis for further analyses.

Table 4.5 shows a summary of the main descriptions of the technological challenges that SMMEs face. The mean illustrates the criticality of the challenge. Thus, the higher the mean, the more critical is the challenge to SMMEs. Therefore, Technological competence (with the highest mean) is the biggest issue facing SMMEs while Reliability of technology, Efficiency of technology and Skills development ranked second and third respectively in terms of their

criticality in the technological challenges for SMMEs. Of the six (6) challenges, Technological insecurities were the least critical technological challenge facing SMMEs.

A measure of the spread of participants' views on each attribute in Table 4.5 was measured using the coefficient of variation. Thus, the higher the coefficient of variation, the greater is the spread of participants' views. It was observed that there was a generally moderate degree of divergence on the opinions of the participants on Technological competencies. The associated coefficient of variation was moderate at 18.0%, as shown. However, Technological insecurities, Technical support, Efficiency of technology and Skills development had a high coefficient of variation that was more than 20.0%.

Table 4.5: Summary of the main description of the technological challenges that SMMEs face

Item	Mean	Std. Deviation	N	**CV**
Technological competencies	3.9	0.701	169	18.0%
Technological insecurities	3.2	0.767	169	23.6%
Technical support	3.4	0.938	169	27.5%
Reliability of technology	3.8	0.753	169	19.6%
The efficiency of technology	3.7	0.776	169	21.1%
Skills development	3.7	0.794	169	21.4%

After identifying and labeling factors, the reliability of subscales was calculated using Cronbach's Alpha. The item-total correlations and the average inter-item correlation were also taken into consideration.

4.4.1 Technological competencies

The factor reliability of the identified dimensions of Technological competencies is presented in Table 4.6. The factor reliability of Technological competencies was 0.705 indicating a satisfactory level of reliability.

Table 4.6: Results of the factor reliability for the identified dimensions of Technological competencies

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	No. of Items
0.703	0.705	5

The mean score and standard deviations of the items were subsequently calculated, as shown in Table 4.7. The means of the four (4) items in the Technological competencies dimension were closely similar to the means that were calculated from the associated theoretical dimension.

Table 4.7: Descriptive statistics of the two dimensions of Technological competencies

Item	Mean	Std. Deviation	N
I have adequate experience to use information technology tools available in our business.	3.7	1.037	168
I have confidence in my ability to use technological tools to enhance the smooth running of our business.	3.8	0.953	168
I have performed some of the functions manually in the past, and I feel that information technology tools have been a help.	4.1	0.892	168
Technological tools are useful and enhance the smooth running of the business by managers/owners.	4.0	0.972	168

4.4.2 Technological insecurities

The factor reliability of the identified dimension of Technological insecurities is presented in Table 4.8. The factor reliability of Technological insecurities was 0.558, indicating a lower level of reliability, but it still falls within the norms when measuring perceptions.

Table 4.8: Results of the factor reliability for the identified dimensions of Technological insecurities

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	No. of Items
0.580	0.558	5

The mean scores and standard deviations of the items were subsequently calculated, as shown in Table 4.9. The means of the five (5) items in the Technological insecurities dimension were closely similar to the means that were calculated from the associated theoretical dimensions.

Table 4.9: Descriptive statistics of the two dimensions of Technological insecurities

Item	Mean	Std. Deviation	N
There should be caution in replacing important people-tasks with technology because new technology is not reliable.	3.2	1.037	164
Some of our staff sometimes thinks that technology systems are not designed for use by ordinary people.	3.2	1.248	164
I rely on the manuals and demonstrations as opposed to help desk or support services.	3.3	1.224	164
I feel more comfortable and trust my ability to use manual tools more than information technology tools.	3.2	1.128	164
New technology is often too complicated to be useful.	3.6	3.442	164

4.4.3 Technological support

The factor reliability of the identified dimension of Technological support is presented in Table 4.10. The factor reliability of Technological support was 0.678 indicating a poor level of reliability.

Table 4.10: Results of the factor reliability for the identified dimensions of Technological support

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	No. of Items
0.678	0.678	3

The mean scores and standard deviations of the items were subsequently calculated, as shown in Table 4.11. The means of the three (3) items in the Technological support dimension were closely similar to the means that were calculated from the associated theoretical dimensions.

Table 4.11: Descriptive statistics of the two dimensions of Technological support

Item	Mean	Std. Deviation	N
The company's staff and I have attended training, educational courses or classes before we could use the technological tools.	3.4	1.245	166
Our company has access to a help desk or support services to answer questions about using technological tools if the need arises.	3.5	1.204	166
I was taught to use most of the IT tools our company uses by IT experts.	3.4	1.158	166

4.4.4 Technological accessibility

The factor reliability of the identified dimension of Technological accessibility is presented in Table 4.12. The factor reliability of Technological support was 0.543. This was lower than the 0.70 cut off and was indicative of poor reliability.

Table 4.12: Results of the factor reliability for the identified dimensions of Technological accessibility

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	No. of Items
0.542	0.543	2

The mean scores and standard deviations of the items were subsequently calculated, as shown in Table 4.13. The means of the two (2) items in the Technological accessibility dimension were closely similar to the means that were calculated from the associated theoretical dimensions.

Table 4.13: Descriptive statistics of the two dimensions of Technological accessibility

Item	Mean	Std. Deviation	N
Our business places a strong emphasis on new and innovative products/services.	3.7	1.070	165
Our business regularly introduces new services/products/processes.	3.5	1.156	165

4.4.5 Reliability of technology

Factor reliability of the identified dimension of Reliability of technology is presented in Table 4.14. The factor reliability of technology was negative due to a negative average covariance among items. This violated the reliability model assumptions, indicating a poor level of reliability. Therefore Reliability of technology construct will be omitted from further analysis in this study.

Table 4.14: Results of the factor reliability for the identified dimensions of Reliability of technology

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	No. of Items
-0.116	-0.233	2

The mean scores and standard deviations of the items were subsequently calculated, as shown in Table 4.15. The means of the two (2) items in the reliability of the technology dimension were closely similar to the means that were calculated from the associated theoretical dimensions.

4.4.6 Skills development

The factor reliability of the identified dimension of Skills development is presented in Table 4.15. The factor reliability of Skills development was 0.697. This was lower than the 0.70 cut-off point, indicating a poor level of reliability.

Table 4.15: Results of the factor reliability for the identified dimensions of Skills development

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	No. of Items
0.697	0.696	3

The mean scores and standard deviations of the items were subsequently calculated, as shown in Table 4.16. The means of the three (3) items in the Skills development dimension were closely similar to the means that were calculated from the associated theoretical dimensions.

Table 4.16: Descriptive statistics of the two dimensions of Skills development

Item	Mean	Std. Deviation	N
The confidence level of our ability to use technological tools to enhance the smooth running of our business is high.	3.7	1.057	159
In our business, we find learning about new technology to be as rewarding as the technology itself	3.8	0.969	159
Our business keeps up with the latest technological developments in the area of interest.	3.6	1.018	159

4.4.7 Correlation analyses

The relationships amongst the six (6) main technological challenges that SMMEs face was performed using correlation analysis, as shown in Table 4.18. A Pearson correlation (Pearson product-moment correlation coefficient) provides the size and significance of the relationship

between two variables under investigation. A Pearson correlation value, r is regarded as large if r > 0.5, medium if r > 0.2 and small if r < 0.2 (Creswell and Clark, 2011).

The correlation analysis in Table 4.18 shows that Technological competencies and Technological insecurities demonstrated a medium, negative and highly significant (r = -0.261; p < 0.01) association. Technological competencies and Reliability of technology showed a large, positive and highly significant (r = 0.552; p <0.01) association while Technological competencies and Efficiency of technology demonstrated a medium, positive and highly significant (r = 0.435; p < 0.01) association. Other associations that were significantly positive or medium sized are shown in Table 4.17. It should be borne in mind that a regression analysis is not necessary in this study, because neither of the factors have a causal effect on any one of the factors.

Table 4.17: Correlation analysis of the six (6) main technological challenges

Pearson correlations coefficients; only statistically significant t values are retained	A	B	C	D	E	F
Technological competencies, A	1					
Technological insecurities, B	-.261**	1				
Technical support, C	.261**		1			
The efficiency of technology, E	.435**		.346**	.432**	1	
Skills development, F	.482**	-.233**	.328**	.476**	.455**	1

4.5 T-TEST AND ANOVA

4.5.1 Provinces

An independent t-test was conducted to find out if respondents from Limpopo and Gauteng answered questions differently. The results of the t-test across the provinces are shown in Table 4.18.

It can be observed that there were significant differences (p < 0.05) across provinces in terms of Technical support and Reliability of the technology. Limpopo was higher than Gauteng in terms of Technical support. For the remaining dimensions, respondents across the two provinces answered questions similarly.

Table 4.18: Results for t-test across Provinces

Attributes		N	Mean	Std. Deviation	p-value
Technological competencies	Limpopo	135	3.9	0.7141	0.169
	Gauteng	27	4.1	0.5604	
Technological insecurities	Limpopo	135	3.3	0.7508	0.235
	Gauteng	27	3.1	0.8234	
Technical support	Limpopo	135	3.6	0.8234	0.000
	Gauteng	27	2.7	1.0043	
Reliability of technology	Limpopo	135	3.7	0.7583	0.004
	Gauteng	27	4.2	0.6018	
Efficiency of technology	Limpopo	135	3.7	0.7611	0.179
	Gauteng	27	3.5	0.7989	
Skills development	Limpopo	135	3.7	0.8138	0.483
	Gauteng	27	3.7778	0.6667	

4.5.2 Highest academic qualification

The views of respondents were compared across academic qualifications using ANOVA, as shown in Table 4.19. There were significant differences ($p < 0.05$) in the views of respondents across academic qualifications on Technological competencies. Matric, Certificate, Diploma, Degree and Postgraduate degree recorded higher scores on Technological competencies when compared to those in possession of lower than Matric certificates. However, respondents expressed similar views on the remaining dimensions.

Table 4.19: ANOVA results for the academic qualifications

Attributes		Sum of Squares	df	Mean Square	F	Sig.
Technological competencies	Between Groups	6.337	5	1.267	2.741	0.021
	Within Groups	74.445	161	0.462		
	Total	80.781	166			
Technological insecurities	Between Groups	1.467	5	0.293	0.496	0.779
	Within Groups	95.234	161	0.592		
	Total	96.701	166			
Technical support	Between Groups	2.544	5	0.509	0.566	0.726
	Within Groups	144.671	161	0.899		

	Total	147.215	166			
Reliability of technology	Between Groups	5.713	5	1.143	2.058	0.073
	Within Groups	89.388	161	0.555		
	Total	95.101	166			
Efficiency of technology	Between Groups	3.492	5	0.698	1.153	0.335
	Within Groups	97.554	161	0.606		
	Total	101.046	166			
Skills development	Between Groups	3.817	5	0.763	1.226	0.299
	Within Groups	100.262	161	0.623		
	Total	104.080	166			

4.5.3 ANOVA of the age of the business

Table 4.20 shows the ANOVA results across the ages of the businesses. The results indicate that there were significant differences ($p < 0.05$) across the age of the business on Technological competencies, Technological insecurities and Skills development. Medium-aged businesses recorded lower mean scores on Technological competencies, compared to the rest. However, old businesses recorded lower mean scores on Technological insecurities compared to the rest. On the other hand, growing businesses recorded lower mean scores on Skills development when compared to the other business age groups.

Table 4.20: ANOVA results for the age of the business

Attributes		Sum of Squares	df	Mean Square	F	Sig.
Technological competencies	Between Groups	7.835	8	0.979	2.045	0.045
	Within Groups	73.756	154	0.479		
	Total	81.591	162			
Technological insecurities	Between Groups	10.150	8	1.269	2.275	0.025
	Within Groups	85.902	154	0.558		
	Total	96.052	162			
Technical support	Between Groups	8.274	8	1.034	1.152	0.332
	Within Groups	138.247	154	0.898		
	Total	146.521	162			

Reliability of technology	Between Groups	8.585	8	1.073	1.937	0.058
	Within Groups	85.305	154	0.554		
	Total	93.891	162			
Efficiency of technology	Between Groups	7.839	8	0.980	1.640	0.118
	Within Groups	92.043	154	0.598		
	Total	99.882	162			
Skills development	Between Groups	10.267	8	1.283	2.098	0.039
	Within Groups	94.206	154	0.612		
	Total	104.473	162			

4.5.4 ANOVA of industry

The comparison of opinions across the industry using ANOVA is shown in Table 4.21. It can be observed that there were no significant differences ($p > 0.05$) in opinions across the industry on any of the attributes that were considered. Respondents generally expressed positive opinions on all the attributes that were considered, as shown in Table 4.21.

Table 4.21: ANOVA results for the industry

Attributes		Sum of Squares	df	Mean Square	F	Sig.
Technological competencies	Between Groups	9.865	19	0.519	1.044	0.415
	Within Groups	71.597	144	0.497		
	Total	81.462	163			
Technological insecurities	Between Groups	11.368	19	0.598	1.039	0.421
	Within Groups	82.959	144	0.576		
	Total	94.328	163			
Technical support	Between Groups	23.772	19	1.251	1.525	0.085
	Within Groups	118.144	144	0.820		
	Total	141.916	163			
Reliability of technology	Between Groups	16.210	19	0.853	1.570	0.071
	Within Groups	78.265	144	0.544		
	Total	94.475	163			
Efficiency of technology	Between Groups	17.153	19	0.903	1.633	0.056

	Within Groups	79.619	144	0.553		
	Total	96.772	163			
Skills development	Between Groups	13.104	19	0.690	1.123	0.335
	Within Groups	88.462	144	0.614		
	Total	101.566	163			

4.5.5 ANOVA of the number of permanent employees

The comparison of opinions across a number of permanent employees using ANOVA is shown in Table 4.22. It can be observed that there were significant differences ($p < 0.05$) in opinions across the number of permanent employees on Technological competencies and Reliability of technology. Companies with a smaller number of permanent employees recorded lower mean scores on Technological competencies and Reliability of technology, when compared to the rest.

Table 4.22: ANOVA results for the number of permanent employees

		Sum of Squares	df	Mean Square	F	Sig.
Technological competencies	Between Groups	14.196	11	1.291	2.893	0.002
	Within Groups	66.461	149	0.446		
	Total	80.658	160			
Technological insecurities	Between Groups	10.063	11	0.915	1.682	0.083
	Within Groups	81.039	149	0.544		
	Total	91.102	160			
Technical support	Between Groups	14.214	11	1.292	1.534	0.125
	Within Groups	125.475	149	0.842		
	Total	139.689	160			
Reliability of technology	Between Groups	12.354	11	1.123	2.158	0.020
	Within Groups	77.550	149	0.520		
	Total	89.904	160			
Efficiency of technology	Between Groups	3.876	11	0.352	0.571	0.850
	Within Groups	91.971	149	0.617		
	Total	95.846	160			

Skills development	Between Groups	9.518	11	0.865	1.401	0.178
	Within Groups	92.043	149	0.618		
	Total	101.561	160			

4.5.6 ANOVA of the age group

The comparison of opinions across age group, using ANOVA is shown in Table 4.23. It can be observed that there were significant differences ($p < 0.05$) in opinions across age group on Technological competencies only. In all cases, the youngest group (29 years and younger) has a lower score than the older ones in terms of Technological competencies. Therefore this is a bigger problem for businesses with older owners/managers.

Table 4.23: Comparison of opinions across age group using ANOVA

Attribute		Sum of Squares	Df	Mean Square	F	Sig.
Technological competencies	Between Groups	6.337	5	1.267	2.741	0.021
	Within Groups	74.445	161	0.462		
	Total	80.781	166			
Technological insecurities	Between Groups	1.467	5	0.293	0.496	0.779
	Within Groups	95.234	161	0.592		
	Total	96.701	166			
Technical support	Between Groups	2.544	5	0.509	0.566	0.726
	Within Groups	144.671	161	0.899		
	Total	147.215	166			
Reliability of technology	Between Groups	5.713	5	1.143	2.058	0.073
	Within Groups	89.388	161	0.555		
	Total	95.101	166			
Efficiency of technology	Between Groups	3.492	5	0.698	1.153	0.335
	Within Groups	97.554	161	0.606		
	Total	101.046	166			
Skills development	Between Groups	3.817	5	0.763	1.226	0.299
	Within Groups	100.262	161	0.623		
	Total	104.080	166			

4.6 SUMMARY

This chapter presented quantitative results on the technological challenges facing black-owned SMMEs in selected provinces in South Africa. Data for the study was gathered using a questionnaire survey.

Factor analysis extracted 12 factors from the dataset, which explained a significant cumulative variance of 65.63% for the data. However, only six (6) factors had high and satisfactory reliability. Technological competencies, Technological insecurities, Technical support, Efficiency of technology and Skills development were identified as the main technological challenges that SMMEs face. Technological competence was the biggest issue facing SMMEs while Reliability of technology, Efficiency of technology and Skills development were ranked second and third respectively, in terms of the criticality of the technological challenges for SMMEs. Of the six (6) main challenges, Technological insecurities were the least critical technological challenge facing SMMEs.

CHAPTER 5
CONCLUSIONS AND RECOMMENDATIONS

5.1 INTRODUCTION

The previous chapter provided detailed statistical analysis on technological challenges that affect the business performance of SMMEs in South Africa. This chapter aims to provide conclusions from theoretical objectives as well as from empirical research objectives. Additionally, the chapter presents the limitations of the study as well as recommendations on challenges that affect the business performance of SMMEs in South Africa. Future research opportunities are also presented in this chapter.

5.2 CONCLUSIONS

In line with the empirical objectives of the study, assessment of the technological challenges in black-owned SMMEs, assessment of attitudes towards the access to technological tools, assessment of attitudes towards the knowledge, skills, and resources of the business as well as assessment of the usability of technological tools were conceptualized from the reviewed literature theory.

Moghavvemi et *al*. (2012:34) affirm that for SMEs to realize growth and improved economic capabilities from their methods of reengineering processes, cost-cutting, proficiency, and efficiency, information technology are the critical tools to drive these aspirations. However, there are some factors that continue to result in most SMMEs to be sluggish and fall behind in terms of the adoption and use of information technology, compared to their counterparts from developed countries. These factors have been singled out and include elements such as a lack of required resources (capacity and funding constraints), and a shortage of the required skills and knowledge of the benefits of successfully adopting technology and putting it to good use (Moghavvemi et *al*., 2012:28).

Alamro and Tarawneh (2011:504), furthermore, affirm that other barriers hindering the successful implementation of technology and its effective use, include the following: a lack of the required knowledge of information by employees, failure to comprehend emerging technology, a shortage of technology cognisance, the level of creativeness and the willpower of the owners/managers, failure to manage time, the absence of clients' readiness, a shortage of

financial support and trust from financial institutions, increased fake and fraudulent emails, and losses incurred by street vendors as a result of untrustworthy suppliers.

Cascio and Montealegre (2016:356) assert that employees might develop a fear of the unknown, or become oppressed, particularly when the implementation of technology results in a deficiency of self-sufficiency, skills, and understanding. Consequently unnecessary stress develops, personnel become demotivated, and non-productive behaviours may creep in to destruct technology adoption, unless the personnel are adequately trained.

According to Aeppel (2015:1), workers with the perception that they may be deemed redundant are always reluctant to embrace the implementation of new technology due to their fear of job losses. Furthermore, Aeppel (2015:1) asserts that the overall number of job losses have certainly not dropped over time as a result of new technology. Agostino and Delaney (2015:9) indicate that the introduction of emerging technology might threaten employees' job security, especially those individuals who are comfortable with the current culture, operations, and production systems.

Due to the implementation of emerging technological platforms, changes may emerge regarding the segregation of duties and workload allocation, and may also trigger the need to develop the current staff through training intervention as well as to hire additional staff, according to Agostino and Delaney (2015:9). The information technology innovation studies conducted in the past concluded that the resolution to adopt new technology is driven by technological forces, such as difficulty in the deployment, suitability, anticipated benefits, secrecy and safety of information concerns, and development of technology (Ahmadi-Javida et *al.*, 2017:3).

Leboea (2017:54) has discovered that the barriers preventing SMEs to improve the utilisation of technological platforms are not only budget constraints, but also a limited level of knowledge about the importance of adopting the technology by owners and managers of SMEs. Leboea (2017:54) points out that owners and managers of most SMEs lack the appropriate knowhow of emerging technology and the capacity to select the technology that is most suitable and fit for purpose in their production of goods and services.

The information technology innovation studies conducted in the past concluded that the resolution to adopt new technology is driven by technological forces, such as difficulty in the deployment, suitability, anticipated benefits, secrecy and safety of information concerns, and the development of technology (Ahmadi-Javida, Jalali & Klassen, 2017:3).

Bhorat *et al.* (2018:11) observe that compatibility relates to the simplicity of the utilisation of emerging technology such as Internet banking applications. Therefore, owners/managers of SMEs without optimism and a lack of specific skills concerning the utilisation of certain technological tools, might not find it easy to adopt and utilise information technology innovation (Bhorat *et al*., 2018:11).

5.3 RECOMMENDATIONS

This subsection presents recommendations for black-owned SMMEs in South Africa as well as recommendations for future research opportunities.

Recommendations on how to deal with the primary six (6) technological challenges facing black-owned SMMEs in South Africa, that were identified in the previous chapter are as follows:

i. Technological competencies

It is advisable for black-owned SMMEs to seriously consider improving the technological competencies of their staff through having regular training sessions and workshops (both in-house and externally). The training and workshops will help black-owned SMME staff to gain a good understanding of the technology in use in the market (their benefits to the business and what these can and cannot do), and learn how to navigate the technological platforms that have been implemented.

Black-owned SMMEs should also consider supporting their staff members to take classes in associated and useful technology. Classroom learning provides an opportunity to interact with well-informed and experienced instructors who know a lot about educational material that cannot be found in books or online sources. Again, instructors with an extensive background in technology usually know their subject matter and can offer on-the-spot answers to any questions raised. Classroom learning sessions allow learners to network and learn from each other.

Black-owned SMMEs should consider improving the Technological competencies of their staff through regular coaching sessions. Such sessions will help staff members to receive first-hand step-by-step navigation of relevant technological platforms and gain knowledge from experienced experts.

ii. Technical support

Prior to the implementation of technology, black-owned SMMEs should ensure that all stakeholders, such as management personnel as well as employees, buy into the idea and fully support it. Leadership should ensure that there are adequate financial resources for technology developments and funding for management initiatives aimed at adopting emerging technology. SMMEs should ensure that they have the relevant skilled personnel to support the functionality of the technology that have been implemented. Such skills can be sourced from outside or in-house, depending on what the business views as cost-effective.

iii. Efficiency of technology

Black-owned SMMEs should consider implementing modern technology that can support and improve the operational performance of their businesses. The technology should enhance the capacity to improve productivity, and gather and transmit adequate information to the relevant stakeholders as and when required. To achieve this, black-owned SMMEs should always do thorough due diligence prior to the adoption of the technology. The due diligence helps to develop or procure the technology that best fits their technical and business needs. The technology preferred for adoption should be simple, useful and user-friendly.

iv. Reliability of technology

Black-owned SMMEs are advised to implement tried and tested technology that can perform consistently and hence provide the much-needed support. After deployment of technology to support the operations of the business, it is also advisable to have skilled and experienced personnel who can provide regular technical support and maintenance services. Predictive as well as proactive maintenance should regularly be offered to ensure the availability of the technological system at all times. Technical staff should be regularly trained so that they can keep abreast of changes in the technological space and offer quality service that ensures high reliability of the technological system.

v. Skills development

Skills are essential in any business, including black-owned SMMEs as they determine the ability of the organisation to succeed. It is therefore advisable for black-owned SMMEs to identify skill gaps, especially concerning the technical staff (for the deployment, technical support, and

maintenance of the system) and hence develop strategies or plans of action (Workplace Skills Plan) on how to sharpen those skills. The skills gap should be informed by a skills audit, a performance management system, and any technological changes in the organisation. A well-structured Workplace Skills Plan puts in place training requirements for the business and considers the associated budget. Again, the Workplace Skills Plan takes into consideration the current as well as future demands of the given skills sets. Besides enhancing user abilities to navigate the system and improving the technical skills of employees, black-owned SMMEs should consider leadership development programs that can improve senior managers' capabilities to understand and manage change brought on due to the deployment of technological systems.

vi. Technological insecurities

Black-owned SMMEs are advised to communicate their organisation's intention to deploy a new technological system in order to have full buy-in from stakeholders, including management and employees. The communication message should provide the benefits of the technological system (including enhanced operational efficiencies, cost-effectiveness, and user-friendliness), to allay any fears that the new technology will replace people's jobs. The following are security solutions that black-owned SMMEs can apply to mitigate technological insecurities or threats from the use of any technological system:

- Security updates need to be applied continuously in order to reduce risks of misconfigurations in the technological system, hence reducing the vulnerability of data theft and any other forms of threats.

- Unique default passwords need to be used for every device or system that is used by black-owned SMMEs. Users need to continually change their passwords to guard against theft, loss, or any form of threat to the functionality of the technological system.

- Due to many cyber threats, communication between specific devices should be limited. Black-owned SMMEs are advised to evaluate devices that are allowed to communicate. Internet protocol, Wi-Fi isolation and any other access restrictions should be used to prevent unnecessary threats.

5.4 RECOMMENDATIONS FOR FUTURE RESEARCH

The following are suggested research studies that can be explored further:

- A similar study needs to be undertaken, but this time it should cover more provinces and not just Gauteng and Limpopo. That will provide a better representation of the South African context.

- A mixed-method approach should be considered for the same study in the future. This makes use of both quantitative and qualitative approaches. A mixed-method approach has higher levels of reliability and leverages the strengths of the qualitative approach, which provides a detailed account of the subject under investigation.

- The current study was focused on assessing technological challenges in black-owned SMMEs from a non-causal approach. In the future, it will be worthwhile to investigate the factors that influence the selection or usability of a technology system from a causal standpoint. The causal research approach can support the building of a model for the successful implementation of technological systems in black-owned businesses.

- It is also of value to do a study to quantify the contribution of technological systems to black-owned businesses from a South African context. The literature theory is awash with the benefits of these technological systems, without providing the quantum of the contribution to businesses, especially black-owned entities.

5.5 LIMITATIONS

The following is a summary of the limitations of the study:

- Only two (2) provinces (Limpopo and Gauteng) were considered for the current study. This limits the generalizability of the findings to the South African context as the country consists of nine (9) provinces. This is a limitation to the external validity as the extent to which the findings can be applied to other provinces outside Limpopo and Gauteng, are unknown.

- Since a structured questionnaire was applied in this study, the results could have been contaminated by an error from the bias of the data gathering instrument. This is called

standard method bias and occurs when variations in responses are caused by the instrument rather than the disposition of the respondents that the instrument attempts to measure.

- The researcher did not make an attempt to provide the questionnaire in locally preferred languages that could be easier understood by every respondent. This could have had a significant effect on the interpretation or misinterpretation of some of the questions in the questionnaire.

5.6 ACHIEVEMENT OF OBJECTIVES

The main objective of the study was to assess the technological challenges in black-owned SMMEs in selected provinces in South Africa. Only six (6) factors that had high and satisfactory reliability were extracted from the data, using factor analysis. The six (6) factors included Technological competencies, Technological insecurities, Technical support, Reliability of technology, Efficiency of technology and Skills development. Technological competence was the biggest issue facing SMMEs, while the Reliability of technology, Efficiency of technology and Skills development were ranked second and third respectively, in terms of their criticality in the technological challenges for SMMEs. Of the six (6) main challenges, namely Technological insecurities, were the least critical technological challenge facing SMMEs. Literature theory on this subject though does not specifically cover comprehensive technological challenges affecting small businesses, including those that were highlighted in the findings of the study (Cascio & Montealegre, 2016:356; Pentina *et al.* 2012:66).

The second objective of the study was to assess the attitudes towards the access to technological tools. The findings of the study indicated that black business owners had positive attitudes towards technological tools. This is contrary to the theory, which suggested that most black businesses hardly know of modern technology to support business operations. Due to this fact, black businesses owners hardly had any motivation to access technological tools to use in their businesses (Mingaine, 2013:17).

The third objective of the study was to assess the attitudes of businesses towards knowledge, skills, and resources. The findings of the study revealed that black businesses have access to support services for using technological tools, adequate experience to use information technology tools available, and high confidence to use technological tools to enhance the smooth running of the business. This is divergent to the literature theory which argued that most

black business owners and their employees hardly had any experience, knowhow, confidence, or support to keep technological systems in operation and support their businesses to achieve their broad goals (Leboea, 2017:54).

The fourth objective of the study was to assess the usability of technological tools. The findings revealed that black business owners had a positive attitude towards the usability of technological tools. This contradicts the literature which argued that due to the fact that black business owners lack skills and knowledge of technological tools, they find it difficult to use technological tools (Bhorat *et al*., 2018:11).

5.7 SUMMARY

A definitive objective of the chapter is to close the empirical study by compiling a draft of suggested solutions aimed at combating the effects originating from the identified technological challenges of SMMEs.
The areas selected for the exploration of this research paper were the Gauteng and Limpopo provinces in South Africa.

The empirical study exploration was thoroughly examined and deliberated on. Furthermore, the empirical study gave guidance which aided the researcher to define suggestions to improve the adoption of technology, to embrace and its use by black-owned small businesses in selected areas of the Gauteng and Limpopo provinces. The study was trailed by a basic assessment in paragraph 5.6, to conclude if the research targets were accomplished. The insights of the research study were tried against the results accomplished in the study. Finally, the researcher supplied some recommendations in paragraph 5.4, for the study topic to be explored further.

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APPENDIX A

ASSESSING TECHNOLOGICAL CHALLENGES IN BLACK-OWNED SMMES IN SELECTED PROVINCES IN SOUTH AFRICA

CONFIDENTIAL

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Note: All responses are confidential, and neither the individual nor the organisation would be identified in any report or release.

ASSESSING TECHNOLOGICAL CHALLENGES IN BLACK-OWNED SMMES IN SELECTED PROVINCES IN SOUTH AFRICA

Dear Respondent

Organisations require partaking vibrantly in the markets worldwide, utilising the most recent technology, continuously innovating and rejuvenating technology, and position themselves in a manner that will help them gain an edge over the rival organisations in the global markets. However, numerous researchers cited that the adoption of information technology in small business organisations remains constrained due to deficiency of technology cognisance.

Small and medium-sized enterprises (SMEs) have been identified as a critical instrument that contributes to the growth of a nation's economy, and this is also the case in those nations that are on a developing phase. Numerous scholars have identified technology as a critical resource that enables SMMEs in both developing and developed countries to overgrow and to gain competitive advantage. The principal objective of this study is to identify and examine the technological challenges that affect business performances of black-owned SMMEs in South Africa. The new aspiration the researcher seeks to achieve through the utilisation of the questionnaire is to assist small businesses to embrace, adopt and use technology in order to improve their business operations and to gain a perspective of how small businesses are using current technology and what their needs are in the future.

The field of study falls within the subject discipline of entrepreneurship and information technology. This study predominantly focuses on the challenges faced by SMMEs that are influenced by technological factors and possible future opportunities. Only businesses with less than 200 employees will be taken into account. The study will be carried out in selected regions of Limpopo and the Gauteng province.

Only businesses older than one year will be considered during the research process because most businesses that have not yet reached the full first year are considered to be still under establishment. Your contribution is highly appreciated.

SECTION A: DEMOGRAPHIC INFORMATION

Take note that the purpose of gathering demographic data is to profile the respondents. It will not be used to make comparisons between groups.

Mark the applicable block with a cross (X). Complete the applicable information.

A1	**Indicate your age group.**	≤ 29	30 - 39	40 - 49	50 - 59	60+

A2	**Indicate your highest academic qualification.**	
	Lower than matric	
	Matric	
	Certificate	
	Diploma (Technical College or University of Technology)	
	University degree	
	Postgraduate degree	

A3	**How many ARE PERMANENT EMPLOYEES employed by the business?**

A4	**In which industry does the business operate?**				
	Automotive	Agriculture	Clothing	Construction	Food
	Real estate	Retail	Wholesale	Manufacturing	Services
	Other: (Specify):				

A5	**What is the age of business (years)?**

A6	**What is the legal status of the business?**			
	Proprietorship	Partnership	Company (private)	Company (public)
	Close Corporation	Co-operative	Business Trust	Franchise
	Other or combination (specify):			
A7	**Please indicate the province where your business is operating in.**			
	Limpopo		Gauteng	

SECTION B: TECHNOLOGY TOOLS

The following statements concern your attitude towards access to technological tools of the business.

Please rate the extent to which you agree or disagree with the following statements by making an "X" over the appropriate number on the 1 to 5 point scale next to the statement.

1 = Strongly disagree	*2 = Disagree*	*3 = Neutral*	*4 = Agree*	*5 = Strongly agree*

	STATEMENT	**SCALE**				
B1	Our business currently has information technology tools that are fully utilised.	**1**	**2**	**3**	**4**	**5**
B2	Our business has had difficulties getting access to information technology tools required to conduct our business.	**1**	**2**	**3**	**4**	**5**
B3	Our business has acquired the necessary information technology tools.	**1**	**2**	**3**	**4**	**5**
B4	Funding, infrastructures, Internet connection availability, training, etc. are the barriers to gaining access to technology.	**1**	**2**	**3**	**4**	**5**
B5	There should be caution in replacing important people-tasks with technology because new technology is not reliable.	**1**	**2**	**3**	**4**	**5**
B6	Our business regularly introduces new services/products/processes.	**1**	**2**	**3**	**4**	**5**
B7	Our business places a strong emphasis on new and innovative products/services.	**1**	**2**	**3**	**4**	**5**
B8	Our business is continually pursuing new opportunities.	**1**	**2**	**3**	**4**	**5**
B9	The confidence level on our ability to use technological tools to enhance the smooth running of our business is high.	**1**	**2**	**3**	**4**	**5**
B10	In our business, there is a strong relationship between the number of new ideas generated and the number of new ideas successfully implemented.	**1**	**2**	**3**	**4**	**5**
B11	Our business places a strong emphasis on continuous improvement in products/service delivery.	**1**	**2**	**3**	**4**	**5**
B12	Our business has a widely held belief that innovation is an absolute necessity for the business' future.	**1**	**2**	**3**	**4**	**5**
B13	Technological tools are useful and enhance the smooth running of the business by managers/owners.	**1**	**2**	**3**	**4**	**5**

SECTION C: KNOWLEDGE AND SKILLS AND RESOURCES

The following statements concern your attitude towards the knowledge, skills and resources of the business.

Please rate the extent to which you agree or disagree with the following statements by making an "X" over the appropriate number on the 1 to 5 point scale next to the statement.

1 = Strongly disagree	*2 = Disagree*	*3 = Neutral*	*4 = Agree*	*5 = Strongly agree*

	STATEMENT	**SCALE**				
C1	I taught myself to use most of the IT tools our company uses.	**1**	**2**	**3**	**4**	**5**
C2	I was taught to use most of the IT tools our company uses by IT experts.	**1**	**2**	**3**	**4**	**5**
C3	The company's staff and I have attended training, educational courses or classes before we can use technological tools.	**1**	**2**	**3**	**4**	**5**
C4	Our company has access to a help desk or support services to answer questions about using technological tools if the need arises.	**1**	**2**	**3**	**4**	**5**
C5	I rely on the manuals and demonstrations as opposed to help desk or support services.	**1**	**2**	**3**	**4**	**5**
C6	I feel more comfortable and trust my ability to use manual tools more than information technology tools.	**1**	**2**	**3**	**4**	**5**
C7	I have adequate experience to use information technology tools available in our business.	**1**	**2**	**3**	**4**	**5**
C8	I have confidence in my ability to use technological tools to enhance the smooth running of our business.	**1**	**2**	**3**	**4**	**5**
C9	I have performed some of the functions manually in the past, and I feel that information technology tools have been a help.	**1**	**2**	**3**	**4**	**5**

SECTION D: COMPLEXITY, COMPATIBILITY AND BENEFITS OF TECHNOLOGY

The following statements concern your attitude towards the usability of technological tools in the business.

Please rate the extent to which you agree or disagree with the following statements by making an "X" over the appropriate number on the 1 to 5 point scale next to the statement.

1 = Strongly disagree	*2 = Disagree*	*3 = Neutral*	*4 = Agree*	*5 = Strongly agree*

	STATEMENT	**SCALE**				
D1	Some of our staff sometimes thinks that technology systems are not designed for use by ordinary people.	**1**	**2**	**3**	**4**	**5**
D2	There should be caution in replacing important people-tasks with technology because new technology is not reliable.	**1**	**2**	**3**	**4**	**5**
D3	Employees are often encouraged to be abreast with technology development to enhance innovation in our daily business operations.	**1**	**2**	**3**	**4**	**5**
D4	Our business has a widely held belief that innovation is an absolute necessity for the business's future.	**1**	**2**	**3**	**4**	**5**
D5	In our business, technological tools have been used comfortably and without constant supervision.	**1**	**2**	**3**	**4**	**5**
D6	The efficiency (doing things right) of our business has improved over the past few years due to the usage of technological tools.	**1**	**2**	**3**	**4**	**5**
D7	New-technology products are more convenient to use.	**1**	**2**	**3**	**4**	**5**
D8	Technology gives our business more control over the day to day activities.	**1**	**2**	**3**	**4**	**5**
D9	In our business, we find new technology to be mentally stimulating.	**1**	**2**	**3**	**4**	**5**
D10	In our business, we find learning about new technology to be as rewarding as the technology itself.	**1**	**2**	**3**	**4**	**5**
D11	Our business keeps up with the latest technological developments in the area of interest.	**1**	**2**	**3**	**4**	**5**
D12	In our business, we believe that technology makes our overall performance to be more efficient.	**1**	**2**	**3**	**4**	**5**
D13	Our business has barriers to gaining access to technological tools.	**1**	**2**	**3**	**4**	**5**
D14	Technology gives our business more freedom of mobility.	**1**	**2**	**3**	**4**	**5**
D15	New technology is often too complicated to be useful.	**1**	**2**	**3**	**4**	**5**
D16	In our business, we believe that technology enables the team to conduct business activities more quickly.	**1**	**2**	**3**	**4**	**5**

THANK YOU FOR YOUR TIME.