Readiness of SMMEs for the adoption of the fourth industrial revolution in Mamelodi Township

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ABSTRACT

This study aimed to assess the readiness of small, medium, and micro enterprises (SMMEs) in Mamelodi township to adopt the Fourth Industrial Revolution (4IR). Within the South African environment, small, medium, and micro-enterprises (SMMEs) are frequently associated with a substantial rate of failure. Previous studies have investigated many factors that contribute to the low survival rate of small, medium, and micro enterprises (SMMEs). However, most of the studies focused on managerial issues, such as lack of experience, ineffective management methods, insufficient financial management, and obsolete marketing techniques. Most established companies have adopted various technologies associated with the Fourth Industrial Revolution (4IR) and are thriving as a result of the benefits associated with digitalization and automation. Therefore, it is crucial to evaluate the readiness of SMMEs in adopting the Fourth Industrial Revolution (4IR) and achieving similar benefits.

Qualitative data was collected through interviews with owners and managers of small, medium, and micro enterprises (SMMEs) in Mamelodi township, Tshwane Municipality. The study found that SMMEs in Mamelodi are willing to adopt the Fourth Industrial Revolution (4IR), while encountering various difficulties. The results provide significant insights for owners and managers of Small, Medium, and Micro Enterprises (SMMEs) in townships about the implementation of the Fourth Industrial Revolution (4IR). Furthermore, government organizations tasked with supporting the creation and sustainability of small, medium, and micro enterprises (SMMEs) are aware of the scope of their operations, specifically in a township like Mamelodi. The study provided a vial contribution to the growing body of research on Small, Medium, and Micro Enterprises (SMMEs) in townships and their incorporation of the Fourth Industrial Revolution (4IR). The essay highlighted major barriers that hinder the adoption and use of existing technology, while also providing tangible evidence of the influence of contemporary technology on the development and success of small, medium, and micro enterprises (SMMEs).

Introduction

The aim of this study was to assess the preparedness of small, medium, and micro enterprises (SMMEs) in Mamelodi township, South Africa, to embrace the Fourth Industrial Revolution (4IR). The nation is grappling with a multitude of issues, such as elevated levels of unemployment, crime, inequality, and poverty. According to Statistics South Africa (2023), the unemployment rate stood at 32.6% in the second quarter of 2023. Unemployment rates in townships are anticipated to rise further due to reasons such as limited opportunities, resources, and amenities. Small, Medium, and Micro Enterprises (SMMEs) play a crucial role in the economic growth and development of the country, as supported by various studies (Dushime, Muathe, & Kavindah, 2022; Enwereje, Aluko, & Bayai, 2023; Majadibodu, Ramasimu, & Ladzani, 2023; Matekenya & Moyo, 2022; Mavutha, Kamwendo, & Corbishley, 2023; Moise,
Khoase, & Ndayizigamiye, 2020; Mokoena & Liambo, 2023; Ramasimu, Ramasimu, & Nenzhelele, 2023; Ramsuraj, 2023). The
to which SMMEs have contributed to their intended socioeconomic development function in the economy is a subject of
debate, uncertainty, and disagreement (Ramsuraj, 2023). As per the International Finance Corporation (2020), Small, Medium, and
Micro Enterprises (SMMEs) in South Africa contribute around 34% to the gross domestic product (GDP) and employ over 60% of
the entire labor force. According to SEDA (2021), in 2021, Small, Medium, and Micro Enterprises (SMMEs) accounted for 9.8
million jobs, which represents 64% of the total employment in the economy. The National Development Plan (NDP) projected that
Small, Medium, and Micro Enterprises (SMMEs) would be responsible for creating around 90% of employment opportunities by
the year 2030 (Bushe, 2019; Enwereji et al., 2023).

Madaku and Kasseram (2022) found that South Africa lags behind other emerging and developing market economies in terms of
firm formation. Furthermore, there is a concerning trend of high failure rates among small, medium, and micro enterprises (SMMEs)
in South Africa, as evidenced by multiple studies (Bushe, 2019; Enwereji et al., 2023; Madaku & Kasseram, 2022; Matekenya &
Moyo, 2022; Mokoena & Liambo, 2023; Ngonisa, Mgxekwa, Ndlovu, Ngonyama, & Mlambo, 2023; van Wyk & Venter, 2023).
According to Bushe (2019), over 70% of Small, Medium, and Micro Enterprises (SMMEs) cease operations within the initial 5-7
years. According to the 2019/2020 Global Entrepreneurship Monitor (GEM) research, the rate of enterprises closing down in South
Africa was 4.9%. In contrast, only 3.5% of the adult population were able to sustain their businesses for a minimum of 42 months
(Matekenya & Moyo, 2022). South Africa’s domestic start-up firms exhibit a comparatively poor survival rate according to
international benchmarks (Enwereji et al., 2023).

The sustained viability of Small, Medium, and Micro Enterprises (SMMEs) is crucial in addressing various issues faced by the
country, such as the persistently high levels of unemployment (van Wyk & Venter, 2023). The South African government has
implemented measures to stimulate the expansion of the SMME sector, therefore fostering national economic growth with the
assistance of both public and private institutions (Moise et al., 2020). In order to address the probable collapse of this crucial sector,
comprehensive research has been implemented in functional areas such as finance, marketing, and general management. The research
endeavors have been enhanced by purposeful initiatives and interventions from the national government, including the creation of
the Department of Small Business Development (DSBD) and the Small Enterprise Development Agency (SEDA). Policy directives
such as the Preferential Procurement Policy Framework (PPPF) have been established, and legal instruments like B-BBEE have been
implemented. The Gauteng government has established smart city initiatives such as Steyn City, Menlyn Maine, and Waterval Estate,
inspired by the achievements of Sandton City (Masabo, 2022). The efforts mostly focus on company development and have been
sparingly implemented in township regions to enhance small-scale enterprises. SMMEs often experience failure due to a lack of
specific attention. Nyathi and Benedict (2017) found evidence supporting this claim. However, other research, such as Majadibodu et al.
(2023), suggest that the South African government has implemented programs to support SMEs. For instance, Mqaba (2015)
emphasized that government support entails a unique combination of aid, such as offering technical training, managerial workshops,
equipment help, mentorship, and coaching.

Although there is extensive literature on small, medium, and micro enterprises (SMMEs) that emphasizes the significance of business
management, training, and the distinctive qualities of SMME managers, there has been limited focus on the potential impact of Fourth
Industrial Revolution (4IR) technologies in improving innovation, efficiencies, and competitiveness in highly competitive business
environments. Jenny and Mbiti (2010) propose that there is a lack of understanding of the economic consequences of new
interventions and ICT developments on small, medium, and micro enterprises (SMMEs). Matekenya and Moyo (2022) argue that
there is little empirical evidence to demonstrate the influence of innovation on the performance of firms in South Africa, particularly
small, medium, and micro enterprises (SMMEs). The evolving global economy, characterized by a shift towards knowledge-based
industries, requires firms to be innovative in order to sustain growth, development, and fulfill socio-economic objectives (Matekenya
& Moyo, 2022). Organizations may gain a competitive edge in the market by being innovative and introducing cutting-edge
procedures and goods (Dlamini & Kheswa, 2023). Urban (2021) examined a diverse set of human and contextual elements within
the South African entrepreneurial ecosystem. Several structural, market, institutional, and policy obstacles hinder the growth and
development of productive entrepreneurship (Urban, 2021). Hence, examining the use of cutting-edge technologies by SMMEs in
townships may uncover alternative strategies that might be adopted by SMMEs in the current downturn and occasionally unchanging
economy.

Previous studies have been conducted in several locations and nations, including Europe, the USA, India, Zimbabwe, Kenya, and
Uganda (Gomez & Pather, 2012). However, there has been a scarcity of study on the Fourth Industrial Revolution (4IR) conducted
in South African townships, with the exception of studies focusing on mobile applications (Prisecaru, 2016). The COVID-19
pandemic has a negative effect on the demand and supply of enterprises (Enwereji et al., 2023; Nhuviar & Dorasamy, 2021). Consequently,
several small, medium, and micro enterprises (SMMEs) were compelled to transition to e-commerce platforms in order to carry out online transactions. This involved utilizing e-shops to sell items and services, ensuring access to dependable internet, facilitating digital payments, and managing customer logistics (Ramsem & Govender, 2023). The Fourth Industrial Revolution (4IR) has caused significant disruptions in various aspects of life worldwide (Gumbai & Hossani, 2023; Mhlanga, Shava,
& Dzingirai, 2023; van Wyk & Ssemugabi, 2023). Connectivity services are essential for facilitating the transmission of digital data
and physical goods within companies, particularly small firms, which are fundamental to the global economy (van Wyk & Ssemugabi,
2023). The utilization of computers, which serve as fundamental tools for digitalization, in company operations is directly and
favorably associated with increased competitiveness among small, medium, and micro enterprises (SMMEs) (Moyeen, Huq, & Campus, 2009). Nevertheless, Ardito, Petruzelli, Paniolo, and Garavelli (2019) highlight that the adoption of digitalization is impeded by the substantial financial commitment and the diverse set of technical competencies needed. Hence, it is crucial to perform a study that would assess the preparedness of small, medium, and micro enterprises (SMMEs) in townships to embrace the Fourth Industrial Revolution (4IR). The main research inquiry for this study was: To what extent are small, medium, and micro enterprises (SMMEs) in Mamelodi township, South Africa, prepared to embrace the Fourth Industrial Revolution (4IR)? The subsequent section outlines the goals and aims of this investigation.

The aim of this study was to examine the preparedness of small, medium, and micro enterprises (SMMEs) in Mamelodi township, South Africa, to embrace the Fourth Industrial Revolution (4IR). The study aimed to investigate the reasons behind the establishment of SMMEs by their owners, the specific technological tools utilized by SMMEs in Mamelodi township, the benefits derived from the implementation of the Fourth Industrial Revolution (4IR) in SMMEs, the financial capacity of SMMEs to embrace the 4IR, the potential improvements in SMME operations resulting from the integration of the 4IR, the preparedness of the physical environment of SMMEs to accommodate the 4IR, and the psychological readiness of SMME owners and managers to adopt the 4IR.

Literature review

This section presents the literature on the SMMEs, 4IR, and the readiness of SMMEs and it concludes with the theory underpinning this study.

Small, Medium and Micro-Enterprises (SMMEs)

This sub-section describes the term “SMME” and highlights the overview of an SMME in South Africa. SMMEs are defined differently according to the local laws in each nation, and they are usually classified based on their revenue base, size or assets (Enwereji et al, 2023; Moise et al, 2020). In the South African context, the Constitution of the Republic of South Africa 108 of 1996, and the National Small Business Act 102 of 1996 (amended by the National Small Business Act 29 of 2004) define an SMME as a distinct and separate business entity, including non-governmental organizations (NGOs) and co-operatives plus their subsidiaries and branches, managed by one or more owners (Enwereji et al, 2023). Msomi and Olarewaju (2021) describe an SMME as an organization that employs one to two hundred persons. Small businesses in South Africa can be classified as either small, medium or micro-enterprises (National Small Business Amendment Act, 2004). The White Paper of 1994 defines micro-enterprises as family-run businesses that are frequently operated without the official licenses, permissions, and registration that are necessary for a firm to run smoothly in addition to maintaining proper records (Enwereji et al, 2023). A small business can have five to 50 employees and they usually have official registration documents and company licenses and adhere to tax and regulatory requirements. Medium enterprises are companies with up to 200 employees, R5 million in capital assets, and shareholder management (Enwereji et al, 2023; Moise et al, 2022). In other contexts, SMMEs are commonly referred to as small and medium enterprises (SMEs) (Moise et al, 2020). For consistency, the abbreviation “SMMEs” will be used throughout this paper.

The Fourth Industrial Revolution (4IR)

The world economy’s changing nature, which has become more knowledge-based, has compelled businesses to be innovative to maintain growth and development and realize socio-economic goals (Matekenya & Moyo, 2022). SMMEs are increasingly relying on information technology (IT) to effectively manage their business operations (Lejaka, Da Veiga, & Loock, 2019). The 4IR (also known as Industry 4.0) has introduced some of the major leading tools of technology that can be used in various industries, from services to manufacturing (Nwachukwu, 2022). A new level of automation is being realized in the 4IR, blurring the lines between biological, physical, and digital levels as technologies are used to conduct work that was performed by humans in the past (Ogunlana & Tengeh, 2021; Selemele, Khwela, & Selelo, 2023).

The 4IR consists of value-creation processes facilitated by digital technologies such as the Internet of Things (IoT), cloud computing, big data analytics, cyber-physical systems (CPS) and smart sensors combined with production processes, thus creating new business model innovations, and efficiency gains (Gumbi & Hossani, 2023; Vogelsang, Liere-Netheler, Packmohr, & Hoppe, 2019). The IoT interconnects all the aspects of a factory or household via a server to transfer data, which allows for a better flow of information from one end to the other. Big data describes a large volume of data that can be mined for information and used for machine learning (Nwachukwu, 2022). The digital development globally necessitates that SMMEs innovate and re-think their business model. Therefore, any company must change and adapt if it wants to ensure its future (Sibulukulu, 2023). A possible solution for smaller businesses is the emergence of innovations that are designed to enable businesses to be more competitive (Mavutha et al, 2023).
Readiness of Small, Medium and Micro-Enterprises (SMMEs)

Figure 1 shows the four types of readiness of SMMEs.

**Financial readiness**

A small business needs financial resources to buy starting assets, which are typically the main building blocks for operating small businesses (Khoase & Ndayizigamiye, 2018). According to Waweru, Waweru, Wanjau, & Kinyanjui (2018), small businesses exhibit inimitable financial needs globally, and they encounter financial insufficiency compared to large enterprises. Due to their small size, poor ability to generate cash, and inability to compete with their larger firm counterparts with whom they share the small market, small businesses are particularly vulnerable (Masabo, 2022). Even though money is disproportionately important in running a successful business, it is important to remember that small businesses also confront a number of additional difficulties. These consist of the characteristics of the owner-manager, the size of the SMME and its stage of development, among other things (Masocha & Fatoki, 2018). The absence of support services or their comparatively higher unit costs are cited as obstacles to SMMEs’ efforts to purchase cost-effective technology (Wdowik & Ratnayake, 2019). Venture capital and early-stage finance for innovations are the two main types of funding for technology initiatives. However, such funding is not very strong in South Africa (Drucker, 2014). In Sibalukhulu (2023), it was highlighted that most technologies are safeguarded by intellectual property laws, including patents, resulting in the cost of securing these technologies being outrageous for cash-impoverished small businesses.

**Operational readiness**

The classification of services needed by typical small businesses to be operationally sustainable is shown in Figure 2 below.

**Figure 1:** Small, medium and micro-enterprises readiness to adopt the 4IR; Source: Authors

**Figure 2:** A typology of SME operations; Source: Ngassam, Kandie, Nkaelang, & Modiba (2009, p.3)
Operational characteristics of a business have been used differently as systems for defining, identifying, measuring, and maintaining continuous improvement as well as management apparatuses in organizations (Waweru et al., 2018). An operating system is a set-up of resources used to deliver products or services. (Bateman, 2019) and companies pursue efficiency of operations to sustain competitive advantage (Waweru et al., 2018). According to Bollard, Larrea, Singla and Sood (2017), the next-generation operating model requires lean process redesign, digitization, business process outsourcing, advanced analytics, and intelligent process automation. Operationally, the 4IR ironically offers small enterprises both an opportunity and a burden. E-commerce is a prime example, as it enhances value chain integration, allows for customization, and gives smaller businesses the chance to reach clients around the world (Liu & He, 2018). Business managers must therefore determine where, how, and how long e-commerce profitability can be sustained at the strategic and operational levels. According to Matekenya and Moyo (2022), the literature has emphasized the significance of digitization and innovation in the process of maintaining the development of SMMEs. Furthermore, the 4IR and COVID-19 pandemic have hastened the necessity for digitization and innovation in SMMEs (Matekenya & Moyo, 2022; Sibalukhulu, 2023). Unfortunately, a lot of SMEs struggled to adapt (Sibalukhulu, 2023).

Physical readiness

According to Penrose (1959), the capacities at the business level that are realised through the value of and the interaction between intangible and tangible assets are what establish the boundaries of the organization. Business-level resources that are tangible assets include things like real estate, physical structures, equipment, and stock. On the other hand, intangible resources are assets at the business level that are not physical, such as knowledge, intellectual property, and patents (Masabo, 2022). Therefore, for SMMEs to be ready for the adoption of the 4IR, they should possess the necessary tangible and intangible assets. However, disruptive events mostly impact small businesses because of their relative lack of resource endowment and limited capabilities, resulting in them being more vulnerable to disruptive occurrences (Ahmed, Kilika, & Gakenia, 2021a). To avoid the digital divide, structural problems, particularly the availability of adequate infrastructure, should be addressed (Sibalukhulu, 2023). Small businesses have inherent limitations in terms of capacity and scope, which have a negative impact on customer reach and profitability. The theory of endogenous growth may be used to explain these limitations (Nyirenda-Jere, & Biru, 2015). However, as has been demonstrated by Shefer and Frenkel (2005) and Agwa-Ejon and Mbohwa (2015), innovative output is feasible with modest investments even through ad hoc operations on the premises of their businesses.

Psychological readiness

A new society known as the information society, knowledge society, networked society, or e-society has emerged because of the 4IR (Magro & Wilson, 2013). Therefore, leadership in the digital era will need to develop new mindsets, competencies and information that are responsive to the societal paradigm shift (Magro & Wilson, 2013). If the ICT finance needs of a small business are met, but the current owner-manager is unable to mentally (psychologically) adjust to the disturbance into uncharted territory, the unanticipated result would be a catastrophic failure with severe financial repercussions (Masabo, 2022). Adopting the 4IR would mean having less physical workspace and more virtual space, fewer face-to-face interactions and connections, and digitally mediated procedures. One of the primary traits and strengths of small businesses – the personal, hands-on approach – is drastically different from such a manner of operating. Adopting an e-leadership culture is the only way to prevent the apparent loss of close contact with stakeholders, whose relationship value is more psychological than economic (Ribiere & Worasingchai, 2013). According to Wolf (2006), innovation, like the 4IR, is a creation of a person’s internal dynamics. Thus, important determinants of the acceptance of innovations are personal traits. Research on entrepreneurship is currently using the diffusion theory, which was first used to analyse consumer behavior, to look at how entrepreneurs adapt and commercialize innovations (Marcati, Guido, & Peluso, 2008; Dibra, 2015). According to the diffusion hypothesis, innovativeness is influenced by the psychological foundations of skills, human capital, knowledge, and experience (Booyens, 2011). Additionally, a person’s personality traits affect how creative they are. Similar psychological foundations can be found in as many different small business sectors as there are entrepreneurs (Masabo, 2022).

Theoretical framework

The resource-based view (RBV) theory was adopted to understand how small businesses in a township such as Mamelodi are ready to adopt the 4IR. The resource-based view theory has dominated strategic management practice and thinking for a while now (Ahmed, Kilika, & Gakenia, 2021b). The RBV theory postulates that the competitive advantage of a business is gained from internal sources such as a pool of resources including critical intangible resources. Therefore, a business is analyzed based on the performance from the resource perspective rather than the product side (Zvarimwa & Zimuto, 2022). For a business to be competitive in the market, it must source resources that are valuable, rare, inimitable, non-substitutable, and exploitability (VRINE) (Wanjogo & Muathe, 2022; Zvarimwa & Zimuto, 2022).

The RBV theory is applied in this study to explain the manner in which some SMMEs are ready to adopt the 4IR in order to be competitive. For the purpose of this study, the readiness of SMMEs will be studied pertaining to their financial, operational, physical and psychological factors. The following section presents the methodology adopted in this study.
Research methodology

In this section, the research philosophy and approach, research design, population and sample, and data collection and analyses are discussed.

Philosophy and approach

According to Al-Ababneh (2020), when structuring the research process, researchers should start with ontology (philosophical assumptions about the nature of reality), epistemology (how they know what is known), axiology (the inclusion of their values), and methodology (the nature in which their research is conducted). Research methodology is defined as methods, procedures, techniques, and ways used to collect and capture all the necessary data to understand the research problem (Abu-Dalbouh, 2013; Patel & Patel, 2019). The study was qualitative in nature. The qualitative methodology emanates from interpretivist epistemology and constructionist ontology. The fundamental notion is that meaning is rooted in the experiences of participants and that such meaning is determined through the perceptions of researchers (Alborough & Hansen, 2022; Saunders, Lewis, & Thornhill, 2015). The qualitative method was chosen due to its ability to permit researchers to conceptualize the topic, explain causal links between phenomena and interpret it in the human and social context.

Research design

This study used the case study design. A case study design is suitable for describing, explaining, or exploring phenomena or events in the daily environments where they occur (Saunders et al, 2015; Yin, 2003). The case study design captured information relative to explanatory questions, including “how”, ‘what’ and ‘why’. These questions resulted in the interview guide to address the “how” ready, “what” forms of readiness and the reasons “why” such readiness does or does not exist in SMMEs.

Population and sample

The population for this study was SMMEs in Mamelodi township in Tshwane Municipality, South Africa. Notwithstanding its semi-informal nature, the SMME sector in Mamelodi is important and could empower, revitalize, and uplift the socio-economic of previously disadvantaged communities in the township. It seems as if there is no available information about the current number of SMMEs in Mamelodi Township. According to SEDA (2021), there were 786 027 SMMEs in Gauteng in 2021. Mamelodi Township is a significant township in the province; thus, it is assumed that a considerable number of SMMEs exist there. According to Saunders et al (2015), it is difficult to include the entire population in a study. As such, a sample of the population should be selected. A sample is a section of the population that is selected for investigation (Bryman & Bell, 2003). To select participants, a purposive sampling technique was used. Purposive sampling refers to non-probability sampling and is used to select a segment of the population to be studied based on the researcher’s judgement (Saunders et al, 2015). A total of 21 interviews were conducted.

Data collection and analysis

A total of 20 SMME owners and managers and one SEDA representative were interviewed to collect the data for this study. The collected data was analysed through thematic analysis technique. Thematic data analysis using the Nvivo software package was conducted due to its applicability to the qualitative nature of this study. Pre-analysis, material exploration and interpretation phases were conducted during the thematic analysis process. The following steps were applicable:

- **Step 1** – Reviewing the research questions and/or research approach.
- **Step 2** – Reading a few transcripts and writing summary memorandums.
- **Step 3** – Creating a research journal and developing a coding strategy.
- **Step 4** – Coding for the broad topic areas (themes) and using a mind map.
- **Step 5** – Reviewing your coding.
- **Step 6** – Re-organising the codes.
- **Step 7** – Exploring data using coding queries.
- **Step 8** – Identifying themes.

The following section addresses the ethical requirements that were considered when conducting this study.

Ethical considerations

The principles guiding ethical research in the social sciences guided this study. The participants were provided with the purpose and a detailed outline of the study before all interviews were conducted. The researcher undertook to treat the research participants respectfully and not as objects and management principles were applied, so as not to use the research to disempower the participants. Concerted efforts were made to respect the community’s social setup, cultures, and leadership. High levels of confidentiality were upheld by keeping the identities and views of the participants anonymous. An ethical clearance certificate for the study was obtained from the Department of Business Management, College of Economic and Management Sciences at the University of South Africa.
Permission was also sought from participants, who had to sign a consent form to record their voluntary participation. The next section presents the findings of this study and discussions.

**Findings and Discussions**

This section presents and discusses findings regarding the reasons why the participants started a business, the technological tools used by SMMEs, the advantages of the 4IR to small businesses, the readiness of SMMEs to adopt the 4IR and external support interventions.

**Reasons for starting a business**

The findings revealed that the participants started their businesses because they wanted to be independent through self-employment. Figure 3 below depicts a Word Cloud with the main reasons for starting a business.

![Figure 3: Reasons for starting a business; Source: Authors](image)

Figure 3 reveals that operating their own business, opportunities, growth, advancement, and performance were the most dominant reasons why SMME owners started their businesses. However, the government regarded SMMEs as critical components in terms of the creation of employment, economic development, poverty alleviation and social emancipation. While SMME owners had a narrow focus on self-employment, the SEDA representative indicated that the main reasons for supporting start-ups were the creation of employment, economic development, poverty alleviation and social emancipation. The following was highlighted: “our constitutional mandate is to promote, support and develop small businesses in accordance with the enabling Act.” This is in line with van Wyk and Venter’s (2023) viewpoint that SMMEs are significant stakeholders in the South African economy. Matekenya and Moyo (2022) highlighted that SMMEs have been identified in the National Development Plan as key components that can be implemented for the realization of socioeconomic goals and innovation.

**Technological tools used by Small, Medium and Micro-Enterprises (SMMEs)**

Figure 4 depicts the ICT used by SMMEs that participated in this study.

![Figure 4: Information and Communication Technologies (ICT) used by SMMEs; Source: Authors](image)
The ICT appliances that were used by the SMMEs included computers, laptops, tills, and cellphones. Computers were commonly used because of their cost-effectiveness and high versatility. In addition, cameras, speed points, internet, teleconferencing, and social media networks were used but not included in the diagram. In certain instances, some SMMEs did not use these technologies. The reasons provided for the lack of these technologies included the complexity, size, and cost of such applications. This is in line with Wdowik and Ratnayake’s (2019) assertion that the absence of support services or their comparatively higher unit costs are cited as obstacles to SMEs’ efforts to purchase cost-effective technology. Hence, some SMMEs indicated that they were not ready to adopt the 4IR. Unfortunately, this comes at a cost. As highlighted in Ramsern and Govender (2023), the consequences of lack of use of the latest technologies for SMMEs include buffering of connectivity during meetings, and slowness in meetings and delays in updating product information, payments made and received, receiving orders, communicating, sending important e-mails, deliveries, and updating stock levels.

Advantages of the 4IR to small businesses

Figure 5 below shows the advantages that small businesses can realize by adopting the 4IR.

The Word Cloud above reveals that the advantages of the 4IR that small businesses can realize include new, changes, easier, better, accelerate, revenue, impressive, providing, streams, and automation, among others. This means that SMMEs were able to provide changes and new ways of doing business, they provided better, and impressive services and they improved their revenue. The study by Dlamini and Kheswa (2023) revealed that the benefit of incorporating the 4IR in business is gaining momentum and this is apparent in the strategic direction and business focus. Connectivity services are imperative for enabling digital information and physical product flow for organizations, including small businesses as the pillar of global economies (van Wyk & Ssemugabi, 2023).

Taking cognisance of the advantages of adopting the 4IR, the main question is whether SMMEs are ready to adopt the 4IR. This question will be addressed in the following sub-section.

The readiness of SMMEs to adopt the Fourth Industrial Revolution (4IR)

Embarking on this entrepreneurial exercise has proven overwhelming to some participants as evidenced by submissions concerning drawbacks encountered or feared in the implementation of the 4IR. The traditional approach requires transformation (changes) to realize the abstract dream of high profitability facilitated by the digital era. Two broad categories emerged from the data. The first group included SMMEs that were ready to adopt the 4IR depending on their financial, operational, physical, and psychological characteristics. As highlighted in Figure 5, some SMME owners and managers were aware of the advantages that they could realize by adopting the 4IR. The other group included SMMEs who believed they were unable to embrace the 4IR. Based on the nature of the product or service provided, several participants associated this with poor demand because of the challenge of poverty in the community. It was mentioned that “demand for our business offerings is poor because our location borders squatter camps, has no amenities, unemployment is high, and general there is insecurity for infrastructure”.

Furthermore, participants highlighted that the risk of investing in the area overshadows the benefits, and this is heightened by such physical locations that make businesses not being valued. Therefore, some SMMEs conduct their business in a survival mode of “its business as usual” to keep afloat with no prospects for advancement. The lack of a will to improve creates an environment whereby SMMEs are on the peripheries of the township, reflecting poor readiness to adopt the 4IR in all aspects. This is in line with the conclusion by Ngonisa et al (2023) that SMMEs’ access to finance is determined by location heterogeneity. Financial factors were highlighted as the most influential reason for adopting the latest ICT applications used by similar SMMEs. Replies from participants
show that these technologies can be imitated as they essentially relate to soft skills such as marketing, communication, and functional skills. In addition, operational, psychological, and physical factors were equally relevant given their similar metrics and the social fabric of townships, which has substantial predispositions to competition.

In a study by Lejaka et al (2019), it was revealed that SMMEs are gradually relying on information technology (IT) to effectively manage their business operations. However, they do not possess sufficient financial support and IT expertise to avert established cyber threats (Lejaka, da Veiga, & Loock, 2023). This supports the findings of this study. Matekenya and Moyo (2022) found that spending on research and development appears to be restricted to businesses with larger sales, which shows that smaller businesses lack the funds to make such investments. In Gumbi and Hossani (2023), it was highlighted that many SMMEs are not ready to adopt 4IR approaches like smart manufacturing and that the current frameworks do not apply to SMMEs as they do not deal with specific preconditions of the environment in which SMMEs operate. Furthermore, Gumbi and Hossani (2023) highlighted that the current adoption of smart manufacturing in low-income and emerging economy countries is relatively inadequate, and these countries are not ready for the digital transformation exercise. This is due to the lack of investment, mindset to adopt new technologies, electricity infrastructure, broadband infrastructure, digital skills and expertise, manufacturing information and communication technology (ICT) infrastructure, and limited usage of core smart manufacturing technologies (Gumbi & Hossani, 2023). According to Selemela et al (2023), South Africa has the lowest electricity penetration globally, and electricity is expensive compared to other developing economies. Furthermore, poor infrastructure in the country, including electricity, dates back to colonial times (Selemela et al, 2023). In the study by Moos and Sambo (2018), it was found that SMMEs did not have sufficient knowledge of technology, including complex software, the internet, and advanced technologies. Therefore, SMMEs are unable to provide goods and services in a convenient, timely, cost-effective, competitive, and consistent manner, which is necessary for their survival and profitability, due to the lack of adequate technology.

Figure 6 depicts the main factors that constrained the readiness of SMMEs to adopt the 4IR.

![Figure 6: Factors that constrained the adoption of the 4IR by SMMEs; Source: Authors](image)

The main factors that constrained SMMEs to adopt the 4IR included a lack of skills, sponsorship, planning, leadership, and understanding. Furthermore, there was ignorance from those who were involved, and, in some cases, they found the 4IR to be complex. The data show a general dejection arising from a sense of general lack in a multitude of business acumen. While the literature places finances overwhelmingly on top of the list of obstacles constraining the survival and expansion of small businesses, the above findings are skewed toward human factors instead. The findings in this study are supported by Matekenya and Moyo’s (2022) viewpoint that SMMEs have constrained resources and time to integrate new innovative business models and strategies. For SMMEs to overcome these challenges, external support interventions are required, as discussed below.

**External support interventions**

SMME owners/managers were aware they could be assisted and supported through partnerships and collaborations to vastly improve their businesses through the adoption of the 4IR. To this effect, the SEDA representative stated: “that is why we run incubation facilities so that our small business clients may not start from scratch but simply catch up and go”. To assist SMMEs in adopting the 4IR, SEDA provided support such as the acquisition, transfer, increased access, and usage of technology. This was confirmed by both the participants and SEDA showing that SMMEs were indeed assisted with a variety of offerings, including ICT. Additionally, SEDA assisted SMMEs by establishing incubation centers and digital hubs. These centers provided a comprehensive effort
addressing both the theoretical and practical proportions of business through advisory and financial-technical assistance. Some participants confirmed that they were assisted by government agencies, as highlighted in Table 1.

Table 1: Government agencies assisting SMMEs

<table>
<thead>
<tr>
<th>Government Agency Affiliated</th>
<th>No. of Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>National Empowerment Fund [DTI]</td>
<td>1</td>
</tr>
<tr>
<td>Department of trade and industry (SEDA)</td>
<td>1</td>
</tr>
<tr>
<td>Department of Energy</td>
<td>1</td>
</tr>
<tr>
<td>Health and human services</td>
<td>1</td>
</tr>
<tr>
<td>Industrial development corporation</td>
<td>1</td>
</tr>
</tbody>
</table>

Source: Authors

Table 1 lists the government agencies that assisted SMMEs that took part in this study. Although SMMEs are assisted by the government through SEDA, the list reveals how little assistance is rendered or sought despite SMMEs being a crucial sector and having a myriad of challenges. This was confirmed by Pu, Qamruzzaman, Mehta, Naqvi, and Karim (2021), who found that a lack of money, a lack of networking opportunities, and a lack of government backing are the main obstacles to the expansion of SMMEs. Ngonisa et al (2023) mentioned that evidence reveals that most SMMEs fail as a result of a lack of access to finance, with between 70% and 80% of the SMMEs closing before they reach five years of operation. It was suggested that to improve access to finance by SMMEs, policymakers should focus on policies that seek to enhance high competition in the banking sector (Ngonisa et al, 2023).

In the context of this study, only government agencies were involved, and no private sector assistance was found. This anomaly is caused partly by the township economy settings having community programmes that have a socio-economic mix that blurs the lines between contributing stakeholders. SEDA was of the opinion that they were the only public entity mandated to aid and support SMMEs. The Minister of the Department of Small Business Development introduced the Small Business Innovation Fund, which is aimed to provide high-growth potential SMMEs with grants and loans (Bowmaker-Falconer & Herrington, 2020). In the study by Waweru et al (2018), it was found that it is rewarding for owners and managers of small businesses to use more alternative financing in their companies. Therefore, alternative financing solutions such as venture capital, trade credit and partnerships with non-bank financial institutions can be considered rather than relying solely on government agencies. This is in line with the South African government’s plan to encourage the growth of the SMME sector, by promoting national economic growth through public and private supporting institutions (Moise et al, 2020).

Table 2 contains prominent words about what SMME owners and managers regard as beneficial assistance in their quest to adopt the 4IR.

Table 2: The drivers of desire for assistance by SMMEs

| Source: Authors’ compilation |

Words such as lack, support and poor, reveal evidence of their inadequacies and are excessively high in this tabular presentation. References to motivation, change, collaboration, solution, expert, empowerment, and training are strong indicators of psychological readiness to embrace the 4IR as well as assistance in that quest. Furthermore, the words innovation, expert, change, technical and collaboration suggest a recognition of incapacity needing external redress. However, as highlighted in Sibalukhulu (2023), SMMEs are weary of being empowered and trained through enterprise development and support programmes, and not being provided with
access to opportunities and markets that will enable them to nurture their newly acquired skills. The following section presents the conclusions pertaining to this study.

Conclusions

The main research inquiry for this study was: To what extent are small, medium, and micro enterprises (SMMEs) in Mamelodi township, South Africa, prepared to embrace the Fourth Industrial Revolution (4IR)? The survey found that the small, medium, and micro enterprises (SMMEs) utilized information and communication technology (ICT) devices such as computers, laptops, tablets, and cellphones. SMME owners and managers were cognizant of the benefits they may get by embracing the Fourth Industrial Revolution (4IR). In addition, small, medium, and micro enterprises (SMMEs) were prepared to embrace the Fourth Industrial Revolution (4IR) despite the different hurdles that were emphasized. The results indicated that financial factors were the primary determinant in small, medium, and micro enterprises’ (SMMEs) adoption of the latest information and communication technology (ICT) applications. Lack of funding emerged as the primary obstacle to achieving preparation for the Fourth Industrial Revolution (4IR), both in actuality and in perception. Information and Communication Technology (ICT) packages that facilitate e-commerce are expensive. This problem is worsened by the fact that obtaining such costly ICT does not ensure success. It is necessary for financial institutions like SEDA to get licenses for ICT packages as primary license holders, allowing registered and affiliate SMMEs to use them as secondary or subsidiary users. This is the act of maintaining control over corporations and their subordinate entities. Furthermore, the comparable dimensions and the social organization of townships, characterized by a pronounced inclination towards competition in operational, psychological, and physical elements, had equal significance.

The presence of operational readiness was also observed to be widespread. Big businesses have demonstrated that the most popular and cost-effective way to transition to the Fourth Industrial Revolution (4IR) is by engaging in internet-based economic activities. An elementary endeavor that is frequently employed and widely embraced by customers is e-commerce. E-commerce facilitates the integration of value chains, enables customization, and offers smaller enterprises chances. SMME owners and managers were psychologically prepared to embrace the Fourth Industrial Revolution (4IR). Participant replies indicate that these technologies are applicable as they mostly relate to soft skills such as marketing, communication, and functional abilities. Small business owners, government sponsors such as SEDA, and township communities each have distinct motivations for promoting township entrepreneurship. While the Fourth Industrial Revolution (4IR) is praised for its ability to enhance efficiency and effectiveness by simplifying processes, it also seems to undermine broader societal goals such as promoting widespread employment. Therefore, the interpretation suggests that ideal leaders are individuals who possess the ability to handle paradoxes, dilemmas, and the intricate behavioral intricacies that come with them. Hence, it is recommended that the main focus of leadership training should be on transformative leadership. An additional rationale for this leadership initiative is rooted in the nation’s current state of change, where the regeneration of townships is becoming a prominent and rapidly advancing priority. Given the constrained technological capabilities of public institutions like SEDA, it is strongly advised that they allocate a portion of their funds for small firms by utilizing the expertise of financial service providers specializing in venture capital and startup investment.

The SETAs are the primary source of funding for the well-established and well-financed skills training sector in South Africa. These Skills Education and Training Authorities (SETAs) collect mandatory fees from businesses. Nevertheless, the primary target of their training activities and current objective is the younger generation, including school leavers, graduates, and employees. Consequently, the SMME sector is experiencing a shortage of skills due to the financial constraints faced by enterprises in providing management training for their staff. Due to the fact that not all young individuals are officially registered in SETA programs, a detrimental situation arises where the owner-managers lack ICT training, while the youth lack the opportunity to gain practical experience and exposure. An alteration is necessary due to the fact that graduate learning programs currently focus on the limited and diminishing corporate sector. As previously stated, the training and academic courses have been primarily focused on management challenges and concerns related to survival. It is suggested that a new curriculum be used in both customized training programs and the National Qualification Framework at the postsecondary level.

The study’s findings enhanced the existing literature by illustrating the crucial role of an organization’s resources in determining its performance. Within the scope of this research, it was discovered that possessing financial, physical, operational, and psychological resources empowers small, medium, and micro enterprises (SMMEs) to embrace the Fourth Industrial Revolution (4IR). This can confer upon them a competitive edge, particularly in the aftermath of the COVID-19 pandemic and in the period of technological progress.

Recommendations

Empirical research illustrates the high susceptibility of SMMEs as a result of their diminutive scale, limited income generation capacity, and lack of competitiveness against major enterprises. Unlike most small, medium, and micro enterprises (SMMEs), many large and successful companies are conglomerates that have multiple shareholding or ownership arrangements. Alliances generate mutual advantages by using the collective resources of member firms. To ensure assistance and minimize risks, it is necessary to incorporate the establishment of alliances, coalitions, joint ventures, or partnerships into training and funding activities, either through persuasive means or in a more suitable manner. Furthermore, it is recommended that entrepreneurship policy should prioritize those who are proficient in information and communication technology, young in age, and possess a high level of education. Addressing
the high rates of teenage unemployment, empowering the movement, and transitioning small businesses from a social to a business orientation are all essential for resolving this issue.

Pressuring small-scale operators to imitate successful big enterprises that have adopted the Fourth Industrial Revolution (4IR) may appear advantageous. This could be a mistake if specific elements, such as historical factors, are misunderstood. Further comprehensive research should be done to analyze the cost-benefit implications of implementing the Fourth Industrial Revolution (4IR) specifically for small, medium, and micro enterprises (SMMEs). SMMEs may find the notion of e-leadership challenging due to the intricate and not easily understandable relationship between ICT and productivity. However, it is generally believed that this relationship has a positive trend. Additional investigation is necessary to explore the utilization of ICT-induced economies of scale in extremely small-scale organizations. Further research can be carried out in different townships around South Africa, encompassing a bigger sample size and implementing a longitudinal study. Moreover, it would be advantageous for future research to establish links between the difficulties faced by SMMEs and the potential strategies or solutions that might be implemented. This may entail offering practical and effective advice for small, medium, and micro enterprise (SMME) owners and managers.

Limitations

The study exclusively examined small, medium, and micro enterprises (SMMEs) located in Mamelodi township, within the Tshwane Municipality of South Africa. A total of 20 SMME owners and managers were interviewed for the study. The researcher conducted the study within a strict time constraint of two months, collecting primary data. Interviewing owner-operated SMMEs proved to be difficult due to the limited availability of sufficient time. Furthermore, townships possess distinct characteristics that can result in anecdotal answers, showcasing the peculiarities that typify the limitations of qualitative data. This factor added to the difficulty of applying the findings to other situations. Contrary to the extensive Soweto township, there appears to be no discernible database documenting small enterprises in Mamelodi township. This made the identification of the sample for the study difficult and burdensome. Due to the current COVID-19 pandemic restrictions on mobility and interpersonal interaction, it was not feasible to conduct in-person interviews. The study was required to comply with both the university and national health guidelines regarding the pandemic. Consequently, it was necessary to conduct interviews with research participants over the phone.

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References


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