

**THE READINESS OF SMALL BUSINESSES TO EMBRACE THE FOURTH
INDUSTRIAL REVOLUTION IN MAMELODI TOWNSHIP**

by

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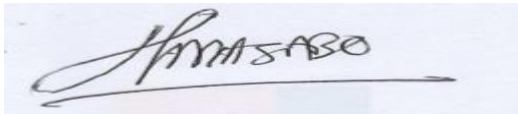
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November 2021

DECLARATION

I, **TEDDY TIMOTHY MASABO** declare that “The readiness of small businesses to embrace the Fourth Industrial Revolution in Mamelodi Township” is my own work and that all the sources that I have used or quoted have been indicated and acknowledged by means of complete references.

Signature:

A handwritten signature in black ink on a light blue background. The signature is written in a cursive style and reads "T. MASABO".

DEDICATION

This dissertation is dedicated to my late mother Lucy Masabo who instilled in me discipline, a culture of responsibility, hard work and a deep affection for education.

ACKNOWLEDGEMENTS

First and foremost, I would like to thank Jehovah God through my Saviour and Lord Jesus Christ for the gift of life and ability to live a productive life on earth.

I thank my family for their unwavering support in this erstwhile academic journey. I highly treasure my wife Thobekile Masabo for her dedication, patience and deep commitment to my studies as someone who has successfully journeyed in this discourse and wish her well in her PhD.

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I acknowledge the systematic encouragement and motivational support from my colleague Dr Mkhululi Sibindi as well as intermittent but valuable inputs from Dr Vusumuzi Maphosa and Mr Mfowabo Maphosa.

ABSTRACT

The study sought to explore the readiness of small businesses for the Fourth Industrial Revolution (4IR) focussing on the township economy of Mamelodi. Small businesses are known to have a very high failure rate. Most studies conducted on the causes of the low survival rate of small businesses have focused on management-related issues. Such issues include poor financial, management and marketing practices which are compounded by lack of requisite skills and training. Empirical evidence confirms the link between the absence of training and support to the failure of small, medium, enterprises (SMEs). However, despite multi-pronged interventions in the sector, the failure rate has remained high. The study adopted the interpretivism philosophy. Qualitative research design and a case study approach were adopted to gather data to answer the research questions.

Key findings revealed that this sector is substantial and despite its semi-informal nature it is capable of being used as a vehicle for township revitalization, empowerment and socio-economic upliftment of previously disadvantaged communities. This in turn has the potential to address the triple challenges of poverty, inequality and unemployment in the country. South Africa's economy is a dichotomy reflecting first world represented by big business and the developing world as manifested in small businesses. Big business has successfully and fully embraced 4IR and is seemingly reaping a variety of benefits that digitization and automation encapsulate. There is potential for small businesses to also embrace the 4IR and achieve similar benefits, which is the knowledge gap that this study explores. To explore this phenomenon, the study focus on small business readiness for the information age and confined the analysis to financial, operational, physical and psychological paradigms as well as the negative and positive outcomes associated with the 4IR. The study concluded that small businesses operating in Mamelodi Township are ready for the 4IR.

ABBREVIATIONS USED IN THE DISSERTATION

4IR	Fourth Industrial Revolution
AIT	Advanced Information Technology
AMP	Advanced Manufacturing Partnership
AST	Adaptive Saturation Theory
BBBEE	Broad-Based Black Economic Empowerment
BRICS	Brazil, Russia, India, China, and South Africa
CRM	Customer Relations Management
DCP	Dynamic Capabilities Perspective
DSBD	Department of Small Business Development
DTI	Department of Trade and Industry
ERP	Enterprise Resource Planning
GDP	Gross Domestic Product
ICT	Information Communication Technology
JCSE	Johannesburg Centre for Software Engineering
JTBD	Just To Be Done
KM	Knowledge Management
NCR	National Credit Regulator
NDP	National Development Plan
NPC	National Planning Commission
PCAST	President's Council of Advisors on Science and Technology
PPPF	Preferential Procurement Policy Framework
RBV	Resource Based View
RDP	Reconstruction and Development Programme
SARB	South African Reserve Bank
SCA	Sustained Competitive Advantage
SEDA	Small Enterprises Development Agency
SETA	Sector Education and Training Authority
SME	Small and Medium Enterprise
SPII	Support Program for Industrial Innovation
TQM	Total Quality Management
THRIP	Technology and Human Resources for Industry Programme
VRIN	Valuable Rare Inimitable Non-substitutable

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CHAPTER 1

BACKGROUND AND PROBLEM

1.1 Introduction and background

South Africa is a young democracy in transition, coming from a long period of socio-economic exclusion under apartheid laws. The inevitable and persistent economic inequality has necessitated proactive empowerment initiatives by government and other stakeholders to lift people out of poverty. Since the dawn of democracy in 1994, the South African government has devised a broad range of economic policies, strategies and programme interventions to ensure substantial participation of all citizens in the economy (Ngcobo & Ladzani, 2016: 15). These initiatives are supported by legal instruments such as the National Small Business Act (23) of 1996, amongst others, which make provision for financial support for Small Medium Micro Enterprises (SMEs). The National Credit Regulator (NCR) of South Africa defines a small business as a separate and distinct business entity, including a co-operative enterprise and non-governmental organisation that is managed by one owner or manager (NCR, 2011: 24). The government of South Africa has prioritised the SMEs sector and committed to provide support for its growth with and the National Planning Commission (NPC) (2011) has projected that 90% of job opportunities are to be created by the small businesses sector by the year 2030 (Elephant & Maphela, 2018). Moreover, the small business sector has been identified as an essential enabler for the country's economic growth (Cooperative Governance and Traditional Affairs, 2014; Elephant & Maphela, 2018). Table 1.1 below shows the definitions of SMEs.

Table 1.1: Definitions of SMME s given in the National Small Business Act

Enterprise type	Number of Employees	Annual Turnover (in South African rand)
Medium	51 to 250	≤ R40M
Small	11 to 50	≤ R15M
Micro	0 to 10	≤ R5M

Source: National Small Business Act (Gazetted in 2019).

Table 1.1 shows the profiles and categories of small business as presented in the South African National Small Business Act (2019). The differences between the categories are fairly distinct with the main variables being annual turnover and total number of employees. These differences portray a level of development and ranges from micro which leans more towards informal operations to medium which is almost akin to a corporate entity.

This study focuses on small and medium enterprises and excludes micro businesses as presented in the table above. According to Elephant and Maphela, (2018: 2) the majority of small businesses are classified as “micro” and “very small”. Charman, Petersen, Piper, Liedeman and Legg (2017: 2) state that the Gauteng provincial government has set a target of 30 per cent of its gross domestic product (GDP) to be generated from township-based small businesses by 2030. This target is set out in the provincial five-year strategy designed to promote township economic revitalisation and innovation within a broader provincial economic growth strategy that is inclusive, sustainable and empowering (NPC, 2013). The focus on revitalising townships and their economies is part of post 1994 transformation agenda. The post-independence Reconstruction and Development Programme (RDP) and the current Accelerated and Shared Growth Initiative for South Africa policies both have programmes in service delivery, housing and social grants all aimed at uplifting the living standards of all citizens, particularly township dwellers.

Seeletse and Ladzani (2012: 3289) argue that the historical legacy of exclusion under apartheid is still evident among previously disadvantaged populations and their localities commonly termed as townships in South Africa. The deplorable state of most of the townships calls for intervention with the idea that the township economy needs to be ‘revitalised’ beginning to gain significant political traction as noted in Charman *et al.*, (2017: 1). According to Madichie, Mpiti and Rambe (2019: 146), public support and funding of SMEs for technological acquisitions commensurate with the Fourth Industrial Revolution (4IR) applications is low. Therefore, there is a need to investigate the preparedness of small businesses for the 4IR given their high instability (Madichie *et al.*, 2019: 146).

South Africa is a middle-income country. According to Bond (2007: 1), the country is composed of the “First world economy” (mining, agriculture, financial services) and the “Third world economy” (SMEs, informal sector, township economy). Whilst the former is fully globally integrated and 4IR compliant, the latter is structurally disconnected giving rise to the notion that lessons learnt in the technologically advanced sector are yet to and can still be applied to the small business sector.

Ladzani and Van Vuuren (2002: 156) point out that the major causes of small business failure supported by most empirical studies are related to aspects of business management such as skills in marketing, finances, operations, leadership and human resource management. According to Thornhill and Amit (2003: 498) and Cheung (2008: 501), small business owners are hampered by a lack of experience and training for the management of their business entities. As a result, small businesses fail to make positive and sustained contribution to society (Ahmad, 2009: 98).

The Global Entrepreneur Monitor (GEM, 2010) reports that South Africa ranks 110th out of 135 countries in terms of the unemployment rate. Radipere and Ladzani (2014: 191) posit that government policies and approaches to economic and social development are increasingly being questioned. Government is the major policy maker and driver and has committed to promote economic growth that is inclusive, sustainable and empowering (NPC, 2013). This assertion may have been interpreted as a political rather than economic stance. For example, Fourie (2015: 14) argues that the National Development Plan (NDP) provides inadequate attention to the “unique obstacles faced by micro-enterprises in the margins of the economy”. Chetty (2014: 56) postulates that government’s approach to small business development should be to address the triple challenge of poverty, inequality and unemployment.

Limited effort is being put in the adoption and diffusion of information and communication technologies (ICTs), the cornerstone and main driver of 4IR, which makes a great contribution to the nation’s economic development (Kyobe, 2011: 255). This problem is particularly pronounced in township economies which are situated geospatially within poor communities where about 60 percent of poverty-stricken citizens reside (Kyobe, 2011: 564). . In planning a sustainable future for cities, (townships included), policy makers and planners are currently pursuing radical

technological changes that offer potential for economic development, quality of living and social equity in urban areas. Stratigea (2014: 44) alludes to innovation, sustainability, localisation and smart cities, as major concepts in today's development discourse, revealing an underlying appreciation and need for 4IR. This contrasts with the government's initiatives such as Broad-Based Black Economic Empowerment (BBBEE), the amended Preferential Procurement Policy Framework (PPPF), Construction Industry Empowerment Charter; Codes of Conduct published by the Department of Trade and Industry (DTI), as well as various industry transformation charters.

Ngcobo and Ladzani (2016) list the multiple and critical policy directives that collectively address issues related to transformation that include affirmative action, altered ownership structures, skills development, preferential procurement, management, mentoring and staff development. A closer scrutiny of the preceding policies and history reveals that benefits associated with 4IR (technology and innovation related) such as competitive advantages, high productivity, quality products and services, market leadership, sustainability, and efficiency are yet to be achieved in South Africa. There is ample opportunity to learn from lessons learnt from developed nations.

In the United States, since June 2011, national-level efforts termed Advanced Manufacturing Partnership (AMP) and recommended by the President's Council of Advisors on Science and Technology (PCAST) were instituted (PCAST, 2011). The initiative intends to bring together federal government, industries and universities to create a fertile environment for innovation and invest in new technologies and design methodologies aligned with the 4IR (Liao, Loures, Deschamps, Brezinski & Venâncio, 2017: 5). Similar initiatives have started in South Africa. An example is the City of Centre for Software Engineering (JCSE) whose activities and programmes centre on technological innovation. On a small scale Masango (2017: 7) states that private sector and start-ups have adopted ICT innovations to develop business solutions for their everyday operations.

The 4IR has developed as a precedent of three previous industrial revolutions namely: 1IR (steam power); 2IR (assembly, division of labour, mass production); and 3IR

(electronics and automated production). The 4IR is distinct from the first three revolutions and is characterised by the widespread application of cyber-physical systems in the manufacturing environment (Guoping, Yun & Aizhi, 2017: 626). Corrales and Westhoff (2006: 914) claim that technology adoption is driven by infrastructural requirements, economic, social and cognitive factors requiring adopters to enjoy the necessary levels of income to afford the technology. Conversely, technology adopters ought to have the necessary cognitive skills and technological infrastructure to adopt the technology. According to Schwab, (2017), in considering the velocity, scope, and systems impact brought about by the advent of 4IR, the inadvertent reality for businesses is the speed of current breakthroughs having no historical precedent.

1.2 Problem statement

The failure rate among SMEs in South Africa is around 80 per cent is extremely high and is attributed to avoidable business challenges (Scheers, 2010: 221; Bushe, 2019). To mitigate against the failure of this potentially critical sector extensive research in functional areas such as finance, marketing and general management have been instituted. Such research efforts have been complemented by deliberate national government efforts and interventions such as the setting up of the Department of Small Business Development (DSBD) and the Small Enterprise Development Agency (SEDA). Policy directives such as the Preferential Procurement Policy Framework (PPPR) have been promulgated and legal instruments like B-BBEE introduced. The Gauteng government also has set up smart city concepts like Steyn City, Menlyn Maine and Waterval estate after the success of Sandton City. The initiatives are big business oriented and no similar initiatives have been established in township areas to boost small businesses. With continued lack of targeted focus small business continue to fail (Barron, 2000:1; Brink, 2007: 364; Nyathi & Benedict, 2017).

Using computers (the basic digitalisation tool) in the business is directly and positively correlated with heightened competitiveness among SMEs (Moyeen, Huq, & Campus 2008: 6). However, Ardito, Petruzzelli, Panniello and Garavelli (2019: 324) point out that implementing digitalisation is hindered by the high investment costs and the range of technical skills required.

Jones and Tilley (2003: 8); Moos and Sambo (2018) found that an estimated 88 per cent of the small businesses surveyed did not have adequate knowledge of technology such as advanced software, internet and advanced technology. Non-availability of appropriate technology prevents micro-enterprises and small businesses from providing goods and services conveniently, timely, cost effectively, competitively and at a consistent rate that would translate to survival and profitability (Chong, 2008: 469). Based on the background to the problem, the problem statement of this study is stated as follows: The problem is to establish the readiness of using the successful but yet to be adopted 4IR in growing sustainable SMEs in the townships.

1.3 Research aim and objectives

The aim of this study is to explore the readiness of SMEs in the township economy of Mamelodi for the 4IR.

The primary objective of the study is to:

- Examine the overall readiness of small business in Mamelodi Township to adopting 4IR.

The secondary objectives of the study are to:

- a) Explore the financial readiness of SMEs in Mamelodi Township to technological revolution.
- b) Establish the operational readiness SMEs in Mamelodi Township for potential benefits of using 4IR.
- c) Establish the readiness of SMEs in Mamelodi Township to potential drawbacks of implementing 4IR at the micro level.
- d) Establish the psychological readiness of SME owners/managers in Mamelodi Township to current 4IR programs.
- e) Explore the physical readiness of SMEs in Mamelodi Township to adapting existing 4IR innovations.

1.4 Research questions

The primary research question is:

- Are SMEs in Mamelodi Township ready to adopt the 4IR?

The secondary research questions are:

- a) How financially ready are SMEs in Mamelodi Township for technical revolution?
- b) Are SMEs in Mamelodi operationally ready for 4IR activities that derive benefits?
- c) How ready are SMEs in Mamelodi Township for the drawbacks that may arise from embracing 4IR?
- d) Are SME owners/managers in Mamelodi Township psychologically ready for current 4IR programs?
- e) Are existing 4IR innovations physically adaptable by SMEs in Mamelodi Township?

1.5 Significance of the study

This study seeks to contribute to the growing literature on small businesses in townships and their adoption of the 4IR initiatives. Using ICT applications, small business operations can grow in a competitive environment. This study will thus add to the body of knowledge and provide an entry point for other researchers who may want to carry out further research on townships and modernisation as is synonymous with economies in transition such as Brazil, Russia, India, China and South Africa (BRICS).

Despite being Sub Saharan African's most modern and industrialised nation, South Africa's unemployment rate is high. At the beginning of this study in the first quarter of 2019 general unemployment and youth unemployment (15 – 24 years) stood at 29 per cent and 55.2 per cent, respectively (Stats SA, 2019). This had risen sharply in the last quarter of 2021 to 35.3 percent in general unemployment and 65.5 in youth unemployment (Stats SA, 2021). This demonstrates that big businesses alone are inadequate to solve the high unemployment levels or stimulate broader economic development of townships. Studying SMMEs that are adopting hi-tech may shed light on alternatives available to other small businesses in this generally stagnant or contracting economy. The South African Reserve Bank (SARB) stated that economic growth was at -2% in 2018 (SARB, 2019).

This study aims to contribute new knowledge by examining the known challenges faced by SMEs and linking these to ICT applications to enhance socio-economic

development in Mamelodi Township in particular and South Africa in general. The study will also identify major issues that are hindering adoption and use of contemporary technology and provide empirical evidence on the role of modern technology on the transformation and success of SMEs. From the literature, related research has been carried out in other regions and countries such as Europe, USA, India, Zimbabwe, Kenya and Uganda (Gomez & Pather, 2012; Pohjola, 2002). However, very little research on the 4IR has been done in South African townships other than mobile (cellular phone) applications (Prisecaru, 2016). The uniqueness of South Africa as the last bastion of oppressive minority rule in Africa and possessing a dual first and third world economies in one demand home grown solutions and interventions that can improve people's lives through economic empowerment. The research outcomes can be generalised to other major townships in South Africa (e.g. Soweto, Khayelitsha, Taba Nchu and Langa) and even rundown inner cities in developed first world cities (New York, Chicago, London and Paris), all with similar socioeconomic environments.

1.6 Limitations of the study

The study will not cover foreign-owned small businesses in Mamelodi Township. These businesses will be excluded in order to avoid issues of sensitivities to xenophobia and legal status of persons involved.

The researcher worked within a limited timeframe of two months to gather primary data for the study. Most SMEs are owner operated and getting adequate time to interview them was challenging. Townships have their own unique character which may render responses being anecdotal with idiosyncrasies that characterise the drawbacks of qualitative data. This may introduce a challenge of reproducibility (reliability) of findings in other contexts. Unlike the similar sprawling township of Soweto, no identifiable database seems to exist of small businesses for Mamelodi Township. This rendered identification of the sample for the study cumbersome. The prevailing Covid19 pandemic restrictions on movement and physical contact meant that face to face interviews were not possible. The UNISA guidelines also were in compliance with the national protocols (UNISA Covid-19 Guidelines, 2020). This meant that interviews with research participants had to be telephonic.

1.7 Research rationale and justification

While much literature on SME's has discussed the importance of business management, training and personal unique traits of small business managers, little attention has been placed on the role of 4IR concepts can play to enhance innovation, efficiencies and competitiveness in modern cut-throat business environments. Jenny and Mbiti (2010) suggest that there is a gap in knowledge of the economic impact of new interventions and ICT innovations on small businesses. Understanding the impact of the 4IR on Mamelodi based SMEs will contribute to the body of literature on the relationship between ICT innovation and small business success.

1.8 Outline of the chapters

The proposed outline of the report is as follows:

Chapter 1 - Background and problem

This chapter lays the foundation for the study and provides an overview of the dissertation. It is intended to give insight on the background, problem statement and purpose of the research; outlines the aim and objectives, and research questions. The chapter also discusses the rationale, significance and limitations of the study.

Chapters 2 - Literature review

The focal point of the chapter is on sourcing and examining other studies and work that has been carried out on 4IR and township economies. The chapter also provides valuable in-depth literature on the research that has been conducted locally in mainstream and township economies, as well as regionally and internationally. Theoretical and empirical reviews on the causes of high small business failures are conducted and available ICT applications that have provided solutions elsewhere are explored.

Chapter 3 - Research Methodology

In this chapter, the appropriate research methodology for the study is discussed. The development of the measurement instruments and the rationale used in the collection and coding of the data and the statistical techniques used to gather, process and analyse the data are also discussed.

Chapter 4 - Data analysis, Findings & Interpretation

The results of the study are presented, analysed, interpreted and discussed in this chapter.

Chapter 5 - Discussion, Recommendations and Study Summary

In this chapter the conclusion on the research topic, and suggested recommendations for future research are presented.

1.9 Chapter Summary

This chapter provides the introduction and background to the study. The chapter also highlights the main aim and specific objectives of the study. This study is focussed on small businesses in townships and how they relate to the 4IR. The focus of the study is on Mamelodi Township in Pretoria, Gauteng province, South Africa. The study uses a qualitative research methodology to gather data in order to answer the research questions which centre on readiness, awareness of benefits, drawbacks and available support for the 4IR. The chapter also highlights the rationale, significance and limitations of the study. In conclusion, the chapter outlines how the study will be organised in five chapters.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

This chapter reviews literature from secondary sources such as books, journals and the internet sources on the readiness of township economies to embracing the 4IR. It further discusses the reasons behind the selection of key concepts and theories that help illuminate this study. The literature under review can be classified into four main categories: (1) The financial, operational and physical readiness; (2) the psychological readiness to government and other private sector initiatives; (3) how ready small business owner managers are to the challenges that may arise in efforts to implement the implementation of 4IR; and (5) conceptual theories.

This study is built on Penrose' Resource Based View (RBV) of the business. This theory argues that a business need to have unique competitive advantage to survive (Penrose, 1959). The second theoretical discussion anchoring this study is Schumpeter's (1942) seminal creative destruction theory which focuses on the role of innovation in a business. Finally, the contemporary and emerging e-leadership theory will be applied to shed light on human resource aspect of digitisation.

Figure 2.1 depicts the strategic competitiveness for SMEs achievable through the combination of internal and external inputs to achieve the desired output. The diagram illustrates that although external funding is required by under resourced small businesses, this alone may not translate into Sustained Competitive Advantage (SCA). Rather, the responsibility lies squarely with the SMEs themselves to possess and apply the necessary skills and competencies to successfully compete with their rivals in the market environment.

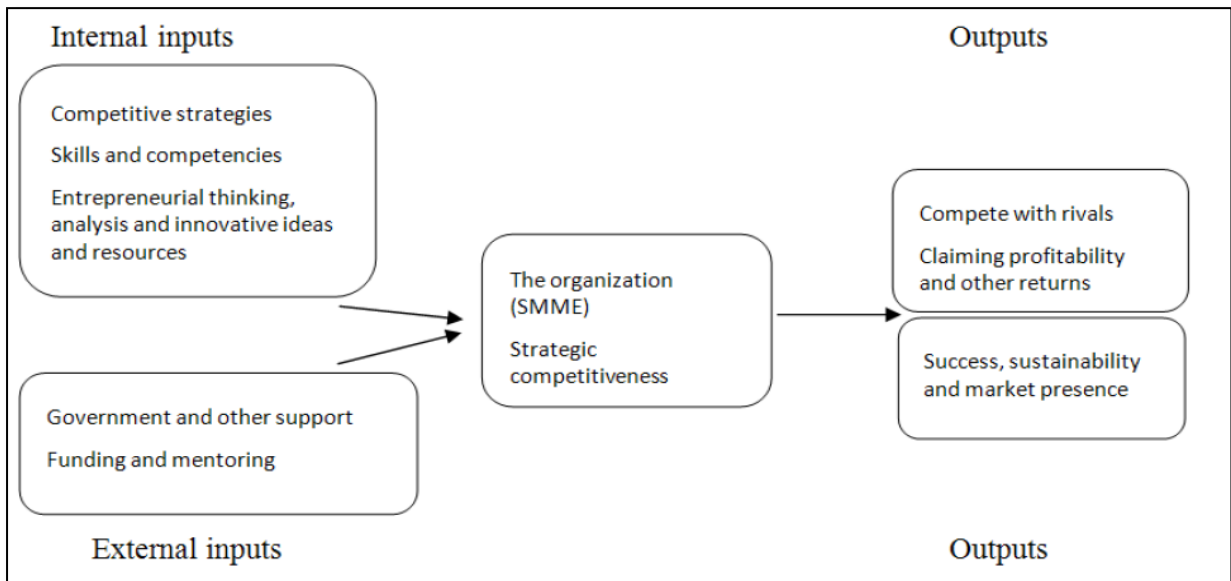


Figure 2.1: Strategic competitiveness for SMEs

Source: Chiloane-Tsoka and Boya (2014).

Tengeh (2013: 347); Zizile and Tendai, (2018: 228) claim that a vibrant and successful SME sector signifies a healthy economy, especially in an emerging market such as South Africa. Conversely, a struggling small business sector is indicative of poor economic performance and growth. This suggests that the township economy which is part of the SME sector, such as that of Mamelodi under study, has great potential to address socio-economic challenges of township economies. The common argument and experience is that SMEs can facilitate economic growth through job creation, poverty alleviation and social stability. Xesha, Iwu, and Slabbert (2014: 37) point out that research evidence suggest that SMEs have a very low survival rate. Adopting the innovative 4IR, with its attendant benefits of streamlined labour, processes and physical infrastructure requirements is arguably worth pursuing as a solution to the high failure rate of small businesses alluded to earlier. Booyens (2011: 72) defines innovation as being the implementation of new or significantly improved product (good or service), or process, a new marketing method, or a new organisational method in business practices, workplace organisation or external relations. This definition does apply to 4IR and forms the basis for examining the readiness of small businesses to digital migration as pathway to the elusive success. The 4IR is a global phenomenon that is rapidly gaining traction. Ardito, Petruzzelli, Panniello and Garavelli, (2019: 326) define 4IR as digitisation and integration of

business processes for efficiency on the part of the business on the one hand and customer fulfilment on the other hand.

The choice of 4IR to investigate small business success is motivated by a need to examine this apparently unexplored link. Most empirical studies have focused on management issues such as skills in marketing, finances, operations, leadership and human resource management (Ladzani & Van Vuuren, 2002: 156; Chiloane-Tsoka & Boya., 2014), lack of experience and training (Thornhill & Amit, 2003: 498; Cheung, 2008: 501; Wiid & Cant 2018) and poor management decisions (Ihua, 2009: 199; Sun, Hyland & Cui 2014)

2.2 Conceptual framework

Figure 2.2 below illustrates the use of different frameworks adopted in this study. According to Bryant and Bailey (1997), researchers use a combination of theories or different approaches to achieve set research objectives as is in this case. The three theories discussed in this chapter represents potentially useful ways of understanding how small business in a township economy such as Mamelodi are ready for 4IR.

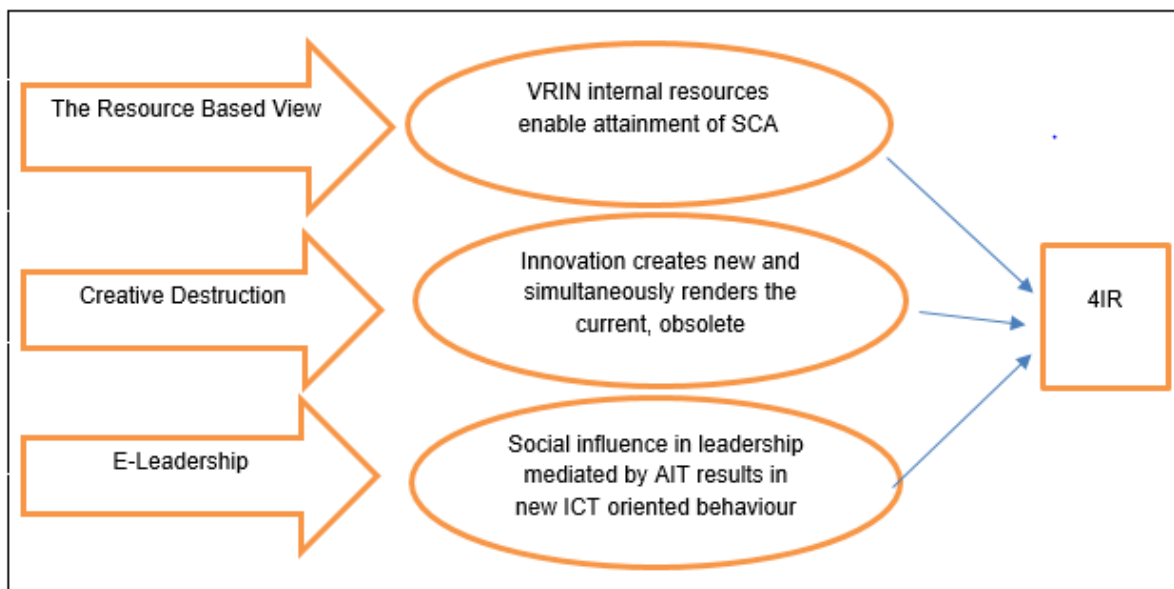


Figure 2.2 : Illustration of the conceptual framework

Source: (Own creation)

2.2.1 The resource based view (RBV)

The RBV theory states that a business's SCA is derived from internal sources. The central proposition of this theory is that for a business to attain a state of SCA, it must acquire and control resources which are valuable, rare, inimitable, and non-substitutable (VRIN) (Kraaijenbrink *et al.*, 2010). The RBV unequivocally looks for the internal sources of SCA so as to explain instances which occur whereby businesses in the same industry might differ in performance. SMEs share the same market with big businesses in township economies such as the one under study, Mamelodi. Small businesses have long been entrenched in such communities with business owners and customers having a personal relationship in most instances. Furthermore, small businesses seemingly have an inherent advantage over big business of convenient location, lower overheads and flexibility of operations which bigger businesses may not be privy to. The RBV theory is applied in this study to explain why or how small businesses may evolve under 4IR to achieve or acquire new SCA and therefore prosper in the midst of marked competition.

According to Barney (1991) the RBV highlights that in order to afford an opportunity for SCA; a resource must be VRIN and be complemented by tacit skills or socially complex organisational processes. Christmann (2000) expounds on VRIN by stating that value is a construct of a resource increasing a customers' willingness to pay or lowering their cost; Rareness is the enabling of a business to command a premium and manage competition; Inimitability arises from the social complexity of a resource and creates the potential for sustained advantage; and non-substitutability refers to the uniqueness of a product or service. Like many formerly disadvantaged townships, Mamelodi is part of governments' revitalisation programs which aim to lift such areas to parity with more affluent or well serviced localities. To achieve this, deliberate policies through public and private initiatives have targeted, in addition to service delivery systems, infrastructure and commercial development (Gauteng Province Department of Economic Development, 2014). The paradox of these efforts has been economic development with the attendant employment creation but with (further) dire consequences for already struggling small businesses. A case in point, Mamelodi has within the past three years been graced with two mega shopping malls; namely, Mams and Tshwane regional shopping Malls.

It would be futile for small businesses to try to compete directly with established brands and well-resourced conglomerates that operate from such malls and other locations within the township. SMEs would therefore need to develop new competences and capabilities by latching onto the 4IR wave with its benefits of virtual existence not bound by physical assets and locations. Kraaijenbrink *et al.*, (2010) argue that businesses that have better product innovation will, in due course, surpass those that have the best product but are complacent by being satisfied with their competitive position. In the 4IR era, small businesses should aim at achieving in line with Porter (1985), improved efficiency (reducing cost) and effectiveness (increasing value), which ICT enabled operations support.

Barney (1991: 101) lists resources that can enable a business to conceive of and implement strategies that improve its efficiency and effectiveness as including all assets, organisational processes, knowledge, capabilities, information, organisational attributes, brand equity, intellectual property, and the businesses' formal and informal networks. These assets should be complemented with capabilities of businesses, which as imperceptible assets encompass the skills of individuals in the business, organisational culture and practices (Elliott & Boshoff, 2009). In other words, the activities that are uniquely township by orientation, proudly nuanced as "ekasi" need to be blended with a touch of modern internet-based e-era. This would invariably set SMEs on a unique niche trajectory, peculiar to South Africa's expansive network of townships such as Mamelodi.

South Africa's sprawling townships have been around for a long time, contain a sizeable proportion of the nation's population, and have similar socio-political fabric such as demographics and popular urban culture as well as history. In addition, despite their fairly underdeveloped state, command a deep-rooted affinity even for residents who have migrated to the suburbs. Famous townships in South Africa other than Mamelodi include Soweto, Kagiso, Soshanguve, Langa, Khayelitsha, Sebokeng, Hamanskraal, Thembisa, Thokoza, Kathlehong and Kwa-Mashu. Riding on the potential that 4IR offers, perhaps the time may be ripe for the development of theory (or business concept) specific to the township economy. This may be done by incorporating among other concepts, the creative destruction of current township

SMME setup using the capabilities of e-leaders in managing the transition so as to achieve a state of SCA as defined in the RBV.

There is a number of popular and successful, predominantly township-based products and services which have stood the test of time. These have the potential to be commercialised, branded and deliverable to customers cost effectively to an e-society which now enjoys almost universal access to internet services mainly through smart mobile phones and affordable data packages. This perhaps would offer small businesses an imperfect market under which they would thrive as the current business space dominated by big business is a perfect market (controlled by market forces) and excludes them. Examples of township business applications include “Chesa nyamas”, “stockvels”, “taxis”, “spaza” shops and food stuffs such as “spatlho, amagwinya, archaar, mugodu, inhloko, ama sondo and umqomboti”. There are also ethnically based cultural ceremonies and historically significant historical political events that are mainly observed in townships such as Sharpeville, Boapatong and June 16 (1976) Soweto massacres for the tourism sector. In addition, there are conventional businesses albeit displaying distinctive township flair such as salons, restaurants, mechanics, B&B’s, grocery stores, catering, car wash, retail, sports and entertainment, construction, transportation, and fast food. This inexhaustible list of products and services are currently being delivered consistently to a loyal township customer base without affording small businesses with any meaningful profitability nor growth but mere survival.

Fiol (2001) and Schroeder and Kotlarsky (2015) posits that both the resources/skills, and the way organisations deploy them, should constantly change, thus leading to the creation of continuously changing temporary advantages. Kraaijenbrink *et al.*, (2010) concurs adding that such SCA must eventually be competed away. This justifies the need for small businesses to continuously seek new sources of business advantage as analysed in the preceding paragraph as opposed to maintaining an unsustainable status quo. A critical lesson stand-alone and under-resourced SMEs could learn from big business in terms of strategic advantage is the use of alliances. The formation of an alliance entails each partaking business entity to bequeath a subsection of its resources to the alliance with the expectation of engendering common benefits from the shared resources of both participating businesses (Lavie, 2006; Hau, 2016).

The alliance can be described as a complementary coalition in which businesses seek to achieve synergies by employing distinct resources that are difficult to accumulate for any single entity and are therefore a resource-based competitive advantage for the businesses participating in such an alliance. In enjoying the benefits of RBV participating businesses may be capable of appropriating a variety of benefits namely internal rent, appropriated relational rent, inbound spill over rent, and outbound spill over rent (Lavie, 2006; Hau, 2016). Therefore, businesses face positive and beneficial trade-offs in building their networks of alliances. SMEs have the option in this cost cutting endeavour to engage in homogenous networks (similar resources) or heterogeneous networks (complementary resources). If such a strategy were to be pursued by small businesses serving a common market, technological and other risks would be minimised or shared and more opportunities for growth would avail. The “dynamic resource-based view” according to Helfat and Peteraf (2003), is a recent extension of the RBV and posits that resources and capabilities should be continually adapted, integrated, and/or reconfigured into other resources and capabilities. Eisenhardt and Martin (2000) agree and refer to the extended version of RBV as the dynamic capabilities perspective (DCP). The DCP solidifies the RBV by adding a new angle of addressing the realities of high-velocity markets and rapid technological change which are synonymous with the 4IR.

The question that can be postured at this juncture is to whether e-commerce or internet-based operations can enable greater profitability and survival among SMEs. Internet usage *per se* cannot be a source of SCA as argued by Lumpkin, Droege and Dess (2002). This is due to the fact that ICT technologies and Internet applications are easily replicable by competitors. This contrasts with non-technology assets such as complementary business and human resources (e-leadership) which cannot easily be reproduced, as is argued in the “strategic necessity hypothesis” (Lumpkin *et al.*, 2002). Therefore, Zhuang and Lederer (2006) as well as Zafar, Ishaque and Javaid (2014) conclude that the only way ICT can contribute to an SCA for businesses is when the use of the Internet is driven by pre-existing business and human resources. Barua and Mukhopadhyay (2000) and Ndayizigamiye and Khoase (2018) further analyses the relationship between ICT usage and productivity and acknowledge the existence of a gap in knowledge between the two variables. They refer to this missing link between ICT and performance as the “productivity paradox,” whilst simultaneously confirming

the existence of a positive relationship. This positive correlation stems from the predictions in the theory of production that lower prices for ICT will create benefits in the form of lower production costs for a given level of output (Barua & Mukhopadhyay, 2000).

Zhu and Kraemer (2002: 275) provide yet another extension to the RBV in the form of the Resource-Based Theory for Net-Enhanced Organisations. This is touted as a potential framework for boosting the theoretical basis of e-commerce value in fast paced e-environments. Wheeler (2002) proposes an extension to this, dubbed the Net-enabled Business Innovation Cycle to account for the integrative as well as disruptive (creative destruction) nature of the 4IR. All these resource-based theoretical frameworks are relevant in this e-era and small business managers need to ready themselves by critically examining how they would strategically fit in their businesses.

2.2.2 Creative destruction

According to Schumpeter (1942: 83), technological progress creates losses as well as gains, by rendering obsolete, old goods/services, markets, and manufacturing processes. Innovation is the primary method by which creative destruction occurs. Abernathy and Clark (1993) and Cunningham (2017) define innovation as being the initial market introduction of a new product or process whose design is a radical departure from previous practices. Innovation is derived from scientific advances, and its introduction renders existing knowledge in that application obsolete by creating new markets, supporting new user needs in the new functions it offers as well as demanding new channels of distribution. In its wake, innovation leaves behind obsolete businesses, practices, and factors of production, while creating new industries.

Bergek, Berggren, Magnusson and Hobday (2013), however, argue that creative destruction may be viewed instead as a process of creative accumulation. In this instance, businesses may be able to absorb new technologies and integrate them within their existing capabilities. This is recommendable for small businesses given their financial and proprietary limitations. Noble as it may be in product and process advancement, novelty in technological advances may not necessarily culminate in competitive significance (Abernathy & Clark, 1993). The implication for small

businesses aiming at tapping into the potential of the 4IR in achieving efficiencies and profitability is that ICT or internet of themselves are not the solution.

In activating creative destruction through digitisation for example, small businesses have options according to their capacity and e-expertise. Paetz (2014) identifies the existence of low end disruption (offering inferior quality), new market disruption (segments not serviced) and sustaining disruption (better offering to incumbents). Spencer *et al.*, (2008:15) introduce another dimension to disruptive technology as either being discontinuous innovations or plain creative destruction. The former refers to disrupting the current capability set required by a given market, whilst the latter is evolutionary. The common thread between the two is that, to be termed a disruptive technology, it should not support current firm-based manufacturing practices. This justifies the case for the troubled SME sector that survival or growth cannot be achieved under the current scenario and forms the basis for this study that a new, promising and tried and tested (by big business), 4IR be considered through experimenting with innovation.

Figure 2.3 exemplifies the different types of innovation available for small businesses according to their size and stage of development. Although it is adopted from the automotive sector, it does equally apply to other business sectors. The diagram shows that on the one hand smaller businesses and new entrants are more likely to be associated with the more disruptive or radical innovations such as niche and revolutionary just as such innovations took place when the Ford Motor Company was in its infancy. On the other hand, larger, incumbent companies are more likely to be associated with incremental or evolutionary innovation depicted in Figure 1.4 as regular and architectural, respectively. This latter position happens whereby the market dominance has been achieved and focus is on customisation of the product offering.

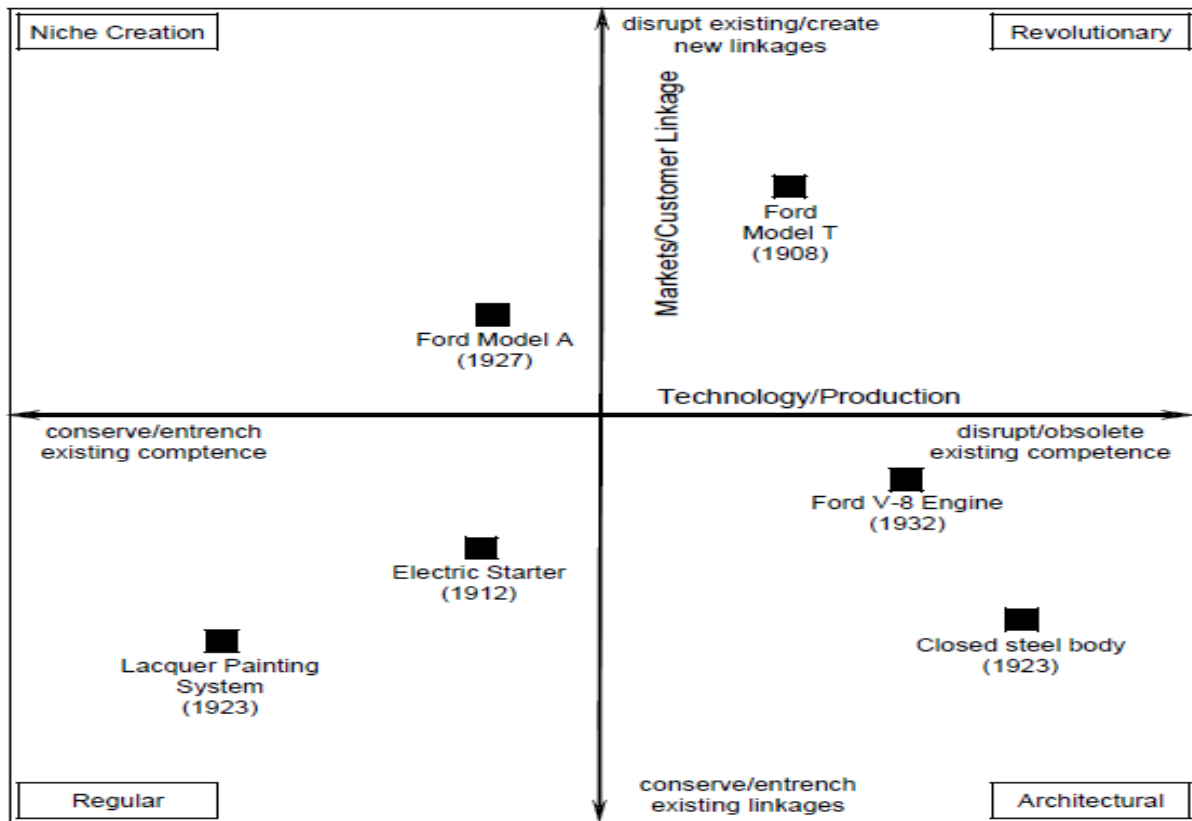


Figure 2.3 :Innovation and technological change

Source: Spencer *et al.*, (2008: 4)

Small businesses should not offer resistance or scepticism to innovation, basing on their financial and technical limitations. Bower and Christensen (1995) as well as Amshoff, Dülme, Echterfeld and Gausemeier (2015) point out that disruptive technologies may not necessarily need to be fundamentally new from a technological point of view. They should at least display superior ‘performance trajectories’ targeting critical attributes that customers such as those in townships in this case, value the most. Spencer *et al.*, (2008: 16) and Ciampi, (2015) also weights in on demystifying innovations such as ICT as being costly, arguing that breakthroughs have aggregate effects having intermediate stages and perpetual refinement.

In instances where small businesses appreciate and desire innovation but are reluctant or incapable of undergoing the innovation processes, manageable alternatives do exist. Ready-made generic innovations can be obtained through licensing agreements and strategic alliances (Gans *et al.*, 2000). Innovations by nature may be costly and time consuming to conceive. As such products, services,

competences or processes thus acquired should be sustainable at least in the medium term by being inimitable and non-substitutable in line with the VRIN concept of RBV ((Barney, 1991). Creative disruption is about interrupting so as to gain and should not translate into negative outcomes as the word “disruption” connotes. Turnheim and Geels (2012: 33) discuss the concept of regime destabilisation as a deliberate and essential effort to manage (disruptive) transitions through ‘creation’ of new and for ‘destroying’ (or withdrawing support for) the old. This is a proactive approach to avoid the inevitable change emanating from the external environment over which a business has little or no control.

Turnheim and Geels (2012: 33) refer to this proactive approach as Technological Innovation Systems (TIS) and has the benefit of creating “windows of opportunity” and up scaling of current processes. The business environment is both dynamic and turbulent not only for well-resourced big business but markedly so for under resourced small businesses. As such innovation in a fast paced and unpredictable e-environment possesses a great challenge. To manage the inevitable change spurred on partly by the advent of 4IR, manageable strategies for SMEs are needed to avoid among other things, psychologically burdening small business owner-managers. Borrás and Edquist (2013: 1514) propose a ‘policy mix’ involving a variety of methods to manage change (disruption). These are: layering (adding on top of the existing); drift (change without altering the fundamentals); and conversion (altering processes but not goals). Kern and Howlett (2009) add a fourth strategy, namely replacement (fundamental restructuring of both goals and activities). This affords small businesses ample choices and they should be strategically ready to manage or even initiate change so as to remain competitive.

Figure 2.4 below shows the link between types of innovations and business success as well as innovation and performance over time. The argument displayed in the diagram is that innovation should be constant over time to enable a steady rise in business performance. Novel disruptive innovations are unknown and untested hence offer less in performance impact than sustaining innovations which are gradual improvements to familiar offerings. Between the two innovation continuums lies the ideal average or recommended middle ground illustrated as the actual performance that the market place can absorb

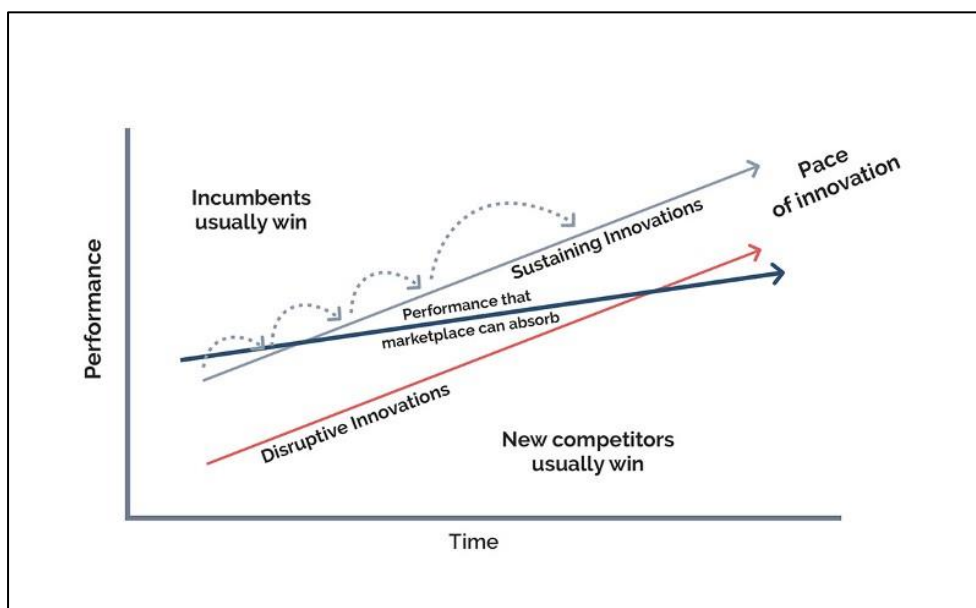


Figure 2.4: Innovation and performance over time

Source: Paetz (2014: 17).

The South African government's policy agenda for transformation and transition are testament to the fact that the business environment does not accord a level playing field for the wide diversity of the economic participants. There is a wide, almost unbridgeable disparity between small and big businesses in all economic metrics conceivable. As previously attested to in this study, SMEs cannot successfully compete directly with large businesses. Generally, small businesses are not ready to enter such competition neither physically, financially, psychologically nor operationally. To counteract this disparity, Paetz (2014), postulates the Job To Be Done (JTBD) concept.

The rationale behind JTBD is that it seeks to quell the error most companies entering markets make, which is attaching conventional definitions of product categories. By targeting demographic characteristics rather than JTBDs, competition by businesses tends to be based on product features. This inadvertently results in either replication of existing players, or adding of features that are akin to the identified preferences of the presumed average consumer in the target demographic. The weakness lies in such competition being against other players in a defined product category and competing for existing consumers in a market. The drawback in this sort of competition is that it does not increase the size of the pie, but rather increases the number of

players wanting a slice of the same pie (Paetz, 2014). Li *et al.*, (2016) terms the above behaviour as competing against non-consumption and that it is the exact opposite of what a disruptive innovator needs to do. If small businesses are to “compete against consumption” it would generally favour the dominant incumbent (big business), hence, disruptors need to compete against non-consumption and increase the size of the pie.

For every need that a product addresses, there are consumers who are left out of the market. An innovative disrupter is similar to an e-leader and refers to an individual who unravels the complexities of ICT by increasing access to technology, harnessing of new ideas, and peer education (Li *et al.*, 2016). An e-leader or innovative disrupter is critical for innovation initiatives in a business, especially SMEs. This is so as the type of a leadership system pursued may be enabled, undermined, or completely disabled by the introduction of ICT.

The psychological issues that a small business owner-manager would likely face in the event of readily overcoming other challenges such as physical, operational and financial would be the paradox that digitisation manifests. Pulley and Sessa (2001) defines a paradox as being a conception of two alternatives being mutually exclusive while there is a need for both concepts to be true. The following paradoxes should be anticipated and mitigated: speed versus bad decisions; autonomy versus isolation; top down versus grassroots; top manager versus technology (decision making); details versus big picture; and flexible versus steady (Pulley & Sessa, 2001). The main dichotomy discernible in these paradoxes is the autonomy of ICT displacing the independence of the SME owner-manager.

Like any business management focus area, leadership is essential to manage the creative destruction phenomenon. Operationally, owner-managers should be ready to avail agile leadership to enable quick response to opportunities and threats in a business environment using ICT (Li *et al.*, 2016). Successful innovative leadership could be rewarded with monopoly rents that accrue as “prizes” to the successful innovator (Schumpeter, 1942:102).

2.2.3 E-leadership

Avolio, Kahai and Dodge (2000) define e-leadership as a process of social influence mediated by Advanced Information Technology (AIT) to produce a change in attitudes, thinking, behaviour, and performance within individuals, groups, and organisations. The duty of an e-leader is to transition a business from the "old economy" (Walker, 2000) into an e-business relying on internet-based activities as the primary source of its revenues and profits (DasGupta, 2011: 5). According to Avolio and Kahai (2003) and Savolainen (2014), e-leadership is management that applies technology-mediated leadership (TML) and is characterized by geographical distance between the leader and other stakeholders as well as strong electronic information sharing applications. An e-leader should therefore be ready to be transformational in the way they operate as the e-phenomenon is altering global business and organisational boundaries. The alteration of business boundaries is in the form of, among others, the elimination of limitations set by the workplace and working hours (Ribiere & Worasinchai, 2013; Hoch & Kozlowski, 2014). Virtual organisation is the name attributed to the new organisational form. The new work environment is known as e-environment and the emerging leadership pattern is labelled as e-leadership (Mohamad & Ismail, 2009: 11).

The Adaptive Saturation Theory (AST) has been identified as one of the main basis for guiding future research on e-leadership (Bierly, Kessler & Christensen, 2000; Schmitz, Teng & Webb, 2016). According to AST, the effects of AIT stem from their interaction with business structures of which leadership is a part. This interrelationship is symbiotic in that business structures themselves, including leadership, may also transform as a result of interactions with AIT (Bierly *et al.*, 2000). The existence of this and other theoretical concepts around e-leadership demonstrates the need for small businesses to adopt a scientific rather than the current instinct based *modus operandi* in operations. Elliott and Boshoff (2009) as well as Avolio, Sosik, Kahai and Baker (2014) demonstrate an e-leader needs to draw a clear distinction between ICT assets and ICT processes as components of information systems. ICT assets are described as human assets, technology assets, and relationship assets, and ICT processes are identified as planning ability, cost-effective operations and support, and fast delivery (Elliott & Boshoff, 2009).

McGowan and Durkin (2002) have built a competency-based model that seeks to simplify how owner-managers manage the Internet within the context of the overall business and marketing activities in day to day operations and activities. This theoretical model details the logical steps which even a small business with modest financial endowment may follow on the path to digitisation, from the conceptualisation (of the Internet) as an operations tool to the successful implementation of the information technology. Firstly, the entrepreneur should have a “vision” of what is achievable through Internet usage; secondly, actual acquisition of the technology and technical competencies to utilise such a medium; and thirdly, attaining the relevant competencies in the form of technical ability.

The steps set forth in this proposition can be reconciled to kinds of readiness for the 4IR by SMEs in three stages. The first stage (vision) requires psychological readiness to overcome fear and scepticism for the unknown whilst the second (implementation) stage requires physical, operational and financial readiness. Finally, in the third stage, with all in place and requiring the services of e-leadership, psychological readiness is yet again a pre-requisite to synthesize the tangible components with the intangible human factors. The third and final stage is particularly significant in that sustainable competitive advantage is no longer rooted in physical assets and financial capital, but in effective channelling of intellectual capital (Seubert, Balaji & Makhija, 2001; Halawi *et al.*, 2005: 76). Furthermore, according to Ngubane, Mayekiso, Sikota, Fitshane, Matsoso and Juan-Pierré (2015), resources are only valuable in as far as they support efforts aimed at improving the business’ efficiency and effectiveness. This, they argue, is the main purpose for the function of an e-leader. Steps should be clearly defined, logical, meaningful and sequential as illustrated diagrammatically below in Figure 2.6.

Figure 2.5 illustrates the gradual, manageable and affordable stages a small business may take in digitisation and the duties of an e-leader to be derived thereof. An e-leader’s agenda is to transform a traditional business into a digitised one such as one utilising e-commerce shown here. The duties and responsibilities rise incrementally with sophistication and the business benefits similarly accrue incrementally. The e-leader must proactively plan for each stage by assessing the psychological physical, operational and financial readiness of the business and the owner-manager to 4IR.

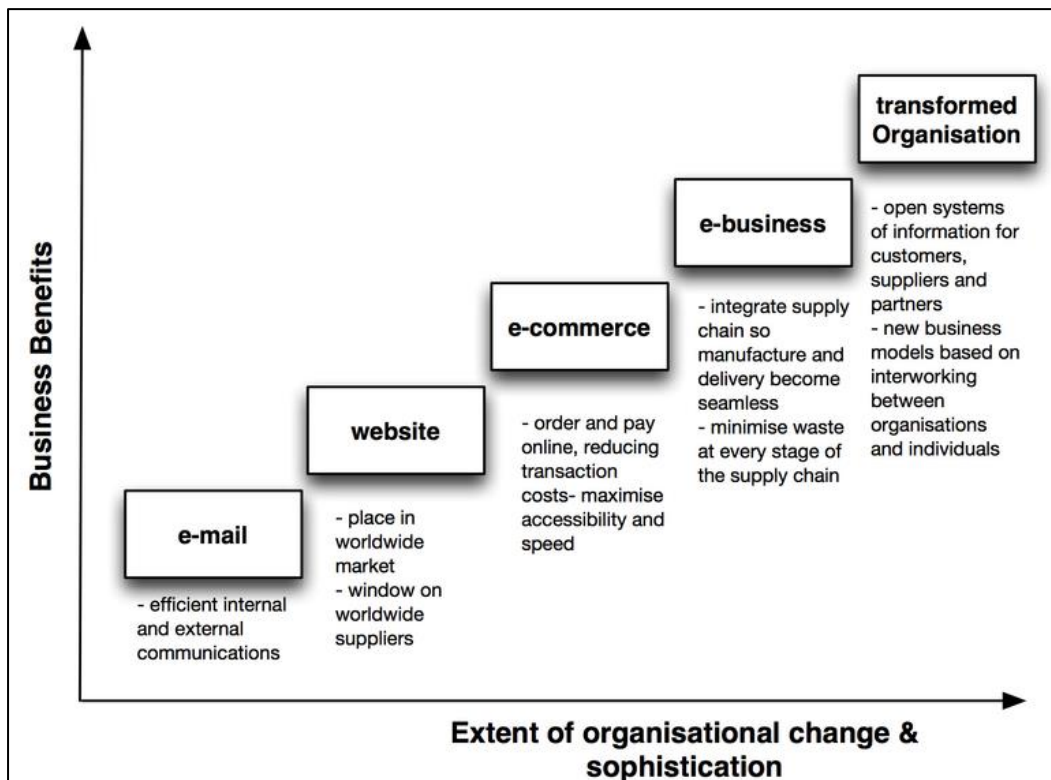


Figure 2.5: Adoption ladder approach to e-commerce.

Source: Motjolopane and Warden (2007)

Ngubane, *et al.*, (2015) suggest that resources of a business do co-evolve with the external environments they operate in through continuous feedback processes, which ideally can be accomplished through a dedicated e-leadership posture. Brink, Cant and Ligthelm (2003) caution about the misreading of customer trends and needs as a major factor that impedes SMME growth in South Africa. To counter this negative phenomenon, Xesha, *et al.*, (2014: 37) propose that a better relationship ought to develop between a business and its customers so that there is lucidity with regards to the needs of customers. CRM is one solution, through which an e-leader can solve such a challenge (McKenna & Martin-Smith, 2005; Li, Liu, Belitski, Ghobadian & O'Regan 2016).

In taking on the role of e-leadership as the 4IR unfolds, owner-managers need not fret as Mohammad (2009: 1) asserts that they need not be neither “technology guru” nor “business wizards”. This is the case in that the very global leadership traits considered necessary for traditional leaders are correspondingly pertinent to e-leaders. However, what distinguishes e-leaders is the ability to synthesize skills, attitudes, knowledge and

personal experiences with technology, and its effective use in this technology-mediated management (TMM) environment (Ribiere & Worasinchai, 2013).

Ribiere and Worasinchai (2013) describe e-leadership as a new and expanding concept and that it has to be adjusted in line with the way owner-managers operate and link it to their current leadership styles. Lippit and White (1958) describe the threefold typology of leadership as authoritarian, laissez-faire, and democratic leadership styles. Being a novel concept, e-leadership may prove challenging for SMEs since the relationship between ICT and productivity is fairly murky and complex although generally displaying a positive correlation. Lippit and White (1958) provide an insightful analysis of the three leadership styles as follows: Authoritarian leadership demands group dependence on the leader, with their presence holding the group together, but regrettably no work is done in their absence; Laissez-faire leaders achieve little work whether they were present or absent; whilst democratic leaders achieve team cohesion and harmonious functioning relationships whether they are present or not. Clearly, owner-managers have a lot of adjusting in their leadership styles as they integrate the status-quo with the e-factor.

E-leadership is described as building on the socio-technical systems approach, which states that business effectiveness is determined by how well the social and technical systems align with each other to the external business environment they operate in (Orlikowski, 1992; Avolio *et al.*, 2000; Šerić, Gil-Saura & Ruiz-Molina, 2014). According to this theoretical construct, technology is both a cause and consequence of internal organisational structures (Orlikowski, 1992). Avolio *et al.*, (2000) applies the term “interpretive flexibility” to describe the recursive relationship between AIT and the organisational setting in which it was developed and used. The socio-technical approach rhymes perfectly with the AST theoretical framework which also captures the view that technology and organisational structures influence each other in a co-evolutionary process.

The significance of AST for small businesses in the e-era lies in its analysis of different work contexts and how users of AIT adapt, resist, or reject technology. The choices made about technology leads to impacts that may not be designed or intended. Arguments in this study concerning e-leadership, creative destruction and RBV

converge on AST. The actions of users (adaptation, resistance, or rejection), or the impacts of their actions leads to modification of the work context in which the technology is used (Avolio *et al.*, 2000). This modification is in products (RBV), management (e-leadership) and processes (creative destruction). E-leadership is so critical that, other than promoting successful adaptations to change, it can also cause new information technology to be appropriated. This may be in such a way that it has minimal effect on the pre-existing social-cultural system that community based SMEs dread to lose.

Noble as it is, e-leadership is fundamentally mismatched between the demands of e-development to transform economies on the one hand and governments and current institutional assets and arrangements on the other hand (Hanna, 2007: 6 ; Van Wart, Roman, Wang, & Liu, 2019). The mismatch takes the form of emphasis on stability, silo mentality and inward-focus. Additionally, separation from other public and private players, and other technology managers from mainstream business leadership is also a misnomer. E-leadership is a long-term process that embroils experimentation, adaptation and institutional learning and accompanying attributes.

DasGupta (2011: 4) identifies the attributes that may be required of owner-managers should they embrace the 4IR and these include cognitive skills, education, quick adaptability to change, flexibility and crisis management. Magro and Wilson (2013) further extends the list to include capacity to build coalitions, forge communities of interest, multi-tasking and social networking. According to Savolainen (2014) a link does and should exist between SME focus areas to qualities and capabilities. Furthermore, these qualities need to be reconciled with the small business owners' desire to remain "humane" despite the greater dependence on technology usage on the one hand and avoiding isolation and confusion on the other hand (DasGupta, 2011: 13). A delicate balance is needed by an e-leader to fuse elements of human capital through leadership with technology as illustrated in detail below.

Figure 2.6 illustrates the link between SME focus areas to qualities, capabilities and attributes required of an e-leader. The diagram illustrates how personality/human constructs provide inputs into e-leadership qualities which in turn define capabilities attainable. The implementing of such capabilities provides the scope for e-leadership.

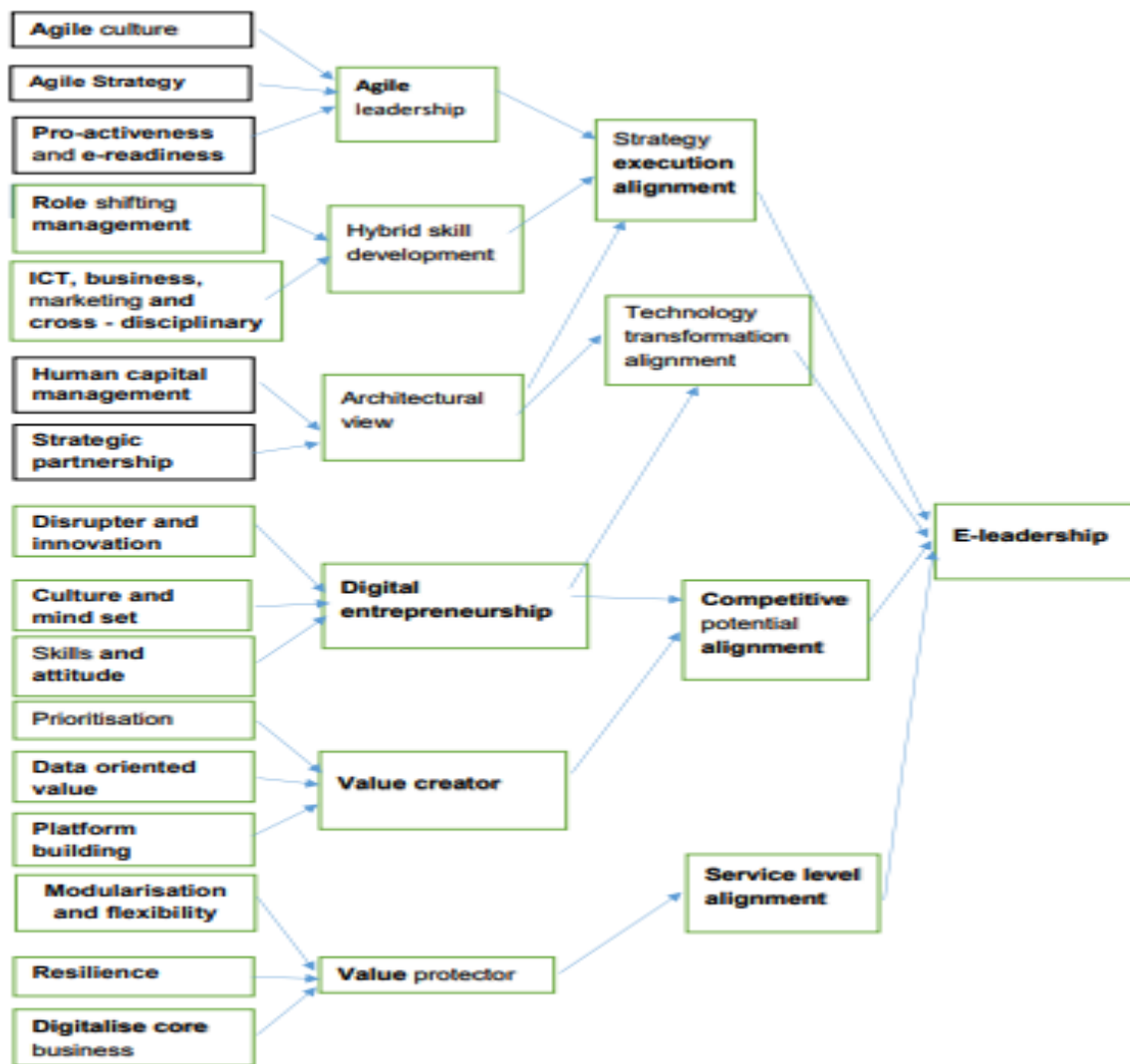


Figure 2.6: Attributes of an e-leader
 Source: Li, et al., (2016: 193)

Some of the actual e-technological activities that an e-leader would engage in according to Mohamad and Ismail (2009: 13) include integration of management information systems and its associated data, legacy hardware and software, the internet, telephone, overnight express mail, fax machines; and groupware tools such as e-mail, bulletin boards, chat and video-conferencing.

2.3 The financial, operational and physical readiness of small businesses

Financial resources are used to acquire physical assets under which operations are undertaken. The RBV explains that a business' SCA is derived from internal resources (Penrose, 1959). In utilising these resources, a business must keep on innovating as

its revenue stream is constantly exposed to new competitors and substitute products (Porter, 1980). SCA may take the form of quickening innovation by the business or slowing imitation by competitors. Kraaijenbrink, Jeroen, Spender, Groen and Aard (2010) posit that only businesses that already possess resources that are Valuable, Rare, Inimitable and Non-substitutable (VRIN) can acquire and apply additional resources otherwise competitors would acquire them with equal ease. However, Miller (2003) and Gupta, Tan, Ee and Phang (2018) counters with the notion that those internal resources a business need to generate SCA are precisely the resources that are difficult to acquire in the first place. The fact that businesses operate in a dynamic environment means they cannot derive any SCA from a static set of resources (Makadok, 2001), thus justifying the case for 4IR with its innovation orientation.

2.3.1 Financial readiness of SMEs

Small businesses are largely vulnerable in nature due to their size, low income generation capacity, and their inability to compete with their large enterprise counterparts with whom they share the limited (township) market. This alone is evidence that they need to be supported, especially financially in order to survive, as alluded to by Motjoloan and Warden, (2007: 2) and Agwa-Ejon and Mbohwa (2015).

Finances needed by a small business are for the acquisition of endogenous resources (internal source) which usually form the bigger part as building blocks for running small enterprises, while exogenous resources (external) are often required on an “as-needed” basis as opportunities arise (Ngassam, Kandie, Nkaelang, & Modiba, 2009: 2); (Khoase, & Ndayizigamiye, 2018: 62)

Small businesses cannot easily reach target markets using the conventional marketing techniques (Stokes, 2000; Becherer & Helms, 2016), due to deficiencies in resource endowments typically available to larger businesses. Although finances play a disproportionately significant role in successful business operations, it is worth noting that should there are still a variety of other challenges faced by small businesses. These include such factors as the traits of the owner-manager, the size of the SMME, and its stage of development (Elliott & Boshoff, 2009; Masocha & Fatoki, 2018: 3)

A vivid illustration would be that ICT infrastructure which drives 4IR is expensive although very useful to possess. Usefulness in having ICT lies partly in accessibility to internet usage, which in turn provides an ability to reach broad and diverse markets at a very low marginal cost. Nevertheless, despite the promise of the internet as a business and marketing tool ideal for small businesses, actual harnessing of this medium has proven to be challenging (Öörni, 2004; Klein, Köhne & Öörni, 2005; Oji, Iwu & Haydam, 2017). This is attributable to owner-managers not understanding the drivers of electronic commerce (Jingting & Jinghua, 2004) even though the technology was made available (Elliott & Boshoff 2009: 37; Tendai, Nicole & Tafadzwa, 2018; 3).

According to Schumpeter (1942), a revolution, by nature is fast paced and disruptive. Therefore, the 4IR is no exception. Paetz (2014) analyses business activities that are disruptive including those that serve unmet or underserved segments, employs different channels, deploys a sustainable cost-of-production advantage, has flexibility, simplicity and convenience, as well as competing against non-consumption. While these facets of managing a business point to operational and marketing initiatives, the financial implication lies in acquiring the relevant assets and information. The contrast to this, termed anti-disruption by Paetz (2014) displays the current state of affairs of struggling and failing small businesses who are not intent on acquiring or do not have access to capital. In business terms, anti-disruption manifests in the form of under financed businesses targeting a crowded market-place product, attacking bread-and-butter segments of the market, not having an inherent cost advantage over competitors and addressing needs that are already well-served by low-cost, affordable alternatives. With RBV being described as a theory of rents and SCA as a set of productive opportunities (Penrose, 1959), small businesses need to develop and channel niche segments with accompanying streamlined and affordable ICT applications. This is only possible with adequate funding, which regrettably is a persistent draw back for SMEs.

According to Halawi, Aronson and McCarthy (2005) and Dalkir (2017), the general and acceptable consensus is that SCA in the 21st century will as a matter of consequence be accomplished through knowledge management (KM). Large organisations are already progressively becoming more alert to the significance of KM for efficiency and competitiveness (Halawi *et al.*, 2005: 76), a strategy worthy of adoption by SMEs. The

principal attraction with KM is the idea that knowledge and its application are the means by which creativity can be promoted (Nonaka & Nishiguchi, 2001; Bolisani & Bratianu, 2018: 13) As crucial to organisational survival as KM is, it is highly complex and involves great outflows of resources, which small businesses may ill afford (Halawi *et al.*, 2005: 76).

Figure 2.7 below illustrates the causal relationship between KM systems usage and the business' competitive edge. The three sections of this model reflect inputs, processes and outputs of a typical small business. All these aspects culminate into SCA by applying VRIN activities. Financing is at the core of all this as it requires adequate funding to have such a lean ICT backed system.

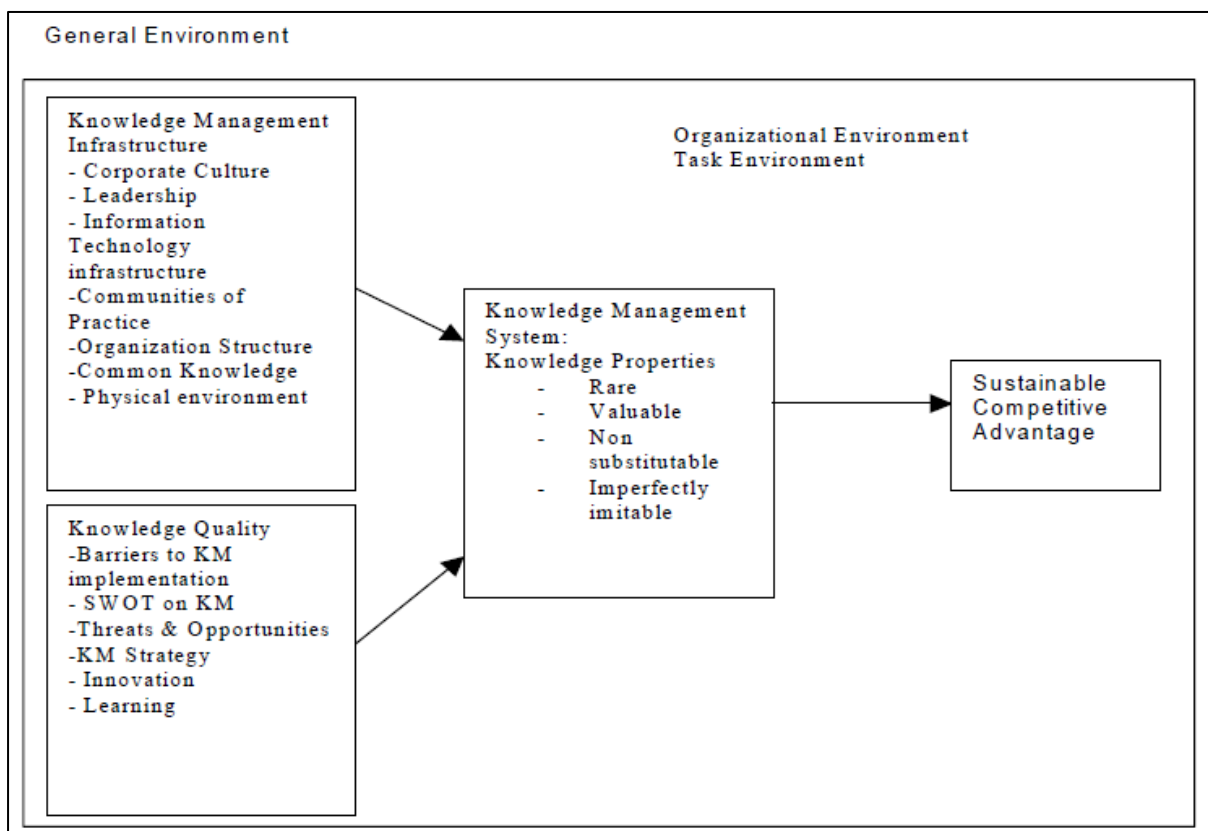


Figure 2.7: Knowledge management and SCA in SMEs

Source: Halawi, Aronson and McCarthy (2005)

Competitive advantage is defined as an ability to earn returns on investment consistently above the average for the industry (Porter, 1985). Barney (1991) indicates

that a business is said to have a competitive advantage when it implements a value creating strategy not simultaneously being implemented by any current or potential competitors. Hence for SMEs to achieve SCA they need to operate at a level of exceptional performance through implementing value-enhancing assets and supporting processes that may not concurrently be followed by any existing or possible competitors (Barney, 1991). Meso and Smith (2000); Bandaranayake and Pushpakumari, (2021: 78) are in agreement with assertion and state that SCA results only from strategic assets. This implies that reliance should not be on poorly financed small scale business activities which are devoid of an e-environment.

Abor and Quartey (2010: 224) and Wdowik and Ratnayake (2019) cite the lack of support services or their relatively higher unit cost as hampering SMEs efforts to acquire cost effective technologies. In particular, consulting businesses are singled out as often not being equipped with appropriate cost-effective business management technology solutions specifically tailor made for SMEs. Kayanula and Quartey (2000) and Johnson (2019) are of the view that numerous institutions providing training and advisory services do exist, but that a skills gap still exists in the SME sector as a whole. This emanates from entrepreneurs not affording the high cost of training and advisory services in the most basic of (ICT) concepts. This is compounded by small business owner-managers themselves not seeing any apparent need to upgrade their soft skills due to complacency or the pressure of hands on business routines. According to Abor and Quartey (2010: 224); Musara, (2021: 613) the most available technology is of foreign origin which is too expensive to acquire in terms of shared ownership, leasing or licencing. Furthermore local patents are difficult to obtain because providers are wary of competition and usually provide such technology to registered operators in highly regulated specific industry sectors.

Funding for technology projects in general takes the form of venture capital and seed funding for innovations. However, such funding is relatively weak in South Africa according to Wolf (2006) and Drucker (2014). Booyens (2011: 70) further states that such institutions providing these services to innovative SMEs and entrepreneurs are too few to make any meaningful impact on cash strapped small businesses. Small business owner-managers have the daunting task of researching on such funders and sacrifice precious time away from their businesses whose day to day activities are

intricately inter-twined with their personal lives. Further complications nonetheless await entrepreneurs even if they discover seed and venture funding institutions.

According to Gans, Hsu and Stern (2000) and Hau (2016) the identification and contracting of technology commercialization partners may involve “search” or transactional costs. In cases where intellectual property (IP) rights are well defined and available for SMEs, financial inhibitions to digitise may further be compounded by costly, contractual and recurring (annual or periodic renewals), royalty rates, intermediaries, specialized legal counsel and other contingent contracting provisions. In cases where small business owners are fairly financially capable of implementing 4IR, the psychological burden of the whole process may prove too burdensome to bear. Licensing and registration requirements, the high cost of settling potential legal claims, and excessive delays in court proceedings which may ensue as well as antitrust legislation perceived to favour larger businesses, may render small business owners not ready for the e-economy.

Marcati, Alberto, Guido and Peluso (2008); Ogujiuba and Boshoff, (2020: 18) citing internal factors as a major source of innovative initiatives, argue that government support efforts should focus on owner-managers rather than the much taunted financial support. The case of human capital is advanced as a kind of resource in line with the RBV. Stam and Wennberg (2009) propose that entrepreneurship policy should target young, highly educated entrepreneurs who are ICT savvy to start businesses or alternatively encourage existing small businesses to incorporate such youth as equity partners bringing in a new paradigm which is 4IR oriented. Green, Kimuyu, Manos, and Murinde (2002) and Ciampi (2015) also support the notion that a large number of small enterprises failing is attributable to non-financial factors. However, their inclusion of a lack of access to appropriate and affordable technology as a factor weakens their argument. Abor and Quartey (2010: 225) concludes their study after scrutinising a myriad of issues with a summary that access to finance remains the greatest concern for the majority of SMEs.

Hanna (2007: 6) and Davis and Dingel (2019) point out the strengths of ICT as being a powerful tool for development, an essential infrastructure for the knowledge economy, impacting a full range of human activities, whilst fostering the dissemination

of information and knowledge and defying geographical restrictions. They state that all this is achieved whilst making information and knowledge more accessible. With all such benefits the case for ICT is that the required initial investment is just a fraction of what would be required in a more physical-asset intensive industrial economy. ICT also has the added advantage of significantly lowering barriers to entry in a market segment and enhancing chances of competing with better resourced players. Hanna (2007: 6) reaches the verdict that the primary emerging barriers are non-financial but rather institutional. Such barriers manifest as a lack of leadership and institutional capabilities being absent as much as they are necessary to leverage ICT for business (development) strategies and fostering of the integration of ICT investments with organisational, process and skill changes. This implies that small business managers need to be strategically ready to balance finances and business operations as an imbalance between the two factors may result in business failure.

Consequently, Li, Liu, Belitski, Ghobadian and O'Regan (2016) provides insights into some ICT applications available to SMEs such as Enterprise Resource Planning (ERP) software and related packages such as advanced planning and scheduling, sales force automation, Customer Relations Management (CRM) and product configuration. These packages provide capability in support of business growth and improved competitiveness by integrating business processes and reducing cost. However, empirical studies indicate that firms find it challenging to successfully implement enterprise systems resulting in lower than expected gains in competitiveness (Dong, Neufeld & Higgins, 2009). This means that small business owner-managers in their quest to access funding for the e-revolution should not be blindsided that funds are the ultimate solution (Goga, Bosiu & Bell, 2019; 827).

True to this assertion, the Standish Group International (2006) reported that only an estimated 35 per cent of organisations in the United States completed their Information Systems (IS) implementation on time and within budget. The Standish Group International (2015) reveals that this trend still persists. Under performance and failure rates are as high as 90 per cent (Loonam & McDonagh, 2005) with upwards of 50 per cent of IS initiatives being abandoned or out rightly failing, and an additional 40 per cent being delivered late and over budget. The primary cause identified as causing lower than expected gains is poor alignment between business needs and technology

according (Bloch, Blumberg & Laartz, 2012). Attempts should be made to ensure business alignment to enable the leader's vision, attitude and behaviour to significantly influence actions that are directed at maximising benefits of ICT backed innovation (Li *et al.*, 2016).

2.3.2 The operational readiness of SMEs

E-commerce, a key pillar of 4IR is defined as being a process of information exchange and transaction involving products and services, utilising ICT, such as networks, software's and non-wireless electronic equipment (Govindaraju & Chandra, 2012: 9). A broad spectrum of activities is encompassed in initiating e-commerce as illustrated in the following diagram.

Figure 2.8 below is a depiction of classification of services required by regular South African small enterprises to be operationally sustainable. The three critical categories are human resources, (HR) infrastructure and finances. The HR factor encompasses the business owner's personality, skills and competences which they deploy to run processes within physically or ICT empowered infrastructure. HR functions demands training, advisory, and consultancy services whilst infrastructure encapsulates acquisition of machinery, equipment and business premises, both of which is enabled through funding.

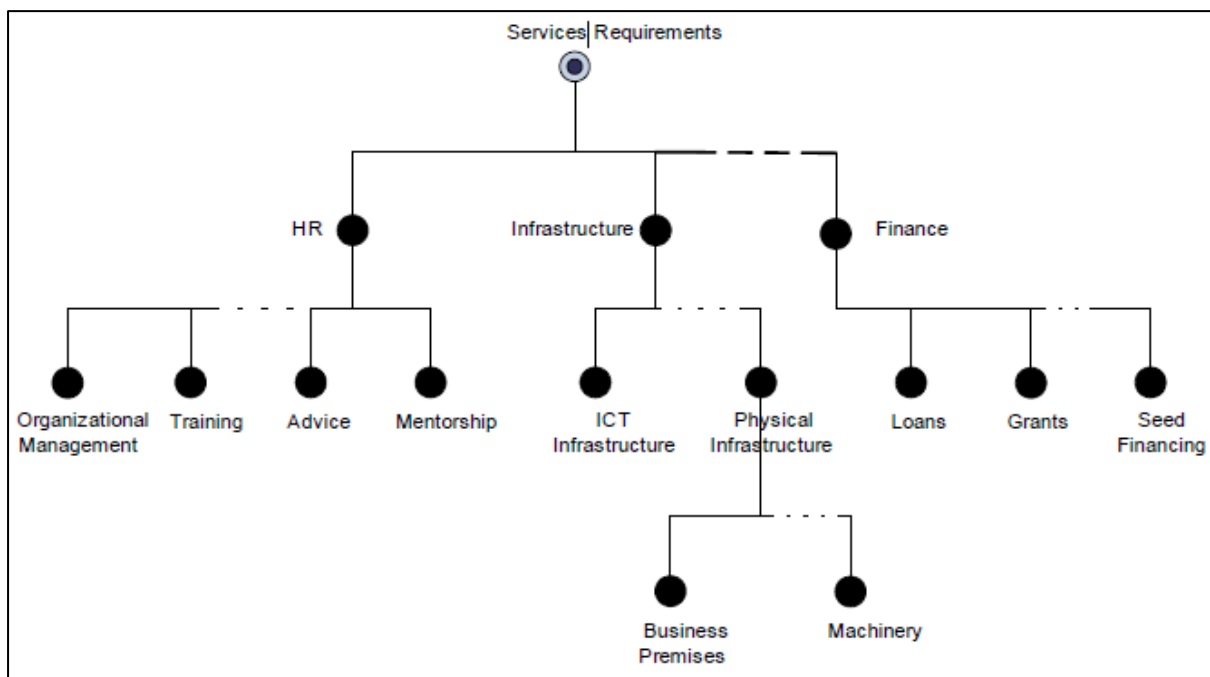


Figure 2.8: A typology of SME operations

Source: Ngassam *et al.*, (2009: 3)

A firm's resources and products are two sides of the same coin in that although its performance is driven directly by its products, it is indirectly driven by the resources that go into their production (Barney, 1986). The RBV therefore postulates that for firms to earn above normal returns they should identify and acquire those resources that are critical to the development of products that customers demand. Individuals in charge of SMEs should therefore be prepared to develop skills that empower them to have abilities of synchronise ICT with end products.

Training has long been advanced as a necessity for SMME success or survival, but the fact that the failure rate is not abating calls for a different approach. Judge and Piccolo (2004) advocate for a greater focus on transformational leadership arguing that the documented effectiveness of this approach in research literature and theory is significant. Bell and Kozlowski (2002) and Hoch and Kozlowski (2014) concurs with the above view. In addition, they advocate that transformation should take the form of virtual teams instead of over reliance on the owner-manager. Transformational leadership is comprised of idealized influence (charisma), inspirational motivation, intellectual stimulation, and individualized consideration behaviours (Purvanova & Bono, 2009: 345). All of these aspects of transformational leadership need to be directed at employees and township customers (Afriyie, Du & Ibn Musah, 2019) to

influence them into embracing the digital age and shifting from the fast redundant becoming traditional way of operational transactions. Consequently, in order to exploit their latent value, which assumedly lies undiscovered due to a lack of global exposure which 4IR enables, new operational approaches need to be explored. Newbert (2007: 122) towing the line of RBV cites worthwhile adaptable new operational capabilities as core capabilities and competences, combinative capabilities and transformation-based competencies.

Generally, technological capability development or e-evolution has a definite and discernible route, which e-evolving small businesses may follow in their operations (Hanna, 2007: 6). The components of e-readiness and e-development are changing over time, and e-institutions are evolving accordingly. At a basic level, e-readiness and information infrastructure such as email and internet are built, followed by shifts towards innovation utilising newly accessible information. This then spurs on human resource development whose e-leadership drives operations (Hanna, 2007: 6).

Barney's (1991) VRIN conceptual framework attempts to define the types of processes by which firms could exploit resources. Teece, Pisano, and Shuen (1997: 510) contributed to this framework by proposing the dynamic capabilities framework to explain how combinations of competences and resources can be developed, deployed, and protected to produce goods and services. To accomplish this the authors defined dynamic capability as "the firm's ability to integrate, build and reconfigure internal and external competences to address rapidly changing environments". Eisenhardt and Martin (2000: 1107) further stated that dynamic capabilities 'are the organisational and strategic routines by which firms achieve new resource configurations as markets emerge, collide, split, evolve, and die'. This clearly demonstrates the dynamic nature of business operations that SMME owner-managers should embrace. The fact that the business environment is not static as demonstrated above, links with the other conceptual framework applied in this study, namely the Schumpeterian creative destruction theory (Schumpeter, 1942: 83).

The Schumpeterian theory postulates that technological progress, such as ICT adoption by SMEs in this case, may create both losses as well as gains, by rendering obsolete, old goods, markets, and manufacturing processes. Newbert (2007: 124)

reinforces and cements the two theories with a contention that resources (RBV) do not possess real value to the firm in isolation but rather that their latent value could only be made available to the firm via its idiosyncratic dynamic capabilities (creative destruction). An attempt is made at expounding the intertwined complexities of technology and innovation by Spencer, Kirchhoff and White (2008: 15) and Østergaard and Park (2015). They point out that technology has the ability to eliminate or alternatively reinforce the current technology product paradigm and is the basis for defining technology as being either disruptive or evolutionary. In their operation therefore, small businesses can adopt any of these two options after weighing the potential benefits of each.

E-leadership theory is the third conceptual theory applied in this study and aligns with the notion by Hanna (2007: 6) that e-leadership needs to evolve to meet these new balances and requirements. Gurr (2004) and Islam, Bilal and Ilyas (2017) point out to the existence of significant differences between traditional organisations and those that have technology-mediated environments. The latter environment appears to require leaders to cope with paradoxes and dilemmas, as well as the associated behavioural complexities (DasGupta, 2011: 7) which owner managers may not possess for the new e-environment or alternatively need to acquire for their operations.

Operationally, 4IR paradoxically presents both opportunity and challenge for small businesses. A case in point is e-commerce which improves value chain integration, enables customisation and also provides smaller companies opportunity to reach customers worldwide (Da Silveira, 2003: 201; Liu & He 2018). At an accelerating rate, the number of businesses utilising the Internet for online trading is on the rise despite many not generating profits as analysed concluded by Da Silveira (2003: 201) and Liu & He (2018). This predicament applies mainly to small businesses and is totally opposite to big tech giants such as Amazon and Alibaba, for example, which are making super profits. The challenge to business managers therefore, is to identify where e-commerce profitability lies, how it is reached and how it could be sustained at strategic and operational (day to day) levels. Jones, Hecker and Holland (2003: 287) as well as Ndayizigamiye and Khoase (2018) argue that there is limited research available on how to effectively implement e-commerce into SME operations. Through research, consultancy, business intuition and continuous on the job learning, such

challenges could either be resolved, or at least be identified, in order to expedite e-commerce with minimal hassles (Motjoloane & Warden, 2007).

2.3.3 Physical readiness of small businesses

The RBV is variably described as a set of productive opportunities (Kraaijenbrink *et al.*, 2010; Drucker, 2014), integrative capabilities (Stansfield & Grant, 2003), interdependencies, asset co-specializations and complementarities (Kor & Leblebici, 2005). According to Penrose (1959; 2009), the boundaries of the business are determined by the capacities at business level that are realized through the value of and the interaction of intangible and tangible assets. Tangible assets are business level resources that are physical assets such as land, buildings, machinery and inventory. Intangible resources on the other hand, are business level assets that are not physical in nature such as intellectual property, patents and knowledge. Empirical evidence and actual observation seem to point out that physically, most SMEs are ready for 4IR in that the township of Mamelodi, like many others in South Africa, physical space and infrastructure are fairly affordable in rental and ownership terms. The digital enabled 4IR is driven by networks and software's (Penprase, 2018) as well as wireless electronic technologies (Govindaraju & Chandra, 2012: 9), which are readily available through mobile network service providers such as Telkom, Vodacom and MTN. Data and information connectivity is readily available through mobile network fixed towers (transmitters) and underground high speed fibre optic connectivity to Mamelodi township which is at the heart of the developed Gauteng province and capital city of the nation, Pretoria.

Schumpeter (1942) postulates that large businesses are responsible for innovation. This assertion is contradicted by Wennekers, Van Stel, Thurik and Reynolds (2005) and more recently by Berends, Jelinek, Reymen and Stultiëns (2014) who point out that research evidence in the last few decades has shown that the innovative advantage has moved from large corporations to small enterprises. Laforet (2008) and Bischoff and Wood (2013) argue that SMEs need to be more creative in order to develop new products to maintain their competitive advantage. Physically, this seems feasible when one considers the assertions by Shefer and Frenkel (2005) and Agwa-Ejon and Mbohwa (2015) that innovative output is possible with limited investment in research and development (R&D) or even through informal R&D activities on their

business premises. Audretsch and Keilbach, (2008) support the case for localised, small scale and unsophisticated R&D as a spill-over effect in accordance with the theory of endogenous (internal) growth.

The theory of endogenous growth may be used to explain how small businesses are by nature limited in terms of scope and capacity resulting in minimal customer reach and profitability (Nyirenda-Jere & Biru, 2015). Nonetheless they compete with larger, well-funded and long established businesses that have infiltrated the township market space and can easily out compete them in all aspects. Competing head-on with such big businesses in the township economy at malls and shopping centres for example, is a major challenge (Schmidt, Bennison, Bainbridge & Hallsworth, 2007; Bean, 2014). SMEs in the manufacturing sector are also faced with bigger competition from cheaper manufactured products from countries such as China and India (Bessant & Tidd, 2007; Bischoff & Wood, 2013). Such cheap products are mainly sold informally in townships at spots where commercial activities are concentrated. In townships municipal bylaw adherence and enforcement is usually lax. This creates chaotic scenarios in which such vendors of cheap imports may obstruct legitimate SMEs and make them physically obscure.

Manjoo (2015) in appreciation of the meteoritic rise of Uber proposes its imitation arguing that the “uberization” or “uberfication” of the economy provides a dramatic change in how local services are located and fulfilled. The logic is that new technologies have the potential to rearrange a broad array of traditional operations into discrete tasks that can be accomplished just when they’re needed, with minimum supply and demand enabled wages and be customer satisfaction oriented. The simplicity of Uber in terms of minimum physical assets but empowered by a simplistic though robust customer centric ICT application does make a strong case for physical readiness of SMEs. Manjoo (2015) proposes that the Uber model be imitated in the typical small businesses such as Bed and Breakfast (B&B), security, home services, delivery and logistics, hospitality, entertainment and services. Manjoo (2015) concludes the argument in terms of the Schumpeterian creative destruction model by arguing that small scale location based advantage should be questioned.

Disruptive Innovation has the ability to create new dimensions of value that the old product category or business model is unable to address by satisfying unmet or underserved needs (Paetz, 2014). This entails engaging in competition based on a different set of benefits that the new approach or technology enables whilst still based on their physical localities. Typically, digitisation benefits include simplicity, convenience, accessibility, significantly lower prices, and ease of use (Paetz, 2014). This may or may not include breakout innovations which the crowded, poorly serviced and infrastructure constrained townships may not endear. The e-leadership theory equally applies as focus ought to shift from the mundane routines at business premises to streamlined digital connectivity. External support to acquire such enabling benefits should be sought and appropriated from relevant institutions.

Ngassam *et al.*, (2009: 2) pinpoints the existence of over eight types of small business supporting agencies in South Africa, namely: Government agencies, banks, private organisations, sectorial bodies, international organisations, non-governmental organisation (NGOs), academic institutions, and regional bodies. Despite these being within the physical and cyber (online) reach by owner-managers, very few are aware of opportunities that such supporting agencies can offer, let alone their existence. Ngassam, *et al.*, (2009: 2) proposes an abandoning of small business silo mentality by advocating that they register within their sectorial bodies in their physical localities so as to share information and benefit from available services.

2.3.4 The psychological readiness of owner-managers to ICT adoption

The 4IR has ushered in a new society, referred to as the information society, knowledge society, networked society or e-society (Magro & Wilson, 2013). Leadership in this digital age will therefore have to acquire a new set of attitudes, skills, and knowledge that are responsive to the societal paradigm shift (Magro & Wilson, 2013). Kraaijenbrink *et al.*, (2010) is of the view that the RBV primarily applies to businesses striving to attain SCA. On the contrary, entrepreneurs satisfied with their competitive position and not seeking a competitive edge is a psychological dysfunction attributable to managers' (flawed) aspirations and intentions.

The psychological mind-set needed and (psychological) readiness thereof by small business owner-managers can best be analysed contextually by examining the

operational challenges they encounter. Schmidt *et al.*, (2007) and Hirt and Willmott (2014), illustrate the intensified threat to SMEs posed by large retailers venturing into niches which have traditionally been the preserve of small retailers such as convenience stores, fast food, B&B, vehicle parts and maintenance and leisure. In addition, such competitors have long operating hours there-by rendering the township neighbourhood enterprises redundant (Schmidt *et al.*, 2007; Hirt & Willmott 2014). Furthermore, large surface retailers and shopping malls have proliferated and offer customer convenience and diversity. The biggest interruption instigated by 4IR is the in-roads made by online stores offering cheaper products and convenient cost effective door to door delivery. Take-a-lot and Uber eats are note-worthy examples respectively.

Paetz (2014), in reference to the Schumpeterian creative destruction theory posits that three factors exist that create the opportunity for disruption (new replacing the old). These are scarcity, default corporate management behaviour and human nature. A close scrutiny of these factors reveals that latching on to a revolution such as 4IR is mainly a function of endogenous (internal, therefore controllable) human mental processes rather than exogenous (external, therefore uncontrollable) environmental impositions. Eisenhardt and Martin (2000) as well as Lepore (2014) draw similar conclusions that creating disruption so as to acquire a competitive advantage can only be activated at a dynamic level through advantageous 'dynamic capabilities' or 'organisational learning'. This is what enables the business to adapt faster than its competition. This implies that small business managers need to change their mind set from the "normal" through organisational and continuous learning, among other things.

Broadly stated, a resource is a valuable asset possessed by entities, and may include physical and financial assets as well as employees' skills and organizational (social) processes. A capability, in contrast, is something a business is able to perform, and stems from resources and routines upon which the business can draw (Winter, 2000; Teece, 2018). This implies that assets on their own, no matter how virtuous they are, cannot guarantee business success. Hence, the human factor is critical and essential to business success and small business managers ought to be mentally ready in this regard. In the event of financing for a small business ICT requirements being met, but

with the incumbent owner-manager not psychologically (mentally) adjusting to the disruption into uncharted territory, the unintended consequence would be catastrophic failure with dire financial implications. Uniqueness of resources as laid out in the VRIN is a plausible solution.

The RBV emphasizes that in order to provide an opportunity for SCA, a resource must be VRIN (Barney, 1991). According to Christmann (2000) and Schroeder and Kotlarsky (2015) achieving a state under which products and services are VRIN is only possible if business functions are supported by tacit skills, socially complex organisational processes and complementary assets and supporting routines. Seemingly, these are cumbersome and rigorous activities but on closer scrutiny once practiced and perfected, they become routine though requiring an alert mental dispensation. An alert mental attitude may be in the form of persistently scanning the e-environment for updated “apps”, for example. Such attitudes are not new to owner-managers whom, driven by a semi informal supply chain, are highly cognisant of cost saving bargains in the market place for which they are on constant lookout. A new paradigm in training is evidently obligatory.

Training for SMEs as alluded to earlier in this study, has mainly focused on business management and entrepreneurship issues such as estate planning, financial record keeping and marketing. Despite all these afore-mentioned training interventions, failure has continued unabated (Brink, 2007: 364; Sun *et al.*, 2014). Training providers for SMEs should now shift focus to transition to an e-society and equip small business with new era e-skills and accompanying mental aptitudes to handle change in line with mainstream economy and international best practices. Relevant change management training, for example, can prepare small business owners psychologically to embrace the inevitable change and embrace 4IR. South Africa has actively pursued a transformation agenda largely based on reversing the effects of Apartheid which formally ended by the year 1994. Laws have been enacted and enabling institutions set up to this effect whose thrust in empowering small businesses is to address the triple challenges of poverty, unemployment and marginalisation. Perhaps it is time that policy makers shift the technical definition of transformation and transition vis-à-vis small businesses from a racial and historical point of view to current economic realities.

Magro and Wilson (2013) suggest that a similar kind of thinking as implied by 'disruptive innovation' be applied to policy. They argue that policies could be disruptive in an institutional context by altering existing practices and thereby creating momentum for transitions including incentivising incumbents to play an active role in the transformation. The shifting of training needs from policies centred on socio-political narratives to streamlined hi-tech business acumen focused on value-enhancing strategies has the ability to persuade SMEs to have a new mind set. Halawi *et al.*, (2005: 76) lists the following as new generation ICT enabled competences needed to replace the status-quo: distinctive competences, core competences, invisible assets, core capabilities, internal capabilities, embedded knowledge, corporate culture, and unique combinations of business experience. Such competences are a significant shift from the traditional norm.

The traditional leader–follower relationship has been altered in the advent of digital communication (Savolainen, 2014). This has been in the form of a swing from authoritarian leadership to knowledge and expert leadership. This entails the business leader no longer basing their power squarely on one's position (Savolainen, 2014). Adopting 4IR would entail less of the physical workplace but more of the virtual, reduced face-to face contacts and interaction, and with processes being technologically mediated. Such a way of operating radically differs from one of the main small business characteristics and source of strength, namely the personal hands-on approach. The apparent loss of the intimate touch with stakeholders, whose relationship value is more psychological than economic, can only, be mitigated by adopting a culture of e-leadership (Ribiere & Worasinchai, 2013).

In a study on the impact of 4IR on Indonesian SMEs, Booyens (2011: 70) makes a discovery that government's effort to support small businesses to adopt e-commerce if done through socialization, education and training, increases the adoption rate exponentially. Hanna (2007: 9) re-enforces the notion that contrary to underlying assumptions, e-development is not a once off project or a blueprint but that it is a process. It is a continuous process of policy development, investment planning, innovation, learning, and change management (Hanna, 2007: 9). This requires personal attributes such as patience, forbearance, tolerance and endurance. It can be argued that in this regard (personal attributes); small business owners are ready to

embrace 4IR for they are known to be persistent and to endure adversity. Entrepreneurship has been noted to thrive under sustained adverse conditions, such as during economic, social and political instabilities both presently (Tengeh, 2016: 203) and historically (Ladzani, 2010: 69). Without strong relationships, it is almost impossible to be successful as a business owner (Donaldson & O'Toole, 2007: 5; Ebbers, 2014). Strong relationships or networks are another strength that small businesses possess and can readily apply if they join the 4IR.

Booyens (2011: 69) examines the role that “push forces” pose as a threat from competitors in influencing e-commerce adoption and usage among SMEs in Indonesia. The discovery made is that such a threat of emulating others basing on the perception that e-commerce is advantageous is insignificant. For this aspect of competition threat, the result indicates that there are not many e-commerce adopter enterprises in the Indonesian SME sector under study just like in the South African context. Competition in townships is usually cut-throat and manifests in the form of skirmishes around ethnic, xenophobic, racial, zonal and sectorial (e.g. taxis) dynamics. Wary of township conflicts discussed above, psychologically, small businesses are nonetheless ready for 4IR as competition on digitalisation issues does not lend itself as a potential source of conflagration.

Wolf (2006) argues that innovation, such as is 4IR is a construct of internal dynamics of an individual. Personal characteristics are thus key factors influencing the adoption of innovations. The diffusion theory originally applied to understanding consumer behaviour is now also being applied to entrepreneurship research to examine the behaviour of entrepreneurs with regards to adopting and commercialising innovations (Marcati *et al.*, 2008; Dibra, 2015). The diffusion theory postulates that psychological underpinnings of skills, human capital, knowledge and experience influence innovativeness (Booyens, 2011: 70). Furthermore, components of human personality determine the degree of individual's creativity. Such psychological underpinnings are as diverse as the types of small business sectors that exist on the entrepreneurial landscape.

The South African SME economy is composed of dynamic and survivalist sectors with the latter forming a larger proportion (Berry, Von Blottnitz, Cassim, Kesper,

Rajaratnam & Van Sevenster, 2002). Policies on SMEs focus on their potential to alleviate poverty and enhance national economic growth. However, these policies seem to be at odds with economic growth driven by competitiveness on the one hand, and employment creation and income distribution on the other hand (Rogerson, 2004). It is vital to distinguish between objectives that support growth and those that underpin development. In this case, SMEs are expected to be ready to approach and engage different parties offering different services in a complex web of stakeholder analysis and management processes. Dynamic SMEs and survivalist SMEs logically require different policies and interventions and consequently different institutions (Rogerson, 2004). Given such limitations, an examination is needed of small business owner-managers to determine how psychologically ready they are to handle such pressure whilst being hands on in their businesses. Though, Ladzani and Netswera (2009) and Khoase and Ndayizigamiye (2018) argue that there are various SME support institutions, Chiloane-Tsoka (2009) points out that there is gross ignorance and lack of knowledge about such support. Given the lack of awareness about basic assistance available, finding sponsors of niche ICT technology would even be harder thus rendering assimilation into 4IR illusive as SMEs may not even be cognisant of their stage of development *vis-à-vis* industrial revolution or evolution.

The term 4IR implies that three other “revolutions” have preceded it, and that organisations would have progressed from one to another. The term leapfrogging refers to skipping stages and catching up faster (Dictionary, 2008). Enterprise development is one method applied by government organs as part of the transformation agenda for established corporates to assist SMEs. Leapfrogging is one strategy that may be used in this arrangement by big business for small businesses to latch on to 4IR expeditiously. Sawers, Pretorius, and Oerlemans, (2008) contend that SMEs are highly vulnerable when collaborating with large businesses due to such relationships typically being asymmetric in favour of the latter. The fear of unintentional knowledge spill-overs and exploitation may raise trust issues resulting in scepticism and reluctance by small businesses.

Booyens (2011: 77), in conceding such scepticism and reluctance points out that although funding for digitisation is available for small businesses, regrettably such comes with a multitude of invasive scrutiny and audit, which the independently minded

owner-managers may find cumbersome and undesirable. For those SMEs seeking assistance, services rendered have been deemed to be inefficient and ineffective in basic entrepreneurial training thereby undermining confidence in such institutions delivering on more sophisticated 4IR concepts (Ngassam *et al.*, 2009: 2). The current state of affairs is that SMEs are peripheral participants in terms of e-commerce, of which more aggressive and offensive e-strategies are a prerequisite if they are to make meaningful inroads in this e-environment punctuated by turbulent markets (Chiloane-Tsoka & Boya, 2014). To make such inroads mentorship may suffice.

Hamilton and Scandura (2003) and Chiloane-Tsoka and Mmako (2018) identified the concept of e-mentoring as a necessary corollary to e-leadership in the digital world. Hamilton and Scandura (2003) further recommend that e-leadership be utilised to overcome human (psychological) barriers to e-mentoring, such as individual barriers, interpersonal barriers, situational factors, social factors, usability factors, gender, ethnicity, age, personality and the changing nature of work. Once these considerations have been adequately identified and analysed, the SMEs may approach the various public small business funding government initiatives and institutional sponsors available which include: Technology and Human Resources for Industry Programme (THRIP); the Support Program for Industrial Innovation (SPII); the Innovation Fund; Technology for Women in Business; Tshumaniso Trust; and Small Enterprises Development Agency (SEDA). The listed businesses offer hi-tech innovation, technology diffusion, scientific research, patent support, seed financing, R&D, access to science and technology, and technology transfer funding to SMEs. All these are complementary to other similar institutions which offer the usual general business support and incubation services.

2.3.5 The readiness of SMEs to potential fall-out of 4IR on their communities

In South Africa, the potential of SMEs to generate employment, contribute to poverty alleviation and local economic development has been the major driver for supporting them (Booyens, 2011: 67). The economic output performance of small businesses is not always significant in some economies, but their significance lies in their positive contribution in terms of introducing innovations, facilitating change and enhancing competition (Wong, Ho & Autio, 2005; Booyens, 2011: 67). Innovation, which is the cornerstone of 4IR, is defined as the application of new knowledge culminating in the

creation of new products, services, processes and organisational methods, or adapting existing ones, based on new knowledge (Wolf, 2006; Agwa-Ejon & Mbohwa, 2015). According to Wolf (2006), this adaptation to local conditions is crucial to increasing the productivity of SMEs. Rogerson (2001) and Drucker, (2014) argue that innovative entrepreneurship is one of the key success factors for the growth of small enterprises with Luiz (2002) arguing that SMEs provide a nursery and proving ground for innovation. These arguments are in line with the RBV (Barney, 1991) which states that firms have to possess resources that are VRIN in order to attain a competitive advantage and enjoy improved performance in the short term (Barney, 1991). Resources that are VRIN arguably enable efficiency and effectiveness in a business undertaking.

Therefore, applying 4IR to a small business is an attempt to achieve efficiency and effectiveness, through streamlining labour and other processes by utilising ICT to create and apply value-enhancing strategies (Halawi *et al.*, 2005: 76). The necessity of such streamlining is that it is a prelude to small business success, which manifests as survival, profitability or growth. Achieving this ideal would entail small businesses departing from or abandoning efforts to acquire, the physical asset base as a strategic resource, as they do not possess such capacity due to their financial limitations. Instead a deliberate shift should be made towards KM (Silver, 2000; Dalkir, 2017). KM being an off-shoot of RBV, thrusts ICT concepts as the main strategic strength through which better processes and products and services can be generated competitively and cost effectively. Examples of KM include focus on core competences, information resource management, the balanced scoreboard, total quality management (TQM), the learning organisation, business process engineering, electronic collaboration, expertise, the networked organisation and boundary less organisation as well as technology (Halawi *et al.*, 2005: 76)

The paradox of adopting the afore mentioned 4IR enabled, critical, best practices and benchmarks, lies in the fact that the very issues that are beneficial to a business are the very issues that adversely affect the society in which they operate. Utilising the Internet as a marketing tool in the tourism industry, B&B establishments may enjoy benefits such as cost-savings on advertising, lower expenditure on physical retail sites, speed, accessibility, communication of large volumes of information, customer

convenience, improved customer relationship management, improved target marketing, and a world-wide reach, as small as they are, (Elliott & Boshoff, 2009).

However, downstream beneficiaries who would be eliminated would include: advertising on billboards, signwriting on walls, handing out fliers/brochures (website/blog), transporters of refreshments (online deliveries), physical/printed airtime (Wi-Fi) among others. Kayanula and Quartey (2000) and Ayandibu and Houghton (2017), point out that SMEs are more labour intensive than their larger counterparts due to them having lower capital costs associated with job creation. This means that although each SME may employ a few workers, the aggregate effect of many small businesses is that they employ a lot of people. Digitisation of processes may result in job losses in the short run. Small businesses perform vital roles in ensuring income stability, growth and employment. Since SMEs are labour intensive, they are more likely to succeed in townships, where they contribute to a more even distribution of economic activity in a region and can help to slow the flow of migration to inner cities and cause squalor, poor hygiene, crime and disease. Such a delicate and intricate balance which has accrued as a benefit among marginalised township dwellers may be upset in the advent of streamlined IT enabled operations.

The benefits of heightened small business activities in townships, whose populace only have basic infrastructure, are not only economic but social as well. Smith and Sparks (2000: 205) found that small retail shops “have provided a sense of location and locale and have often been identified with ‘ways of life’ and social and community infrastructures.” This alludes to retail SMEs providing a sense of identity and being the focus for interaction of community members without which social exclusion and isolation, particularly for the poorer community members, would spread (Schmidt *et al.*, 2007). Retail shops contribute not only to community preservation, but also to serving the specific needs of their customers with whom they have personal relationships (Coca-Stefaniak *et al.*, 2010). As inconceivable as this may sound, the social fabric of townships may be adversely affected by the removal of that personal touch as it is replaced by the cyber sphere of an e-society demanding e-relationships in its stead. In conclusion it is observed that chances of succeeding under 4IR are fairly high due to ICT enabled efficiencies and effectiveness. However, Paetz (2014)

cautions about the equally high chances of failure by giving examples of failed past disrupters namely Yahoo, Nintendo, RIM, Best Buy, Myspace and Nokia.

2.4 Chapter summary

This chapter provided reviewed and synthesized literature on the topic under study. Hambley, O'Neil, and Kline (2005) summarises the new paradigm of work synonymous with the 4IR as one that can now be conducted at anytime, anywhere, in real time and through technology. Such novel complex business activity results in the creative destruction of old products and processes and requires specific management in the form of e-leadership. To achieve the business objectives of increased profits, increased assets, expansion, growth and development (Xesha, *et al.*, 2014: 37), new and alternative sources of competitive advantages need to be discovered and pursued by small businesses. The resource-based view seeks to promulgate unique strategies that small businesses ought to pursue rather than take bigger and better resourced competitors head on, to avoid being easily out competed and ultimately fail in the township economic space. Evidence and arguments presented in this study, while demonstrating how complex the e-era is, nonetheless, in the same vein present types of readiness needed to cope and manage such an endearing endeavour.

CHAPTER 3

RESEARCH METHODOLOGY

3.1 Introduction

This chapter presents the methodology that was adopted to collect, analyse and interpret data on the readiness of small businesses to embrace the 4IR. The research process illustrated by the research onion is shown in Figure 3.1. Furthermore, the research design, approach and sampling procedure used are presented. Finally, the data collection instruments deployed in this study are discussed.

3.2 Research methodology concepts

Research is described by Oates (2015) as a kind of everyday thinking that creates new knowledge. Abu-Dalbouh (2013) further defines research methodology as being procedures, ways, methods and techniques employed to capture and gather all the required information for the purpose of understanding the research issue. According to Burns and Grove (2011) methodology is composed of the design, setting, sample, methodological limitations, data collection and analysis techniques in a study. Furthermore, Sarantakos (2005) argues that methodology refers to how the researcher goes about practically finding out what can be known about a phenomenon. Marczyk, DeMatteo and Festinger (2005) describe methodology as a research strategy that translates ontological and epistemological principles into guidelines that guide how research is to be conducted and the principles, procedures, and practices that govern research. This description is indicative of scientific methods and techniques that were employed to obtain credible and valid knowledge in this study.

Three major ways of thinking about research exist which are epistemology, ontology and axiology. Derstoep and Johnston (2009) and Saunders *et al.*, (2009) define epistemology as the study of concerns about what constitutes acceptable knowledge in a field of study whilst ontology is concerned with the nature of social phenomena as entities. Axiology studies judgments about value. Each of these branches of philosophy influences the research process.

Epistemology refers to the nature of the relationship between the researcher and what is known (Hirschheim, Klein & Lyytinen, 1995: 20). Practically, in research and as far

as it relates to the nature of human knowledge and understanding, epistemology explains what is possible to acquire through different types of inquiry and alternative methods of investigating issues of interest. Two broad epistemological positions exist, namely positivism and interpretivism.

Qualitative methodology is supported by interpretivist epistemology and constructionist ontology. The underlying assumption is that meaning is embedded in the participants' experiences and that such meaning is arbitrated through the researcher's own perceptions (Merriman, 1998). This translates into the researchers using qualitative methodology, immersing themselves and interacting with respondents through observing, interviewing and constructing case studies as was implemented in this study. In line with this assertion, the researcher sought to attain an insider's view of the group under study.

In Figure 3.1 below, Saunders *et al.*, (2009) illustrates the various and systematic layout of the research programme. Proposed in the diagrammatic depiction is a research onion illustrating the different philosophies, approaches, strategies, choices, time horizons, techniques and procedures which were duly deployed in conducting this study. Figure 3.1 was used to guide this study.

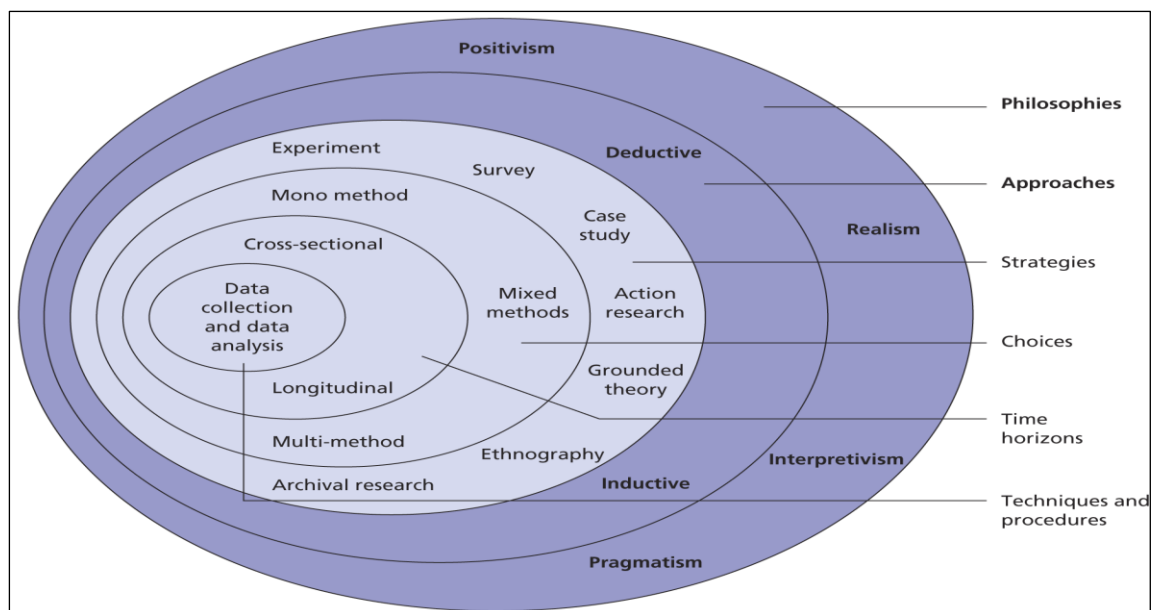


Figure 3.1: The research onion

Source: Saunders *et al.*, (2009)

3.3 Research philosophies

Research philosophy relates to the development and the nature of knowledge, and holds important assumptions about the way in which the researcher views the world (Saunders, *et al.*, 2009). Figure 3.1 above shows the main research philosophies which are positivism, realism, interpretivism and pragmatism.

The philosophy of positivism is an approach for studying certain phenomena by applying natural science methods to examine and understand social reality (du Plooy-Cilliers, 2014). The positivist paradigm of exploring social reality is based on the philosophical ideas of the French philosopher, August Comte and is contextually relevant to a township economic setup such as Mamelodi. According to Comte, observation and reason are the best means of understanding human behavior. True knowledge is based on experience of senses and can be obtained by observation and experiment. Interpretive researchers believe that reality consists of people's subjective experiences of the external world thus, in reality being socially constructed or more specifically, a human construct (Mutch, 2005). Such subjective experiences of small businesses owner managers formed the basis of investigating their psychological readiness to shifting from traditional to technological operations.

In choosing between quantitative and qualitative methods, considerations included meta-theoretical assumptions concerning the nature of the knowable or reality (ontology), views on truth and legitimate knowledge (epistemology), and how this inquirer found out knowledge (methodology) (Antwi & Hamza, 2015: 217).

3.4 Research design

Bush and Burns (2002) posit that research design is a set of advanced decisions that make up the master plan specifying methods and procedures for collecting and analysing the information needed. The qualitative technique was used in this study. According to Denzin and Lincoln (2005: 5), qualitative methods allow the researcher's conceptualisation of the topic by avoiding pre-definition of a problem as well as explaining causal links. The choice of qualitative methods was motivated by the methodology allowing for researcher's conceptualisation of the topic, ability to explain causal links and being investigative and interpretive in the human and social context. The appropriateness of this approach in investigating readiness of SMEs in Mamelodi

to the 4IR lies in qualitative methodology being dialectic (investigative) and interpretive (human and social context). De Vos (1998: 242) reinforces this view with an observation that the interaction between the researcher and the research participant enables the informant's world to be discovered and interpreted by means of qualitative methods.

The motivation to apply qualitative design can be found in contrasting between the two available methods namely qualitative and quantitative as analysed by Atwi and Hamza (2015). Qualitative research would be ideal for investigating readiness for business operational paradigm shift due to the focus and emphasis it places on idealism, subjectivity, exploration orientation, particularist findings; and its descriptive, experimental disposition and manipulatable nature. These dynamics can best investigate a small business owner-manager who predominantly manages their business based on their personality attributes. By contrast, a quantitative approach is rich in generalisations, numerical descriptions of causality, predictability and is scientific in nature. The researcher deemed this approach unsuitable, as it would distort socially oriented township dynamics. Qualitative designs available to a researcher include narrative research, case studies, grounded theory, phenomenology, and Participatory Action Research (PAR) as described by Creswell, Hanson, Clark, Plano and Morales (2007: 237).

A legitimate question may be asked as to what criteria should govern the selection of one design approach over another? Creswell (2003) proposes that researchers should begin their inquiry process with philosophical assumptions about the nature of reality (ontology), how they know what is known (epistemology), the inclusion of their values (axiology), the nature in which their research emerges (methodology), and their writing structures. According to Denzin and Lincoln (2005) various interpretive paradigms to address these assumptions, are available to qualitative researchers. These multiple strategies were available to the researcher including ethnographies, case studies and narrative research (Atwi & Hamza, 2015: 222).

This study adopted the case study strategy so as to afford the researcher the opportunity to have an in-depth understanding of the phenomenon under study. According to Yin (2003), case studies are ideal in explaining, describing or exploring

events or phenomena in the day-to-day contexts in which they transpire. Furthermore, Yin (2003) states that these can help to understand and explain causal links and pathways. This was accomplished for example, by linking psychological readiness of small business owners to pertinent 4IR concepts. In contrast to experimental designs, the case study approach lends itself well to capturing information on more explanatory “how”, ‘what’ and ‘why’ questions. These questions formed the basis of instrument design on “how” ready, “what” forms of readiness and the reasons “why” such readiness does or does not exist among SMEs. Adopting the case study approach in this study was appropriate in that it offered additional insights into the gaps that exist and why implementation of 4IR is or might not be appropriate or feasible.

Case study research builds in-depth, contextual understanding of the situation, through reliance on multiple data sources (Yin, 2003). This makes case study preferable to individual stories such as in narrative research. Yin (2003: 13) states that the choice of case study method is a deliberate attempt at desiring to cover contextual conditions that may be highly pertinent to the phenomenon under study. .. True to the assertion in Creswell *et al.*, (2007: 237) this case study research was a qualitative approach in which the investigation explored a bounded system (a case) or multiple bounded systems (cases) over time through detailed, in-depth data collection involving multiple sources of information. The multiple cases took the form of splitting the SMEs in two, namely case 1 as small and medium business with case 2 being micro enterprises.

Several variations or types of qualitative case studies were at the researcher’s disposal. One such variation is having qualitative case studies being distinguished by the intent of the case analysis. Stake (1995) identifies three variations that exist in terms of intent: the single instrumental case study; the multiple-case study; and the intrinsic case study. In a single instrumental case study, the researcher would focus on an issue or concern and then select one bounded case to illustrate such an issue. In a multiple-case study, as was adopted in this study, the researcher again selects one issue or concern but in turn selects multiple case studies to investigate the issue. This explains the approach chosen to sample a broad spectrum of small business activities. Yin (2003) argues that the multiple-case design applies the logic of replication whereby the data collection procedures are replicated for each case. This

replication was in the form of interview guides being administered being fairly similar with moderate variations according to type of business activity. The qualitative questionnaire originally intended for use was replaced by the interview guide in line with current UNISA Covid19 protocols. As a general rule, qualitative researchers (as is in quantitative research) may not generalise from one case to another due the contextual differences of cases. Therefore great care was undertaken to minimise such generalisations by letting the inquirer select representative cases to include in the qualitative study whilst concurrently being wary of bias.

3.5 Location of study

Mamelodi is a township in Tshwane Municipality situated north of the Gauteng province. Figure 3.2 below shows the map of the township of Mamelodi. It covers an area of 45.2km² with an estimated population of 334 577 people (StatsSA, 2015). The zones forming the population covered were Mahube, Nellmaphious and Extension 6 Sections.

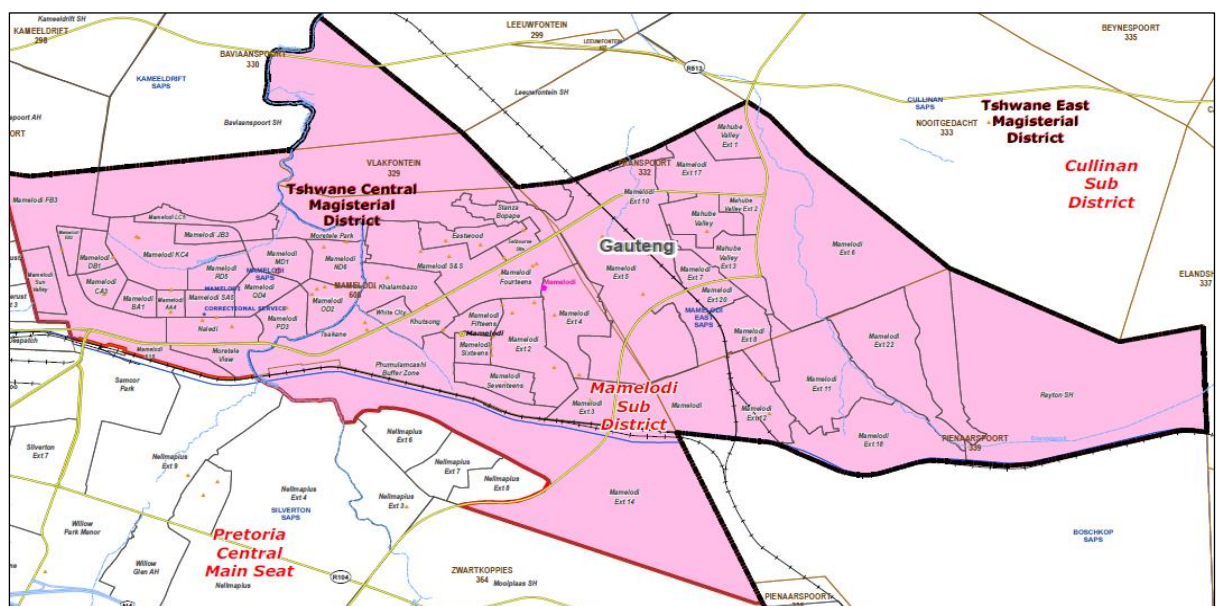


Figure 3.29: The township of Mamelodi in Gauteng province South Africa.

Source: Map data 2020 AfriGIS

3.6 Population of study

Saunders *et al.*, (2009), define a population as the full set of cases from which a sample is taken. Griffie (2012) refers to population as the working population from

which sampling frame or list of possible respondents is made. In this study, the population is defined as all the SMEs in Mamelodi. The estimated number of operating SMEs is 430 (SEDA, 2016).

3.7 Sample and sampling technique

Saunders *et al.*, (2000) state that it is not easy to assess the entire population. Therefore, it is necessary to assess a sample of the population as an alternative in order to generalise about the entire population. Bryman and Bell (2003) state that a sample is the segment of the population that is selected for investigation. Purposive sampling was used to identify the participants. Purposive sampling is a type of non-probability sampling in which the units to be observed are selected on the basis of the researcher's judgement about which ones will be the most useful or representative (Saunders *et al.*, 2009: 237). It is note-worthy that the choice of non-probability sampling technique has the dual advantage of relative costs being moderate to reasonable whilst also being highly beneficial in that control over sample contents is relatively high (Saunders, 2009: 236). This signified advantages to both the researcher and the study itself in terms of quality. This method also presents the opportunity to deliberately select a sample thereby enabling the reaching of difficult-to-identify members of the population (Saunders *et al.*, 2009: 242). Identifying the appropriate members of a population in a township like Mamelodi was challenging due to the haphazard organisation of businesses with blurred distinctions between franchises, formal, informal, SMME and SME entities. In addition, no active and updated database of small businesses exists for the study area.

The case study method has the advantage of having no rules when deciding on a suitable sample size (Patton, 2002). Rather, the focus should be on the logical relationship between the sample selection technique and the purpose of the research with possible generalisations being alluded to theory rather than to a population. Consequently, the sample size was dependent on the research questions and objectives particularly, what is to be found out, useful, credible and achievable within available resources (Patton 2002). This meant that the yardstick in selecting samples was those SMEs displaying little or no apparent Sustainable Competitive Advantages (SCA) synonymous with the RBV. By extension, participants chosen had displayed a fair level of formal as opposed to informal business conduct. The researcher nonetheless needed to have a guideline on sample size given this flexibility to ensure

validity and avoid bias. The observation by Creswell *et al.*, (2009) is that most researchers recommend continual data collection until either saturation point or new insights cease to appear among the sample. This option was not pursued in this study.

Guest *et al.*, (2006) offer the following guidance on sample size that is more acceptable and was pursued. For instances where the research aims to understand commonalities within a fairly homogenous group, such as lack of ICT among SMEs 12 in-depth interviews would be adequate. Regrettably, they note that 12 interviews are unlikely to be sufficient where the sample is drawn from a heterogeneous population such as considering the very diverse nature of SME business activities. Given these considerations, Creswell (2007) recommends 25 to 30 interviews for a general study. Considering these arguments as guidance a suitable size sample focusing on key themes, having reasonable control over costs and considering the limitations imposed by the current Covid19 pandemic was set at 21 participants.

Mamelodi Township is demarcated in zones termed sections. From the geographic sections that make up the township, the researcher targeted those that are in more formal areas as opposed to other more informal (squatter) settlements. The following sections were sampled: Mahube, Nellmaphious and Extension 6. Of the 20 targeted interviews, 7 each were allocated to two sections and six to the third one. One interview was administered to the key informant, namely SEDA using an in-depth interview guide. In the absence of a known database of SMEs, direct observation was used to identify them. Yellow pages and Google search on the internet was used as well. Telephonic appointments were made for data collection. Saunders *et al.*, (2009: 598) describes variations of purposive sampling as including extreme case sampling (unusual or special), heterogeneous sampling (maximum variation), homogeneous (maximum similarity), critical case sampling (dramatic or important) and typical case sampling (representative). These were considered when choosing samples as a kind of triangulation since each possesses unique advantages so as to avoid researcher bias in the quest to meet research objectives. This variety was necessitated by a need to match the equally diverse types of readiness in this study namely physical, financial, operational and psychological readiness among the SMEs.

3.8 Data collection instruments and procedure

Creswell (2007: 247) identifies some types of information sources for case studies as being interviews, direct observations, documents and archival records. For this study interviews were conducted.

Semi-structured interviews were conducted with SME owners in Mamelodi. The interviews were aimed at shedding more light on the different aspects of readiness by SME entrepreneurs for the 4IR. An in-depth interview was conducted with a representative from SEDA. The semi-structured and in-depth (unstructured) interviews were guided by non-standardised interview guides (King, 2004).

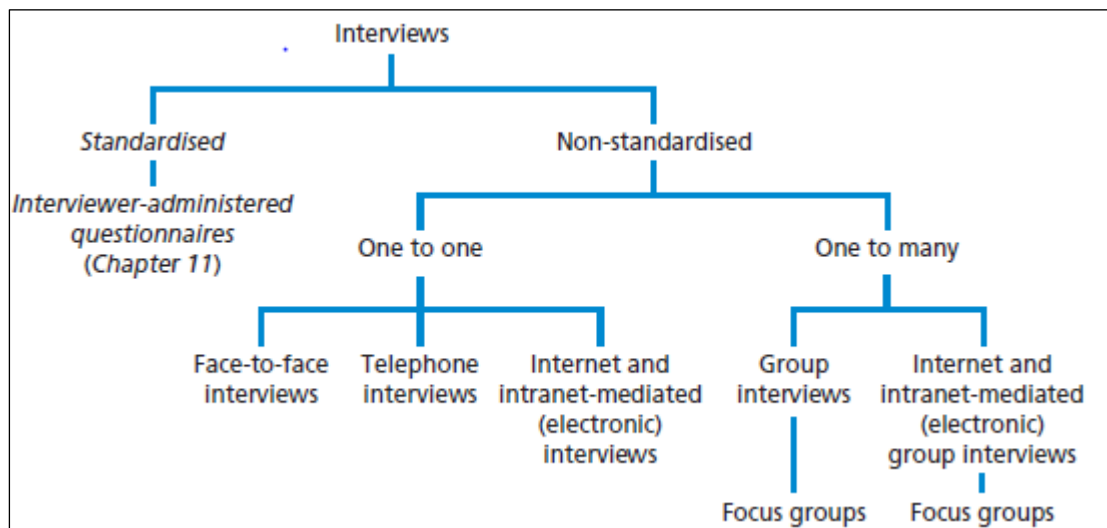


Figure 3.310:Forms of Interviews

Source: Saunders *et al.*, (2009: 321)

Figure 3.3 above illustrates the distinctive purposes of different interviews outlined above. Standardised interviews are normally used to gather data, which will then be the subject of quantitative analysis and therefore not applicable in this study. As part of a case study strategy, non-standardised (semi structured and in-depth) interviews were conducted to gather qualitative data for the study.

The semi-structured interviews were conducted with SME managers and owners. An interview guide was used to assist the researcher to address the research questions. The interview guide contained open-ended questions that enabled participants to express their opinions and experiences regarding the topic under study (Given, 2006).

According to Saunders (2009: 323) open ended questions are used widely in in-depth and semi-structured interviews and are useful in instances where the researcher is unsure of possible responses, such as in exploratory research. When answers required are supposed to be in such a way that what is uppermost in the respondent's mind is discovered and recorded, open ended questions lend themselves to this purpose.

A questionnaire has limitations hence the use of an interview guide. The debilitating limitation is that where-as one can probe and explore issues further with in-depth and semi-structured interviews, this is not possible with questionnaires due to their high levels of standardisation. Saunders (2009: 321) argues that for most management and business research the data collected using questionnaires is most suitable for either descriptive or explanatory purposes rendering it not suitable for the objectives of this study.

The township of Mamelodi has a wide range of SMEs such as bed and breakfast (B&B), motels, car wash, retail, sports and entertainment, construction, transportation, fast food, health and beauty Spas, spaza shops and motor mechanics. Semi-structured interviews were conducted with all businesses in the sample to gather information on the following key areas: the operational, financial, physical and psychological readiness of small business owners to adopting 4IR: the potential negative impact of going hi-tech: The level of ICT usage amongst township businesses (inclusive of social media such as Facebook, Twitter and Chat services); the extent to which businesses have adopted and made use of the new technology; and the extent of knowledge amongst SME owners of any public or private intervention programmes on ICT diffusions.

Through internet website and other searches, details of businesses were sourced such as the location, contact information and type of business activity. This information was placed on a spread sheet and telephonic interviews scheduled. No attempt was made to group businesses closest to each other as initially planned, due to the non-physical contact approach prescribed by Covid19 protocols. This eliminated the need for a more efficient approach given the geographic, random and sometimes haphazard

spread of businesses in the township. One research assistant was trained over three days via the Zoom online chat platform in preparation for the actual interviews.

Hewson, Yule, Laurent and Vogel (2003) offer useful guidelines on internet and email based research that were adhered to in this study. The following general operating guidelines were undertaken to observe and practice the appropriate “netiquette”. These includes ensuring emails are relevant and not sent as junk emails (spam). Invitations to participate were not sent to multiple mailing lists (cross posting) at once as participants may have deemed this to be unacceptable. Deliberate efforts were made at avoiding the use of email attachments, other than the MS Word interview template, as these would have been feared to be containing viruses. These proactive measures were strictly followed as failure to do so may have resulted in a few responses (Coomber 1997:10). Data was collected using an interview schedule and recorded using written notes. However all participants refused digital recording citing a negative prevailing atmosphere that included looting of shops (in Gauteng and KwaZulu- Natal) and a localised Mamelodi extortionist movement dubbed “Boko Haram”.

3.8.1 In-depth interviews with key informants

The key informant interview was conducted first using an in-depth interview guide and was administered telephonically. The key informant was useful for their expert knowledge of the subject under study considering their perspectives of analytic reflection (Saunders *et al.*, 2009: 295).

Specifically, key informants are government run entities for entrepreneurial support in innovation and technology. This means that those quasi government funded initiatives focusing on broader and general small business management issues were excluded. Therefore, the following key informants were identified: Technology and Human Resources for Industry Programme (THRIP); the Support Program for Industrial Innovation (SPII); the Innovation Fund; Technology for Women in Business; Tshumaniso Trust; and SEDA. However, most of these were discovered to be offshoots of the mother body SEDA and due to the prevailing atmosphere alluded to earlier they had no inclination to attend to non-core activities and queries such as research. As a result only SEDA responded to the data collection endeavour.

3.8.2 Qualitative interviews with owner managers

For semi-structured interviews the researcher had a list of questions and themes to be covered. Being non-standardised meant that these slightly varied from one interview to another. In practice this implied that some questions were omitted in particular interviews, given specific organisational contexts that were encountered in relation to the research topic. Depending on the flow of the conversation, the order of the questions was also varied. Contrary to what was initially planned, no additional questions were inserted to explore the research question and objectives on SMME readiness to digitization given the specific nature of peculiar conditions within particular entrepreneurial entities.

3.9 Research rigor

The overall intent of rigorous data collection is to develop an in-depth understanding of the issue at hand. However, the flexibility afforded by non-probability sampling does not imply that the researcher should adopt a less than rigorous approach. In this study, the researcher made use of the triangulation method so as to verify data collected and thus ensure its trustworthiness. Triangulation was in the form of comparing data collected using an in-depth interview guide with that from semi structured interview guide. In-depth interview guides applied to SEDA the key informant whilst the semi structured interview guide related to SME managers and owners. A rigorous approach was applied in selecting sufficient cases to test the propositions that had been advanced and to answer the research questions and meet the research objectives (Saunders *et al.*, 2009:501). A non-probability sample frame whilst being the most practical for a case study on one hand, may not allow the extent of the problem to be determined according to Saunders *et al.*, (2009: 232). This is due to the high reliance on the perceptions of the researcher, unlike in random probability for example. Taking part in interviews such as in-depth or semi-structured interviews is an intrusive process. This is particularly true in cases where the aim is to explore events or to seek explanations. Robson (2002) agrees with this notion and argues that an interviewee may, in principle, be willing to participate but may become hesitant due to the sensitive nature of the themes found in unstructured exploration. The outcome would be a biased data sample. Research rigor in a case study scenario refers to the extent to which the researcher obtains access to participants' information and insight, and is

therefore, able to deduce a meaning that the participant intends to convey from the language that is used by the said respondent.

Saunders *et al.*, (2009: 327) posits that although the validity of such studies is not necessarily an issue, generalisability of the findings from qualitatively based interview studies is usually a challenge. Yin (2003) recommends that such qualitative interviews be conducted carefully by using questions that have clarity, probing the meanings of responses and topics under discussion from a variety of angles, applying a high level of competence and well organized resource and logistical matters. This recommendation was diligently applied in the study by the researcher.

Research rigor refers to the trustworthiness of the qualitative data collection, analysis and interpretation (Creswell & Miller, 2000). Anney (2014: 275) recommends trustworthiness' ability to establish confidence in findings as the source of appropriateness for qualitative research. Trustworthiness was hence used as a yardstick in this particular research and comprised the following criteria:

- a) Credibility. Macnee and McCabe (2008) refer to credibility as the truthfulness of research findings. The research findings must epitomise the original data and interpret it accurately. To ensure rigour in this study, the active and direct participation of the researcher in the chosen medium of communication for data collection was mandatory. The researcher carried out semi-structured, one-to-one individual telephonic interviews along-side the trained research assistant.
- b) Transferability. Bitsch (2005: 85) defines transferability as inferring to how generalisable the research results can be. To ensure this is accomplished, the researcher ensured detailed description of context, the type of sampling, data collection and analysis as well as the characteristics of participants.
- c) Dependability. Bitsch (2005: 86) posits that research findings should be stable over time. This is achievable if research findings are supported by data received from informants. The researcher kept an audit trail which links findings to data collection, recording and analysis.
- d) Confirmability. Tobin and Begley (2004: 392) describe confirmability as the degree to which research results can be collaborated by other researchers. To ensure that data is not fabricated, false or even imagined by the researcher,

data collectors and respondents, techniques such as trust building, confidentiality and accurate questioning was deployed.

3.10 Data analysis techniques

Qualitative data obtained from unstructured and semi-structured interviews was analysed using the technique known as thematic analysis. New units that emerged were integrated into core themes which enabled the researcher to move from the particular to the general. Thematic data analysis method was applied in the study due to its qualitative design which is in line with this research method. Results were discussed and where necessary other related findings from the mainstream economy and emerging economies with similar characteristics like South Africa such as BRICS, studies were considered to support and explain the findings. The Nvivo, a software package for analysis of qualitative data was used for the analysis.

All data sources were analysed and a detailed description of each SMEs input into readiness for 4IR was written and summarised. After generating the description which Stake (1995: 123) terms “relatively uncontested data”; focus shifted to few key issues or themes. Care was taken to minimize or not to generalise beyond the case but to understand the complexities that may suffice in the case. The analytical strategy was used to identify issues within each case and then look for common themes that transcend the cases (Yin, 2003). The description of readiness for example, was banded together according to physical, financial and operational readiness which are exogenous issues possibly beyond the owner managers’ scope. Such issues relate to issues of Sustainable Competitive Advantages (SCA) achievable under the RBV conceptual framework.

Endogenous issues related to the personality of small business managers and can be deemed to be controllable for example, through e-leadership formed another set of themes. Other themes that emerged based on the administered interview guide relate to readiness for or awareness of the unintended consequences of 4IR on township economies and knowledge about available public and private innovation support. The study was closed by providing a broad interpretation of what has been learnt from studying the cases. According to Lincoln and Guba (1985) interpretation of the meaning of the case by the researcher, involved distinguishing between meanings that

come from learning about the issue of the case (instrumental case) or from learning about an unusual situation (intrinsic case). The final interpretive phase involved the researcher reporting the lessons learned from the case about how ready SMEs are for the 4IR. The study ended the case analysis with carefully applied generalisations upon the very widely diverse small and micro business sector operating in Mamelodi Township (Creswell *et al.*, 2007: 248).

3.11 Ethical considerations

Each interview conducted was preceded by introductory remarks reflecting on the nature of the research and the intended use of the information to be provided by participants. The participants were provided with the purpose and a detailed outline of the study. The principles guiding ethical research in the social sciences guided this study. The researcher undertook to treat the research participants respectfully and not as objects and management principles did apply, so as not to use the research to disempower the respondents (Creswell, 2003). Concerted efforts were made to respect the community's social setup, cultures and leadership. High levels of confidentiality were upheld through keeping the identities and views of the participant's private by the researcher.

Appropriate ethical clearance for the proposed study was sought and obtained from the College of Economic and Management Sciences at the University of South Africa (Unisa, 2012). Permission was also sought from participants who had to sign consent forms to participate as an alternative to Gatekeepers letters which were deemed inappropriate for the kind of participants.

3.12 Chapter summary

This chapter detailed the qualitative research methodology and research design used in this study. Sampling processes were also discussed in detail to show how the sample sizes for both in-depth interviews and semi-structured interviews were determined. The actual data collection and analysis procedures applied in the study have also been discussed in this chapter.

CHAPTER 4

DATA PRESENTATION, ANALYSIS AND INTERPRETATION

4.1 Introduction

This chapter presents the results and analysis of the readiness of SMEs in the township economy of Mamelodi for the 4IR. This chapter presents the results to answer the primary and secondary objectives of the study. The primary objective of the study is to examine the overall readiness of small businesses in Mamelodi Township to the adoption of 4IR. The secondary objectives focus on the financial, operational, psychological and physical readiness of the SMEs. In addition to results on the readiness the chapter also provides the results on the challenges arising from the adoption of the 4IR.

This chapter specifically explores the preparedness of SMEs to 4IR as well as knowledge about ICT applications which are commensurate with 4IR. Furthermore, external support initiatives available are explored. Finally, the role of leadership in promoting the adoption of the 4IR as well as the drawbacks to 4IR are examined. The study had two types of respondents so as to effect triangulation. The study comprised of 20 semi-structured interviews with SME owners and managers and 1 in-depth interview with a participant from SEDA. The need for deploying the triangulation method was to verify data collected and thus ensure its trustworthiness (Saunders, Lewis & Thornhill, 2009). Semi structured interview guides were used to guide the interviews. The thematic analysis approach was adopted and the NVivo software package was utilised to analyse the qualitative data.

4.2 Data capturing and coding process in NVivo

4.2.1 Data capturing

Completed interviews were captured in MS Word format. A MS Word template which uses form fields or content controls was used to capture the data. After capturing data verification was done and data was exported to NVivo for analysis. Analysable results were displayed in two forms, namely tree map and word cloud. According to Li, Chau and Zeng (2019) tree mapping is a method used to display sets of hierarchical data for information visualization and computations. Practically, this involves nested figures being utilised, usually in the form of rectangles. These rectangles representing similar objects are ranked by size and placed or stored inside each other. The analysis occurs

in the form of each rectangle displaying an area proportional to a specified dimension of the data. Word clouds are also a visual representation of text data, but unlike utilising rectangles in tree maps, they instead use key words identified. The analysis of data generates tags or single words, with the importance of each word being in the form of differences in font size or colour, (Halvey & Keane, 2007). Such format is useful for quickly perceiving and ranking the relative prominence of items, with the bigger font carrying the greater weight.

4.2.2 Data coding procedure in NVivo

Table 4.1 below shows the phases and related steps undertaken in the thematic content analysis of data collected for the study. This table outlines the data capturing and coding process from pre-analysis through analysis to the interpretation phase.

Table 4.1: Data capturing and coding process undertaken

Phases of thematic content analysis	Steps used by Researcher
First phase <ul style="list-style-type: none"> • Pre-analysis 	Created a project Add documents Grouping documents into document groups Writing up the overall project aim Including Research Questions
Second Phase <ul style="list-style-type: none"> • Material exploration 	Reading the data, selecting data segments and creating quotations Creating and applying codes Writing memos and comments Grouping codes with memos
Third Phase <ul style="list-style-type: none"> • Interpretation 	Exploring the coded data, Linking quotations, codes and memos on conceptual level Extracting reports Making use of tag cloud for data visualisation, Run a word frequency query to see words, concepts frequently used by participants, and made use of map. Tables formulated in Excel for analysis

Source: (Own creation)

The NVivo coding shown in Table 4.1 above was conducted as follows: First an explorative exercise identified the topics that stood out from the data. The completed structured interview forms were exported from Survey Monkey and imported to NVivo and codes or themes were then formulated and assigned to each completed interview form. Analysis was done using Word Frequency queries to list the most frequently occurring words or concepts in the sources. The Word Frequency query was used to identify possible themes, by looking for exact words and broadening the search to find the most frequently occurring concepts. After this exercise Word cloud and Tree Map tags were developed. Tables in excel were formulated to guide the analysis.

As submitted by Richards (2009) and Kovács, Kiss, Kassai, Pados, Kaló, and Rácz, (2019), the researcher focused on ensuring quality data during the course of the data collection process and during the data analysis phase. The focus was on accuracy, exertion of context, depth of narrative, practicality, and an instinctive connection to the data. The researcher mapped out the design for analysis before engaging in the analysis. Ultimately, the analysis resulted in the emergence of core themes. In the second round of coding, usable data was identified and grouped together leading to the further consolidation of the core themes.

The iterative steps taken in NVivo are shown below:

Step 1 - Reviewing the research questions and/or research approach

- Ensuring that there is a clear research question.
- Importing the research questions into NVivo for easy reference.

Step 2 - Reading a few transcripts and writing summary memorandums

When a transcript is opened, a click on the Memorandum link in the ribbon created a linked memorandum to that transcript. The transcript acted as a switch that could be made to the memorandum to write up key points.

Step 3 - Creating a research journal and developing a coding strategy

This stage commenced with reviewing the summarized memorandums that were written for the transcripts. A research journal was created as a memorandum and write up for the key issues coming out from the interviews. Reflection was made on how

Step 6 - Re-organising the Codes

The aim of re-organizing the codes was to create a catalogue of codes, so that they can be accessed more quickly. The rules applied to a catalogue system aims at keeping them like with like. Consequently, only one code was derived for a topic/theme and duplication of codes was totally avoided.

Step 7 - Exploring data using Coding Queries

This step involved shifting from an analysis of the text, to an analysis of the codes and relationships between them.

Step 8 - Identifying themes

Any patterns found are written up in the Research Journal.

4.3 Main findings

A survey tool was used to get a descriptive mapping of demographic characteristics of the population in Mamelodi.

4.3.1 Demographics according to type of business

From the 20 interview guides administered, 57 per cent of the respondents who participated in the study owned small enterprises against 43 per cent from medium enterprises as depicted in Figure 4.2 below. This distinction was profound for the researcher as a guide to the correctness of the sample. Given the narrow difference and consequently, high similarity between the afore-mentioned groups, the significance lies in the absence of micro enterprises as these tend to be more informal and not applicable to 4IR concepts as envisioned in this study. The distinction was in line with the main stakeholder in small businesses, namely SEDA which categorises small entrepreneurs' into small, medium and micro enterprises. Figure 4.2 below illustrates two of the three types of small businesses found in Mamelodi. The pie chart shows the breakdown of respondents in terms of business size.

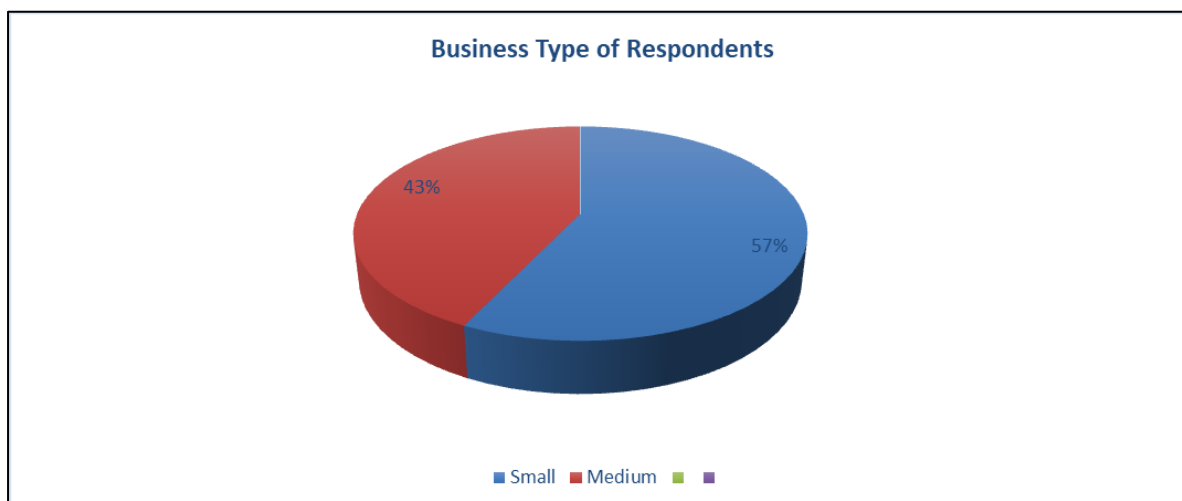


Figure 4.2:Types of business

Source: (Own creation)

With the acronym SMME denoting Small, Medium and Micro Enterprises, Figure 4.2 above accurately pinpoints the two forms of business under study. Specifications of different forms of small businesses are based on annual turnover and labour force strength. Small businesses typically outnumber the medium-sized businesses due to financial and other management related limitations. In order to gain general understanding of the two broad groupings of respondents an introductory background analysis sufficed.

4.3.2 Motives for starting a business

Small business owners indicated that their venturing into business mainly centered on satisfaction of being independent through self-employment as a consequence of pursuing a desired entrepreneurial passion. The key informant had similar objectives but on a broader footing. Whilst small-sized business managers had a narrow focus of self-employment, the government experts had wider considerations of employment, social emancipation, economic development and poverty alleviation in mind. According to the official at SEDA this could be done through *“our constitutional mandate is to promote, support and develop small businesses in accordance with the enabling Act”* namely the National small enterprises Act, (1996).

The question which evaluated the understanding of the SME concept from the respondents showed that they mainly aligned SMEs to business growth in townships

hinted that *“ekasi (township) we practice Ubuntu and share everything as neighbours”* To utilise such infrastructure, socially constructed “joint” ventures of all sorts are resorted to with the probable aim of cutting or sharing costs in consortiums of varied small business concepts. Such inter-connectedness and networking for shared infrastructure, services and operations is robust according to submissions from respondents. This submission was used as a case in point to demonstrate how physically and operationally ready for 4IR small businesses of Mamelodi are.

Such location advantages of being deeply and intimately embedded within their clientele’s domain have hitherto been their sustainable competitive advantage (SCA). Such competitive advantage is in line with the theoretical concept adopted in this study namely, the Resource-Based View (RBV). Kor and Mahoney (2004: 183) and Ruivo, Oliveira and Neto, (2015) posit that SCA being a component of the RBV involves the creation, maintenance and sustenance of competitive advantage. It is imperative that small businesses, according to their own submissions, harness such technologies that enable connectivity, real time applications, online booking and inventory capacity monitoring amongst others. This would be in attempts to enable simplification, streamlining, cost savings and ultimately wider market capitalisation vital in the 4IR.

According to the respondents, they were mostly motivated into operating their businesses in Mamelodi because of the idea to do something to improve their way of life since they were struggling given the high levels of unemployment. They perceived that there is a viable market, and that it is possible to generate profits as reflected in Figure 4.4. However, having embarked on this entrepreneurial journey has proven daunting as evidenced by submissions concerning drawbacks encountered or feared in 4IR implementation. The Word Cloud shows the factors that ordinarily improve business processes. These by extension are possible sources of competitive advantage if 4IR concepts are adopted. The literature review in this study revealed that small businesses are involved in cut throat competition with big, established and fully 4IR compliant businesses in this given locality. Having endured and relatively overcome such odds is a reflection of psychological readiness for an equally daunting 4IR, which with adequate motivation and training can be entrenched into their mental fortitude. One small business owner-manager operating next to a big shopping mall was asked whether or not they believed the 4IR was evolving and responded to say:

“look at the hustle and bustle of that hi-tech place (mall) and compare with my over the counter standalone, yes of course”.

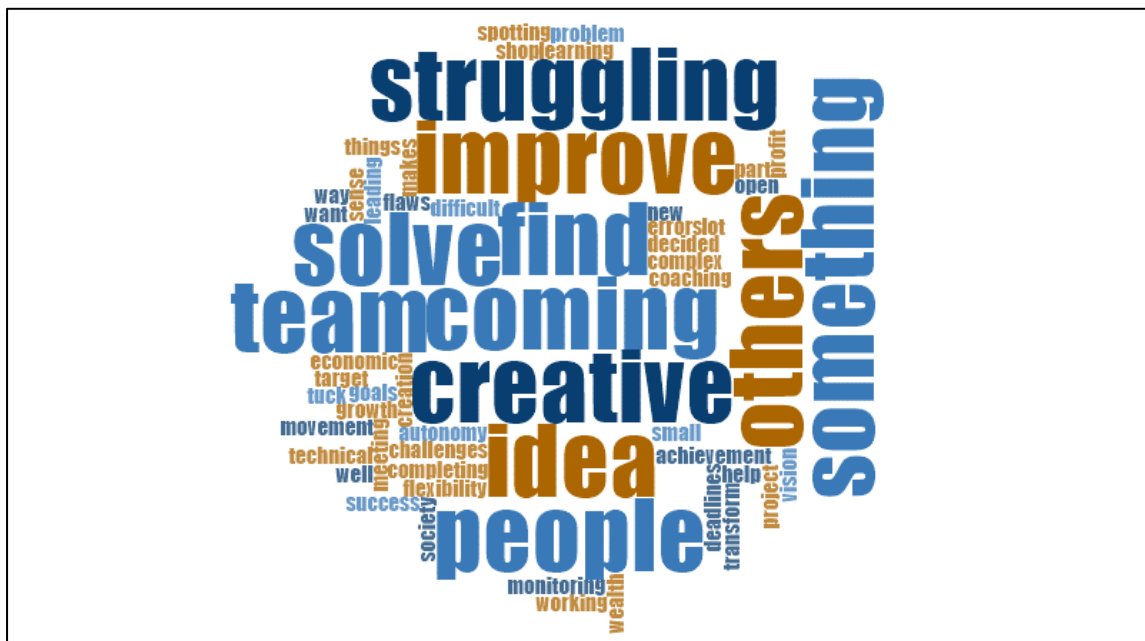


Figure 4.4: Factors that ordinarily improve business processes

Source: (Own Creation)

Figure 4.4 above is a Word Cloud which depicts factors advanced as capable of improving business processes. Prominent tags include solving, creative, idea, others and improve. These factors denote an appreciation for the need for change in the status quo of small businesses. Less prominent tags include difficult, way, small, coaching and technical all indicative of small business owner-managers being cognizant of challenges albeit being capable to over these.

As discussed earlier, the main advantages of the businesses in the area were identified to be mostly access to the market (people), the township is busy, and the possibility of business growth hinges on proximity to customers as shown in Table 4.2 below. The diagram is a tree map and it illustrates some transformative dynamics of migrating from the traditional way of running small business and moving into the digital era.

Table 2.2: Transformative dynamics from traditional to digital era.

people	grow	cause	target	want	dreams	growth	high	inflation	jobs
					fare	location	majority	make	money
		independent	taxi	changes					
	market				fast	lot	need	poor	population
busy		mamelodi	township	create				take	transport
				differences	fulfil	mae	person		walk

Source: (Own Creation)

Table 4.2 is a tree map showing the rank order of transformative factors in migration from traditional small business practices to 4IR. Featuring prominently are tags such as people, busy, market and independent which demonstrate how a hands on approach keeps small business managers busy with people/market through an intimate focus on customer relations. Such traditional approach needs transformation (changes) to achieve that elusive dream of high profitability empowered by an ICT thrust.

In terms of approach, two broad categories emerged in the findings. The first group comprises of businesses that have the means to implement 4IR despite the stated challenges to readiness based on financial, operational, psychological and physical constraints. The other group comprises small businesses which submitted that they are factually incapable of embracing the digital revolution. Depending on the nature of the product or service offering, a fairly sizeable number of participants attributed this to poor demand consistent with a poverty stricken customer base. A female participant stated that *“demand for our business offerings is poor because our location borders squatter camps, has no amenities (water and electricity), unemployment is high, and general there is insecurity for infrastructure”*. In their responses the participants argued that the risk of investing in such areas outweighs the benefits and this is compounded by such physical locations rendering businesses not being credit worthy. Hence the

conclusion in these instances is operating in a survival mode of *“its business as usual”* to keep afloat with no prospects for advancement. The absence of a drive to advance as provided by the 4IR creates a situation whereby SMEs operating on the fringes of the township reflecting zero readiness to 4IR in all aspects.

4.5 Knowledge about ICT applications commensurate with 4IR

Application of digitisation processes may translate into competitive advantage which is synonymous with the resource-based view. Respondents revealed a fairly detailed and accurate awareness of technologies available in the digital age and benefits they endear are displayed in Figure 4.5. These technologies are distinguished between those that are deployed by similar small businesses and those being utilised by big business. In denoting these distinctions, owner-managers were cognizant of the fact that through leapfrogging they can be assisted and supported through partnerships/collaborations, respectively. To this effect the SEDA key informant official interviewed stated that: *“that is why we run incubation facilities so that our small business clients may not start from scratch but simply catch-up and go”*



Figure 4.5: Advantages that may be accrued from small businesses embracing 4IR

Source: (Own Creation)

Figure 4.5 reveals evidence to the effect that advantages stemming from embracing 4IR may accrue to small businesses as perceived by SME owner-managers. They

identified 4IR with new, changes, made better through application of technology which eventually leads to development.

The identified ICT applications used by other similar businesses include computers, fax machines, tills/counters, mobile cell phones, tablets, internet, teleconferencing, and social media networks. ICT applications being used by big businesses and not being used by SMEs include automated machines, CCTV (security cameras), computers, speed point printers, scanners and other digital software systems. These are shown graphically in Figure 4.6 below. Participants indicated that they are unable to access and utilise these applications given their size, complexity and cost of such applications. Therefore, the financial, physical and operational readiness to adopt such ICT applications and machinery was largely ruled out.

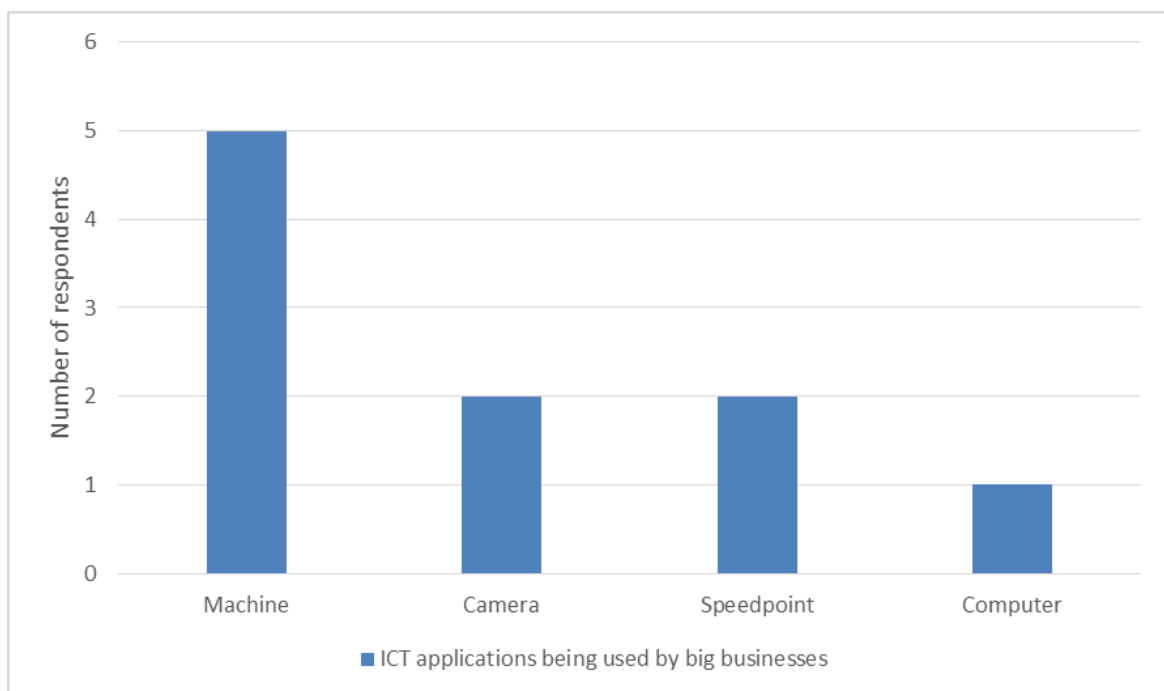


Figure 4.6: Relative importance and consequential comparative equipment usage

Source: (Own Creation)

Figure 4.6 is a bar chart which diagrammatically represents the comparative usage of technologies by small businesses. A comparative analysis of ICT usage by big business indicates that machinery (plant and equipment) overwhelmingly forms the largest fraction. This is probably the case due to the fact they (machines) are the main

value providers for a business through the production of goods and services. The high usage of CCTV is indicative of security concerns in a poverty riddled location like Mamelodi. Speed point and computer application area result of possible high volumes of customer service in mainly service oriented small business operations.

Another important finding is that financial factors were cited as the main factor in adopting ICT concepts used by similar SME's. Responses from participants show that these technologies can be mimicked as they largely relate to soft skills such as marketing, functional skills, and communication. However, a closer analysis reveals that physical and operational factors in addition to financial ones are equally applicable given their similar metrics. Psychological factors also suffice given the social fabric of townships which has heavy inclinations to competition. The conclusion therefore is that based on comparisons with technologies used by their peers, SMEs are financially, psychologically and operationally ready to go digital. Table 4.3 below displays the main ICT applications identified as in use by SMEs. The list reveals mostly operational factors, which denotes operational readiness by respondents.

Table 4.3: Main ICT applications identified as in use by SMEs.

Word	Length	Count	Weighted Percentage (%)	Similar Words
Machine	7	5	13.89	Machine
Camera	6	2	5.56	Camera
speed point	10	2	5.56	speed point
Automatic	9	1	2.78	Automatic
communication	13	1	2.78	Communication
Computer	8	1	2.78	Computer
Control	7	1	2.78	Control
Digital	7	1	2.78	Digital
Door	4	1	2.78	Door
Efficiency	10	1	2.78	Efficiency
Inventory	9	1	2.78	Inventory
Laptop	6	1	2.78	Laptop
Operations	10	1	2.78	Operations
Parking	7	1	2.78	Parking
Photocopy	9	1	2.78	Photocopy
Point of sale	5	1	2.78	POS
Poor	4	1	2.78	Poor
Price	5	1	2.78	Price
Printers	8	1	2.78	Printers
Scan	4	1	2.78	Scan
Screens	7	1	2.78	Screens

Word	Length	Count	Weighted Percentage (%)	Similar Words
Self	4	1	2.78	Self
Software	8	1	2.78	Software
Specific	8	1	2.78	Specific
Swiping	7	1	2.78	Swiping
System	6	1	2.78	System
Tag	3	1	2.78	Tag

Source :(Own Creation)

Table 4.3 is evidence of fairly extensive and diverse use of ICT by SMEs. The fact that such technologies are in place and operational, implies the physical and operational readiness of small businesses for the 4IR. The list points to both service and production ICT applications as well as the small scale nature of activities.

4.6 External support initiatives

Economic factors (of production) are generally scarce (Bacharach, 2019) and this is more so for small businesses run by individuals designated as previously disadvantaged in the South African context. Moreover, areas such as Mamelodi that were formerly subject to discriminatory Apartheid laws still suffer the legacy of severe economic limitations. To mitigate such scarcity of resources this study duly enquired about knowledge and optimisation of government-sponsored initiatives and institutions. The question of public assistance was motivated by an understanding that such assistance generally does not lend itself available with stringent conditions as opposed to that of private players. Help from enabling institutions is indeed forthcoming.

The respondents confirmed that they were affiliated to the following government agencies as listed in Table 4.5 below. SEDA confirmed responses from SMEs that it does indeed engage with them in a variety of offerings, including ICT. Furthermore, SEDA elaborated on the assistance it affords small businesses to include incubation centers and digital hubs. Such concerted efforts by SEDA are comprehensive in that they cover both the theoretical and practical dimensions of business through advisory and financial-technical assistance, respectively.

Table 4.4: List of government agencies that small businesses affiliate to.

Government Agency Affiliated	No. of Responses
National empowerment fund [DTI]	1
Department of trade (SEDA)	1
Department of energy	1
Health and human services	1
Industrial development corporation	1

Source :(Own Creation)

Table 4.4 above is a reflection of the external assistance obtained by SMEs of Mamelodi. The list shows how despite being a crucial sector and having a myriad of challenges, little assistance is sought or rendered. Government agencies are in the fore front with such assistance whilst private sector participants are noticeably absent. Table 4.4 shows a disparity between the stated list and actual government institutions which render small scale business assistance. This anomaly lies partly in the township economy setup having community programs which have a socio-economic mix which blurs the lines between contributing stakeholders. SEDA submitted that as far as they are concerned they are the only public entity mandated to service SMEs.

Table 4.5 below is a collection of responses by small business owner-managers on what they understand as beneficial assistance in their quest to latch onto the 4IR. Tags denoting lack, support and poor reveal evidence of their inadequacies and are disproportionately high in this tabular presentation. References to change, collaboration, solution, expert, empowerment, motivation and training are strong indicators of psychological readiness to embrace the 4IR as well as assistance in that quest.

Table 4.5: The drivers of desire for assistance by SMEs

lack	internet	training	connection	equipment	infrastructure	management	proper	remote	scale	
	poor	administrative	course	expert	innovation	motivation	school	solution	speed	
			employee	genuine	latest	pace	selling	staff	technical	
			change	empower	dict	low	patterns	software	unavailability	use
			collaboration						unstable	work
time										
support										

Source: (Own Creation)

As shown in Table 4.5 above responses about expert, innovation, technical, change and collaboration are indicative of an appreciation of incapacity requiring external redress. The table provides the answers both specific and in magnitude, to the enquiry concerning government assistance for SMEs. It demonstrates how lack and need for support in various forms comprises the greater drive. SEDA is also cognizant of the fear of failure among small businesses and attempts to provide support to improve the probability of success of these SMEs. Fear of failure also ranks high on the psyche of owner-managers as their business is a product of their life savings, pensions, hard earned cash, high risk liabilities and personal reputation. On the other hand the given sponsors dread macro level circumstances such as unemployment, poverty, crime and social disorder. With such an apparent congruent view on business survival, SEDA aims at turning the physical advantage and readiness for 4IR into a reality by migrating from geographical to virtual market space that 4IR enables. Such change is reminiscent of one of the theoretical underpinnings of this study, namely creative destruction.

The theory of creative destruction (Schumpeter, 1942; Aghion & Jaravel, 2015) centers on the premise that old technologies are replaced by new ones through a

progressive or incremental process and ICT Innovation. Ludin and Cheng (2014: 143) and López-Miguens and Vázquez, (2017) offer some assurance which provide psychological motivation and readiness to small businesses by postulating that contrary to the Schumperian theory, change may not necessarily be abrupt. Should change from traditional to digital be embraced mentally by owner-managers, financial readiness becomes achievable as well. This readiness, according to the theory is manageable through incremental savings or progressive acquisition of ICT.

The SMEs interviewed also indicated that they are currently using some automated ICT applications in their businesses. This has facilitated the facile embracing of external assistance to such a territorially sensitive community as is common in townships. SEDA has demonstrated that it is ready for 4IR in all aspects pertaining to this study namely financially, operationally, psychologically and physically. In addition the institution chronicled its readiness for both success and drawback for small businesses in response to the 4IR. Any limitations in driving small businesses into the information age may only be attributable to SMEs themselves and not the agency. SEDA confirmed that constitutional, regulatory and funding mechanisms were in place and that it is fully capacitated to deliver on its mandate.

This mandate is achievable in that the requirements of most SMEs are feasible. The most notable ICT gadgets stated as being utilised by the participants were printers, digital security cameras and doors, fax machines, and alarm security systems. The question on appreciation of innovation concept showed most of the participants had an idea about that it relates to new ideas, improved/transformed processes, ways of doing things, among others. The most common networked ICT applications being used by the SMEs was the Wi-Fi (60 per cent), mobile/cell phones (20 per cent), hotspots (10 per cent), and email (10 per cent) as highlighted below:

Figure 4.7 shown below is a comparative analysis of the different digital applications used by SMEs. The graph illustrates that computerised ICT systems being used by the SMEs were mainly computers, laptops, tills/counters, cell phones/tablets and facsimile machines. Computer usage signifies the physical fixed nature of website and general internet connectivity to affordable Wi-Fi portals. This is closely followed by laptops which serve the same function as computers but with a minor touch of

sophistication. Tills are basic tools that serve as cash registers with cell phones utilising a multitude of communication modes.

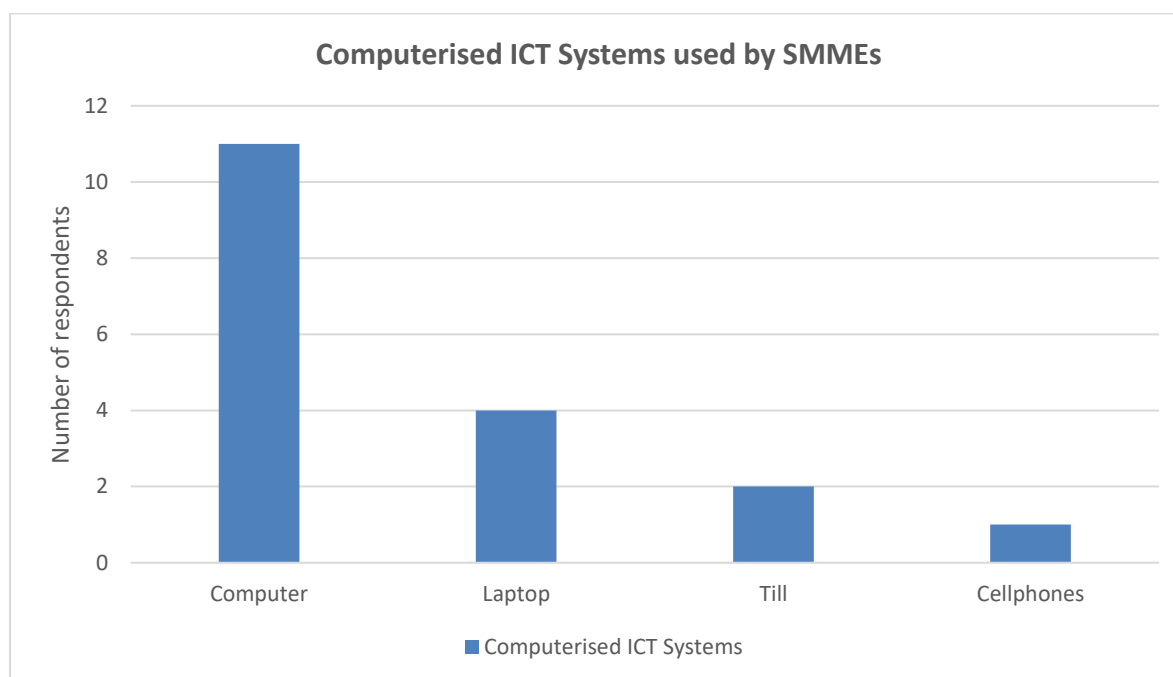


Figure 4.7: The drivers of desire for assistance by SMEs

Source: (Own creation)

Figure 4.7 is a comparative illustration of electronic systems commensurate with 4IR used by SMEs. With the internet being the main driver and enabler of information exchange gadgets such as computers, laptops and cellular phones feature prominently in small business ICT. Computers are the most widely deployed gadgets due to their cost effectiveness whilst being highly versatile.

As illustrated in Table 4.6, small business acceptance and usage of ICT is evident. SEDA offers pro-active assistance in the form of increased access and usage of technology as well as facilitation of acquisition and transfer of technology. These focused objectives are intricately intertwined with the following broader objectives achievable through implementation in duality (technology and management): Promotion of use of quality standards; improvement of competitiveness; and the reduction of small business failure rate. The given list is a demonstration of very limited ICT options which invariably justifies the need for external assistance.

Table 4.6 :Expanded list of ICT commonly used by small businesses of Mamelodi

Word	Length	Count	Weighted Percentage (%)	Similar Words
Computer	8	11	52.38	Computer
laptop	6	4	19.05	Laptop
Till	4	2	9.52	Till
cell phone	9	1	4.76	cell phone
counter	7	1	4.76	Counter
Fax	3	1	4.76	Fax
tablet	6	1	4.76	Tablet

Source: (Own creation)

Table 4.6 is an exhaustive list of ICT applications stated by small businesses in Mamelodi. The list shows the lack of sophistication and business intelligence. The ICT leans heavily towards information sharing and order processing thereby lacking critical Information Management System and KM crucial for high competitiveness.

4.7 The role of leadership in 4IR migration

Consistent with the literature, this study found that participants also demonstrated an appreciation that they are supposed to be the change agents in digitisation in the form of an e-leader. The concepts of e-leadership advanced by owner-managers included motivation, change, inspirational leadership, forward thinking, innovation, and electronic driven. This is in line with the conceptualisation of e-leadership in Avolio, Sosik, Kahai and Baker (2014) based on an appropriate alignment of business strategy and digital technology. The authors argued that this is necessary to enable the fostering of longevity and business growth.

The transformational leadership qualities desired in the SMEs are depicted in Table 4.7. The identified qualities were considered important for business because they motivated the minds of individuals, instilled confidence and increased focus as business can be challenging.

Table 4.7:Transformational leadership qualities desired in the SMEs

Word	Length	Count	Weighted Percentage (%)	Similar Words
charisma	8	5	62.50	charisma
motivation	10	2	25.00	motivation, motivational
inspirational	13	1	12.50	inspirational

Source: (Own creation)

Table 4.7 categorises the two main transformational traits envisioned by small business owners. Given appropriate training and coaching an ideal balance can be achieved that enables small business owners to manage the transition to the 4IR. The status quo reveals an over reliance on their personal charisma which is better fitted to personal interaction with customers rather than the broader virtual space 4IR enables.

Whilst charisma is a natural trait and therefore largely subjective, more concerted objective efforts are needed to build the ability of small business owners to engage with both customers and the 4IR requirements. As such SMEs alluded to the need for training and advocacy efforts to be increased by the government so as to project digitisation on the motivation and inspiration path. The emphasis on government assistance stems from the belief that 4IR is a national imperative and that a central authority is more adept in preparing SMEs along the 4IR dimension.

4.8 Drawbacks to 4IR by small businesses

Figure 4.8 shows the main factors cited by small business owner-managers as drawbacks constraining their readiness for the 4IR. The main drawbacks on the implementation of 4IR were cited as lack of skills, low education levels, lack of entrepreneurship skills, and cyber disruption. Cyber disruption, for instance, lead to lost business as online orders could not be processed. Mobile and computer network coverage for internet usage is supplied mainly by Cell phone companies through physical transmission towers. However due to high crime rates and sheer unsolicited vandalism by vagrants, youth and others, disruptions are incessant and highly counter-productive. Theft from such infrastructures is spurred on by the presence of copper cables, circuit breakers, diesel, sheet metal, light bulbs and sheer curiosity among others factors. Such a state of affairs renders a significant portion of Mamelodi not to be physically and consequentially operationally ready as well. The challenges identified in the implementation of innovative ICT in the SMEs were lack of financial support, poor internet, unavailability of infrastructure/equipment and lack of training.



Figure 4.8:Drawback factors

Source: (Own Creation)

Figure 4.8 summarises the actual and perceived drawbacks to 4IR implementation by SMEs in Mamelodi. The tags reveal the general despondency arising from a sense of general lack in a multitude of business aspects. While empirical data places finances overwhelmingly on top of the list of hurdles constraining the growth of small business, the findings of this study contradicts available mainstream research evidence. The findings in this study are skewed towards human factors instead.

The disadvantages of implementing 4IR on SMEs were noted to be poor business growth, fast technological growth, poor adaptation, and lack of skills. Using semi qualified IT personnel has resulted in the development of unreliable Web sites, Blogs and Applications (Apps). This has manifested in a constant struggle to maintain a sustained online presence for B&B’s and catering establishments as an example. Such unreliable operational challenges do not have ready solutions as brilliant ideas and technical creativity which can place the small business on the spotlight through improved offerings require costly expertise and skills. Efforts have however been made to team up with bigger business through monitoring the immediate business environment so as to partner in the supply chain and gain beneficitation through technology transfer. SEDA has set up innovation hubs to this effect, of which an active example given is the digital hub at their Centre for Entrepreneurial and Rapid Incubator facility. However as discussed earlier on in this study, fears of litigation and high costs

of licensing translate into psychological and financial incapacity, respectively. This applies to situations whereby financing is only obtainable from private financial service providers.

Participants cited the lack of more physical contact brought about by increased online and other cyber transactions as denting long established customer relations. This is because the social setting of townships is built on subjective factors such as affiliations in religious, ethnic, socio-cultural, gender and other demographic dynamics.

4.9 The future of SMEs in the 4IR era

The strategic plan formulated by SEDA for 2021 to 2025, referred to as Program 2, envisions the increase in focus (training and funding) to be on fully 4IR compliant projects (SEDA, 2020).

Figure 4.9 illustrates the perceived notions of small business owner-managers concerning the future with regards to the 4IR. Findings show that 17 out of 18 (94.4 per cent) participants interviewed believed in the 4IR as a way of doing business in future.

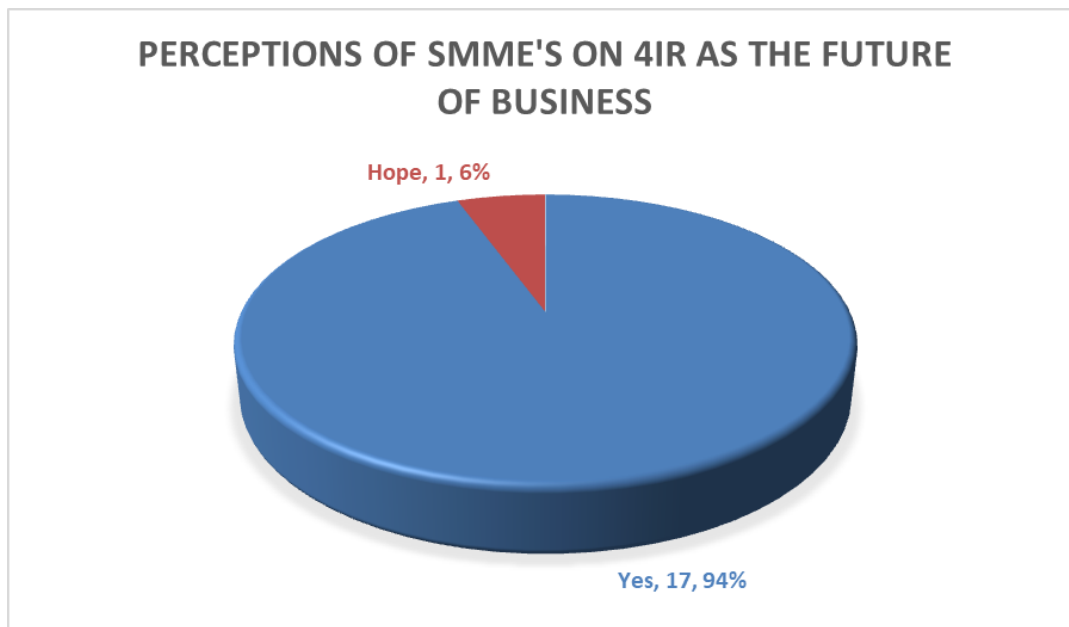


Figure 4.9: Perceptions of small business owner managers about 4IR vis-à-vis the future

Source: (Own Creation)

Just as with SEDA, small business owner-managers also conceded that an objective analysis points to benefits accruing from a digitised business that far outweighs the traditional business model. They identified such factors as improved productivity, increased competitiveness and increased job opportunities as major benefits that could arise from the 4IR in future. Furthermore, potential new market segments were identified for SME business growth in future. These included social media and education.

4.10 Chapter summary and conclusion

This chapter presents and discusses the findings of the study in relation to the primary and secondary objectives. The findings demonstrate the existence of a fair degree of credence in 4IR. The benefits anticipated by the SMEs to emanate from 4IR include increased productivity, a higher market share, more job opportunities, better time management, efficiency, cost-saving, gaining of customers and improved processes, among others. The SMEs also intimated that factors influencing their failure to obtain ICT applications included the following: lack of skills, poor leadership/management, and ignorance. SEDA, being the main agency focused on SMEs also cited similar factors as inhibiting it from rendering assistance that would propel SMEs to success through embarking on the 4IR. The analysis carried out reveals that physical readiness tops the list. This is the case in that it is the initial cause and main pillar of initiating and sustaining the small businesses and plays the part of being a source of SCA. Since business activities are conducted on the actual physical properties which are wired to telecoms, operational readiness appropriately follows. Generally the majority of SMEs agreed that the benefits of 4IR outweigh the drawbacks. This is indicative of psychological readiness which if harnessed properly, through e-leadership for instance can mitigate the financial factor.

CHAPTER 5

DISCUSSION, RECOMMENDATIONS AND STUDY SUMMARY

5.1 Introduction

In this chapter the researcher uses the theoretical framework to discuss the results of the study, including indicating how the study contributes to the body of knowledge. Based on the findings, recommendations are set out before providing summary for the entire study.

5.2 Review of research objectives

The main objective of this study is to explore the overall readiness of small businesses in Mamelodi Township to adopting the 4IR. The secondary study -objectives as listed below:

- a) Explore the financial readiness of SMEs in Mamelodi Township to technological revolution.
- b) Establish the operational readiness SMEs in Mamelodi Township for potential benefits of using 4IR.
- c) Establish the readiness SMEs in Mamelodi Township to potential drawbacks of implementing 4IR at the micro level.
- d) Establish the psychological readiness of SME owners/managers in Mamelodi Township to current 4IR programs.
- e) Explore the physical readiness of SMEs in Mamelodi Township to adapting existing 4IR innovations.

5.3 Discussion of major findings

True to the observation by Eisenhardt and Martin (2000: 1107), 'the current dynamic business environment is aptly described as being a place where markets are emerging, colliding, splitting, evolving and dying'. This statement summarises this study in a nutshell by revealing a revolution in the making as well as validating the three theoretical constructs used. The three theories expound how a business ought to have a specific advantage (RBV), constantly adapt this advantage to change (creative destruction) and be systematically tech savvy (E-leadership). The RBV revealed that resources are not only tangible but also include intangible assets and more significantly in this digital era, intellectual capacity is critical (Winter, 2000;

Teece, 2018). The RBV is premised on the SCA which in turn is driven by innovation and derivatives of internal resources (Penrose, 1959: Porter, 1980). This assertion pointing to an endogenous (internal) inclination is indicative of the overriding effect of owner manager's psychological readiness above others.

This study, through a comparative analysis delved on how big business has largely succeeded in practically endorsing the 4IR. It was discovered that they based their choice on the significance of knowledge for efficiency and competitiveness (Halawi *et al.*, 2005: 76). Most big firms have adopted the principle which states that KM is the idea that knowledge and its application is the vehicle through which creativity becomes a reality through creative destruction (Nonaka & Nishiguchi, 2001). This is a human factor of readiness akin to e-leadership which believes that human mental (psychological) factors can drive corporate behaviour in a direction that enables other forms of readiness or compliance to higher goals such as profitability. Newbert (2007: 122) in his valuation of RBV gives examples of new and preferred SCAs such as core capabilities and competences, combinative capabilities and transformation-based competencies. All these point to the need to align operations, physical assets and financial aspects to a mind-set that is "smart" by being lean and on point as opposed to the traditional. Paetz (2014) introduced the JTBD concept to explain this intended new mind set as a means, for example, to avoid business conduct that does not increase the size of the pie, but regrettably instead increases the number of participants wanting a share of the same pie.

JTBD is a sign that new competences have arisen hence Teece, Pisano, and Shuen (1997: 510) proposed the dynamic capabilities framework to elucidate on how continuous combinations of competences and resources are revolutionary and necessary. This means questioning the current basis for SME strength which comprises physical location, small scale operations and limited financial investment which has culminated largely in a failure to curtail the high business failure rate in this sector. To this effect Hanna (2007: 6) states that 4IR is a process and may be the evolution of human resource development enabling e-leadership to drive operations.

In the event that SCA has been achieved in any form discussed above, Kraaijenbrink, Jeroen, Spender, Groen and Aard (2010) argued that such should be VRIN. ICT was

pinpointed as a medium through which significant lowering of barriers to entry in a market segment can be achieved against better resourced players. The influx or penetration of larger, well-funded, digitally complaint and long established businesses into townships incidentally denotes physical readiness to the 4IR by small businesses. This is the case in that wireless technology and coverage which is mainly internet driven is equally available to all in Mamelodi. Lack of operational and financial readiness is the apparent impediment which falls short in complementing such physical readiness. Nonetheless, Manjoo (2015) dismisses the small scale location based advantage arguing that it should be questioned or discarded as being insignificant in a rapidly changing cyber-oriented space.

A migration from the traditional physical arena to the virtual requires an orderly, systematic and deliberate approach. It was established that this can best be accomplished through a dedicated e-leadership role. Transformational leadership emerged as the ideal, outpacing charismatic and transactional forms as derived from 'behavior' and 'trait theories on leadership. The transformational leader's role is to direct and influence employees as well as township customers into embracing the digital age and treat as redundant traditional operational transactions. The need for such a re-orientation aims at countering the misconception that ICT is cumbersome and rigorous. The actual reality is positive as given adequate practice and an aligned mental dispensation makes it fairly flawless.

The attainment of SCA which is synonymous with RBV received the greatest attention in this study as such unique advantage is the key producer of value for a business. The significance of SCA is partially attested to by the multiple extensions to this paradigm spurred on by 4IR. These include Resource-Based Theory for Net-Enhanced Organisations (Zhu & Kraemer 2002: 275); Net-enabled Business Innovation Cycle (Wheeler 2002); and Adaptive Structuration Theory (AST) (Bierly, Kessler & Christensen, 2000; Schmitz, Teng & Webb, 2016). AST in particular was significant in that it enables interaction between business structures and leadership by accommodating personal attributes such as endurance, tolerance, forbearance and patience. Eisenhardt and Martin (2000) and Lepore (2014) cemented these assertions by theorising that creating disruption enables the acquisition of competitive advantage

activated at a dynamic level through advantageous 'dynamic capabilities' or 'organisational learning'

5.4 Recommendations

The commonest and perhaps fairly cost effective way to transition to 4IR, as proven by big business is through internet based commercial activity. One simplistic initiative commonly used and widely accepted by customers is e-commerce. E-commerce provides integration in value chains, permits customisation as well as affording smaller entrepreneurs an opportunity through KM to reach customers worldwide (Da Silveira, 2003: 201; Liu & He 2018). A deliberate policy to market and introduce e-commerce to SMEs is thereby recommended.

The motivations for township entrepreneurship by small business owners, government sponsors such as SEDA and township communities are variably divergent as noted in the study. The 4IR is touted as enabling efficiency and effectiveness through streamlining on the one hand, but seemingly defeating wider societal goals such as mass employment on the other hand. The interpretation therefore is that ideal leaders are those that can cope with paradoxes and dilemmas, and the associated behavioural complexities (DasGupta, 2011: 7). It is therefore recommended that transformational leadership be the main focus as far as leadership training is concerned. Further justification for this leadership thrust lies in the fact that the nation is in a state of transition and township revitalisation is taking center stage and gathering pace.

Empirical evidence shows how SMEs are very vulnerable as a consequence of their size, poor income generation capacity, and incapability to compete with mainstream businesses. A close inspection of these successful big businesses reveals that they are conglomerates with multiple shareholding or ownership structures unlike the predominantly sole trader SMEs. Lavie (2006) and Hau (2016) point out that alliances engender common benefits from the shared resources of participating firms. The formation of alliances, coalitions, joint ventures or partnerships should be incorporated in training and funding activities either persuasively or more appropriately as a prerequisite for assistance and risk mitigation.

The proposal in Stam and Wennberg (2009) is highly recommended. They proposed that entrepreneurship policy should target young, highly educated entrepreneurs who are ICT savvy to start businesses. This is essential to absorb the high numbers of unemployed youth, address the empowerment drive and break the small business tradition of social rather than business orientation.

It was observed that funding for technologically innovative projects in general is in the form of seed funding and venture capital for big and small businesses alike. However, according to Wolf (2006) this is unfortunate in that such funding is rather weak in South Africa. Further analysis by Booyens (2011: 70) deemed such institutions as being too few to contribute any meaningful impact on underfunded SMEs. With the limited technical capacity of public institutions like SEDA it is highly recommended that they partly channel finances for small businesses through experts such as venture capital and seed funding financial service providers.

The South African skills training landscape is robust and well-funded mainly through Sector Education and Training Authorities (SETAs). These SETAs collect statutory levies from businesses. However their training efforts and current mandate mainly targets the youth, school leavers/graduates and employees. Therefore, a skills gap exists in the SME sector as a whole due to inability to afford such training and where such sponsorship exist it is management related. A lose-lose situation therefore occurs where the owner-managers lack ICT training on one hand and the youth lack access and exposure to practical experience on the other hand as not all are formally absorbed into SETA programs. With graduate learnership programs focusing on the limited and shrinking corporate sector, a shift should be made whereby such should also be placed with the ever expanding SME sector. Standards such as notional hours and credits for example should be uniform so as to incentivise participants.

Funding proved to be the most significant barrier to readiness for 4IR whether in reality or perceptibly. ICT packages that drive e-commerce for example include CRM, TQM and ERP which are very costly (Li, *et al.*, 2016). This issue is further aggravated by the fact that acquiring such expensive ICT does not guarantee success. The Standish Group International (2015) findings revealed how from inception ICT project failure rate, project abandonment and late deliveries averaged 90per cent, 50 per cent and

40 per cent, respectively. This calls for funding institutions such as SEDA to acquire the license's for such ICT packages as principal license holders with rights of use by registered and affiliate SMEs as secondary or subsidiary users. Such is the practice of holding and their subsidiary corporations.

Teece, Pisano and Shuen (1997: 510) in reference to a novel and emerging concept called the dynamic capabilities framework helped explain how combinations of competences (mental/psychological) and resources (SCA/RBV) can be developed and deployed in the production of goods and services. Therefore, they aptly defined dynamic capability as “the firm’s ability to integrate, build and reconfigure internal and external competences to address rapidly changing environments”, such as the 4IR. As previously explained, emphasis on training as well as academic courses has focused on management issues and survival concerns such as estate planning. A new curriculum is therefore recommended to this effect both in customised training programs as well as in the National Qualification Framework at tertiary level.

5.5 Recommendations for further research

It may seem expedient to exert pressure on small scale operatives to emulate big businesses which have successfully embraced 4IR. This may prove a miscalculation if unique factors such as historical considerations are misconstrued. Additional in-depth studies on the cost benefit analysis of adopting 4IR as regards SMEs should be carried out.

Seminal work by Lippit and White (1958) authoritatively describes leadership theory. Notable is the treble typology of leadership namely authoritarian, laissez-faire, and democratic leadership styles together with a multitude of variations and extensions such as transformational leadership detailed earlier on. An emerging concept such as e-leadership may prove daunting for SMEs since the correlation between ICT and productivity is fairly dim and complex although presumably it generally displays a positive trajectory. Further research is therefore required on the application of ICT induced economies of scale on very small scale operations.

5.6 Study summary and conclusion

The main aim of the study was to explore the overall readiness of SMEs in Mamelodi Township to embark on the 4IR. Specific types of readiness pertinent to running a business were examined. These included readiness with regards to physical, financial, operational and psychological factors. The study reviewed the relevant literature on 4IR and SMEs by examining the past, present and future projections of the said factors. By being cognizant of the possibility of either succeeding or failing in digitisation, readiness for potential benefits and drawbacks were also explored. Three theories namely RBV, creative destruction and e-leadership were discussed and their progressive linkage to each other analysed. This was to the effect that a business ought to have a unique business proposition, constantly evolve on an upward projection and implement ICT systematically all this in an endeavor to survive and succeed.

A qualitative research design was adopted as part of the case study approach. The data collection technique comprised in-depth interviews for key informants and semi structured interviews for small business owner-managers. Consequently 20 semi structured interviews and 1 in-depth interview were administered, respectively. The methodology was deemed to be the most appropriate to address the set objectives. Data analysis was conducted through thematic analysis and the NVivo software package was used to generate the themes and codes as well as the Word Clouds and Tree Maps.

4IR is a reality that has manifested and cannot be ignored. Those who choose to ignore it invariably negate efficiency and effectiveness whilst those in acceptance require digital era leadership that demands new sets of attitudes, skills, and knowledge (Magro & Wilson, 2013). Although migration from traditional to ICT focused operations may seem an insurmountable challenge for SMEs, it is note-worthy that the South African governments' policy agenda on transformation and transition embraces the 4IR. The formation and continual support of SEDA is evidence of such. Spencer, Kirchhoff and White (2008: 15) and Østergaard and Park (2015) posit that technology has the dual ability of eliminating or alternatively and reinforcing the current technology product paradigm through a redefinition process attributable to disruptive or evolutionary transition. Small businesses can either accept or reject the 4IR based on

their readiness to respond to the technological developments. Psychological readiness has proven to override all other forms of readiness as an enabling environment and ample proof of success from other sectors is well documented. Paetz (2014) demystifies the 4IR by listing achievable disruptive operations such as serving unmet or underserved segments, employing different channels, deploying a sustainable cost-of-production advantages, having flexibility, simplicity and convenience.

Such simplicity would thwart the futility of competing with big businesses in the township space. Physical readiness stands out prominently as a dynamic in which small businesses are ready the most although Kraaijenbrink *et al.*, (2010) recommends the acquisition of benefits of virtual existence that are not bound by physical assets and locations.

It can be argued that SMEs are financially ready for 4IR. Internet based business processes such as e-commerce require fairly basic apparatus. Bower and Christensen (1995) as well as Amshoff, Dülme, Echterfeld and Gausemeier (2015) assert that disruptive technologies need not necessarily be novel. Furthermore the investments initially required in ICT is a minor fraction compared with more physical-asset intensive industrial economy. Elliott and Boshoff (2009) argue that even in the event of the financial gap is addressed other detrimental factors to SMEs growth still arise or persist. Hanna (2007: 6) reached the conclusion that the primordial barriers are non-financial but rather institutional. Hamilton and Scandura (2003) and Chiloane-Tsoka and Mmako (2018) identified the concept of e-mentoring as a requisite concomitant to e-leadership in the digital world. E-leadership is a psychological construct to which small business owner managers display readiness and ascribe to.

Operationally, it can be argued that small businesses are ready for 4IR. As stated, earlier basic computer infrastructure, network coverage and a wireless connected consumer base is adequate for SMEs to be present on the entire value chain of a business environment.

The analysis of data stemming from participant responses during interviews revealed insights as to why they chose the small scale entrepreneurial path. They cited taking

advantage of opportunities in the township market space to convert hobbies into commercial ventures. This positive outlook demonstrates readiness for benefits stemming from the 4IR. Furthermore citing the need for growth is indicative of readiness to prosper personally, in the business undertaking and in their township economy at large. It is noteworthy to state that digitization incurs losses in the short term but gains in the long run, implying readiness for drawback to 4IR. Such readiness for 4IR challenges is contingent upon psychological readiness whereby with self-assertion owner-managers should resolutely maintain confidence in their newly acquired e-principles despite any hiccups that may arise. By extension the e-mentored owner-managers should equally do the same and educate their clientele and other stakeholders to embrace 4IR.

Psychological readiness is singled out in this study as the most significant factor. First and foremost the term psychology is synonymous with mental processes which directly points to the individual business person and their sole trading undertaking. Two aspects to the psychological dimension are clarified as follows: Firstly, small business owner-managers are ready for 4IR in that they are not only exposed to basic ICT but are also cognizant of its benefits. Secondly, the arguments advanced thus far prove that mental processes are over-arching and can mitigate against other forms of lack of readiness. Bergek, Berggren, Magnusson and Hobday (2013), however argue for instance that creative destruction may instead be viewed as being a process of creative accumulation. In concurring with this line of thought, Seubert, Balaji and Makhija (2001) and Halawi *et al.*, (2005: 76) reason that SCA is no longer embedded in physical assets nor financial capital but is rather conveyed through intellectual capital. Finally, Ngubane, Mayekiso, Sikota, Fitshane, Matsoso and Juan-Pierré (2015) submit that resources are only valuable to the extent that support targeted at ameliorating efficiency and effectiveness in a business concern.

The advent of the 4IR ignites a paradox which presents both opportunity and challenge for small businesses in almost equal measure. Therefore in light of this and other factors discussed, it is the contention of this researcher that in a broad and general sense SMEs in Mamelodi Township are ready for the 4IR.

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APPENDIXES

Data Collection Tools

APPENDIX A: SMALL BUSINESS OWNER MANAGERS

INTERVIEW GUIDE

The information obtained from this survey will be used to understand and appreciate the potential role and possibilities the 4IR offers SMMEs to succeed.

Confidentiality and Consent: The responses you make in this interview are confidential and will by no means be shared with any one. We also undertake not to contact anyone known to you concerning this interview. These forms shall not bear your names neither shall they be used in conjunction with any of the information sourced from you. Please note that you are not obliged to answer any question you do not feel comfortable answering and you may terminate this interview at any time. Nonetheless it would help us understand well what people think, say and do about different kinds of behavior if rendered honest answers by yourself. This in turn would help us extract well informed conclusions. Your help in responding to this survey would be highly appreciated. Approximately 45 minutes of your time is what it will take. Would you be willing to participate?

Yes		No	
-----	--	----	--

I certify that the nature _____ and purpose, as well as the possible risks and potential benefits associated with participants taking part in this research have been explained to the volunteer.

Interviewer's

signature.....

i. **Name of Interviewer** _____

ii. **Date of interview** ___/___/___

iii **Name** _____

Section A: Background

A1. What motivated you to choose the type of business activity you are engaged in?

A2. Why did you choose Mamelodi township to locate the business?

i. Location advantage?

ii. Familiarity of territory or other specify

A3. For how long has this business been operating?

A4. What is your understanding of SMME or small business enterprise/entrepreneurship?

A5. Do you believe there is a 4IR unfolding?

Section B Business potential of 4IR

B1. What is your understanding of 4IR?

B2. In your understanding of 4IR good/poor? State reasons.

B3. Have any organisations advocated 4IR to you? Have you researched on 4IR?

B4. What benefits and drawbacks do you think 4IR has to offer a business like yours?

Benefits	Drawbacks

B5. What do you think are the advantages and disadvantages of implementing 4IR in your community?

Advantages	Disadvantages

B6. Do you think 4IR can or will lead to job losses? If so why?

--

B7. What do you perceive as challenges that are brought by innovative ICT concepts to your business?

--

Section C Current ICT knowledge and usage ?

C1. What ICT applications is your business currently utilising? Describe

Computerised	Automated	Networked	Other

C2. Which ICT applications do you know of being used by businesses similar to yours in size or activity?

--

C3. Which ICT applications do you know of being used by big businesses?

--

C4. Can they be adopted for small businesses like yours? State reasons

--

C5. Which ICT concepts have you applied and succeeded? Are they linked to common causes of business failure?

--

C6. Categorise technologies by usage and name actual examples

Usage of technology	Examples

C7. Are there any ICT technologies which you may need but cannot obtain?

--

C8. What caused you to fail to acquire the technology?

--

Section D: External support in 4IR implementation

D1. Is your business affiliated to any government funded support agencies? Name the agencies

--

D2. What are these agencies approach to 4IR? Do they train or advocate 4IR?

D3. Have these agencies provided your business with 4IR related support? Or funding for 4IR? What role can they play to facilitate 4IR? What proportion/percentage of support is 4IR related?

Section E: 4IR and the future

E1. Do you believe 4IR is the way going into the future?

;

APPENDIX B: KEY INFORMANT INTERVIEWS

SEMI STRUCTURED INTERVIEW GUIDE

This is an in-depth interview guide for qualitative study. The information obtained from this survey will be used to understand and appreciate the potential role and possibilities the 4IR offers SMMEs to succeed.

Confidentiality and Consent: The responses you make in this interview are confidential and will by no means be shared with any one. We also undertake not to contact anyone known to you concerning this interview. These forms shall not bear your names neither shall they be used in conjunction with any of the information sourced from you. Please note that you are not obliged to answer any question you do not feel comfortable answering and you may terminate this interview at any time. Nonetheless it would help us understand well what people think, say and do about different kinds of behavior if rendered honest answers by yourself. This in turn would help us extract well informed conclusions. Your help in responding to this survey would be highly appreciated. Approximately 45 minutes of your time is what it will take. Would you be willing to participate?

I certify that the nature and purpose, as well as the possible risks and potential benefits associated with participants taking part in this research have been explained to the volunteer.

Interviewer's signature.....

iii. **Name of Interviewer** _____

iv. **Date of interview** ___/___/___

lii **Name** _____

Section A: Background

A1. What is the purpose of your organisations?

A2. Under which government department are you? NGO?

A3. What is your organisations mandate to SMMEs?

A4. Under which legislation where you set up?

A5. Which definition do you use to describe SMMEs? What are the main characteristics or reasons for existence?

A6. Does your organisation have a database of SMMEs? Mamelodi in particular? Is it accessible by the public? Any confidentiality issues?

Section B. Current ICT knowledge and usage

B1. What is your organisations view on 4IR? Is it prioritised? in infancy or advanced stage? Explain?

B2. Do you track and update new technologies suitable for SMMEs

B3 Do you have a Research and Development department? or lab? or outsource research?

B4. Do you actively promote 4IR concepts among SMMEs?

B5. What advocacy initiatives on 4IR do you run? Training campaigns? how regular are these?

B6. Do you provide funding for technology acquisition by SMMEs?

B7. Do your stakeholders and funders etc. advocate for 4IR?

B8. Do they encourage or advocate 4IR as solution to business failure rate?

Section C. Viability of 4IR technologies

C1. What are the main ICTs you have funded for different small business sectors? In production, marketing, systems etc.? State how?

C2. Do you categorise ICT applications according to the main known factors that cause small business failure? Finances? market access? business management? etc.

C3. Which technologies have been successful?

C4. Which technologies have been challenging or failed?

Section D: Available technical support

D1. What proportion or percentage of your support for SMMEs goes towards 4IR compliance?

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D2. Are there any particular agencies you utilise for 4IR information dissemination since it's a specialist/technical field? Government? Universities? etc.

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Section E: 4IR and the future

E1. Do you believe that 4IR can work for small businesses?

Positive	negative

E2. Do you believe 4IR is the way going into the future?

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APPENDIX C: LETTER FROM EDITOR

714 Lochiel Street
Faerie Glen
Pretoria 0181, South Africa

January 4, 2022
The Academic Director
University of South Africa
Pretoria

Dear Sir/Madam,

Ref: Editing services for dissertation for Teddy Timothy Masabo

This is to confirm that I have edited the dissertation prepared by Teddy Timothy Masabo for submission to the Department of Business Management at the University of South Africa for the requirements for the degree of Master of Commerce. The dissertation is entitled: **“The readiness of small businesses to embrace the Fourth Industrial Revolution in Mamelodi Township”**.

The editing process was performed to ensure that the dissertation conforms to the usage of professional business English with regards to grammar, punctuation and spellings. The editing did not in any way contribute to the structure, content or any other aspects that might add to the academic quality of the dissertation. The content and structure of the dissertation remains the responsibility of the author.

Regards,



Silvester Hwenha

Research and M&E Consultant

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