The development of a framework for technology business incubation for the sustainable growth of small businesses in KwaZulu-Natal

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ABSTRACT

Technology business incubators (TBIs) are essential for the growth of technology-focused entrepreneurs by providing support services, access to experts, and infrastructure that fosters innovation. This aligns with Resource-Based Theory, emphasising that a business's competitive advantage comes from accessing unique resources. Technology incubation is a selective intervention focusing on technology-focused or technology-enabled small businesses. This study revealed that the technology-focused small businesses contribute to technology development, innovation and diversification of products and services. It also revealed that TBIs play a critical role in facilitating the growth and development of technology-focused entrepreneurs by offering essential support services, access to specialised expertise, and necessary infrastructure that fosters innovation and enhances entrepreneurial potential. The economic profile of technology-focused small businesses in KwaZulu-Natal (KZN) revealed its potential to contribute positively to developing high-technology or technology-enabled enterprises. Despite government support for SMMEs, as outlined in the National Development Plan 2030, high failure rates among these businesses persist. Often, this stems from their inability to secure essential resources, hindering their technological contribution and innovation.

Utilising qualitative research methods,13 of the 17 heads of TBIs in the province, classified as managers, CEOs or directors, were interviewed to explore their experiences of this phenomenon. The study adopted the epistemological and ontological assumptions of interpretivism and subjectivism. Thematic analysis was followed in the analysis and interpretation of data. The findings contributed to a tailored framework for technology business incubation in KZN, outlining strategic approaches to improve practices and presenting a comprehensive overview of TBI services and key stakeholders needed to foster a thriving ecosystem for technology-driven small enterprises, thus achieving the primary aim of this study.

This study also investigated the landscape of TBIs in KZN, South Africa, underscoring their significant potential to stimulate economic growth, create

employment opportunities, and address challenges related to poverty and inequality by promoting technology-driven small enterprises. The study's conclusions revealed the importance of technology business incubation as an essential intervention for the development and sustainability of technology-focused small businesses in KZN.

The study's findings also highlighted the need to explore this phenomenon further from different perspectives, including those of the targeted beneficiaries, technology-focused small businesses and other stakeholders, and possibly replicate it in other provinces of South Africa.

Keywords: Technology business incubation, Technology incubation, Small businesses, SMMEs, Growth, Sustainability.

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DEDICATION

I dedicate this thesis to:

- My family: my mother, Zikhwezile Virginia; my son, Ndumiso; my grandson, Senzelwe; my brothers, Phumlani and Nkumbulo; all my nieces and nephews. You always believed in me. I derived strength and courage from your support.

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LIST OF ACRONYMS

CIPC: Companies and Intellectual Property Commission
DPME: Department of Monitoring and Evaluation
DSBD: Department of Small Business Development
DSI: Department of Science and Innovation
DST: Department of Science and Technology
DSTI: Department of Science, Technology and Innovation
DTI: Department of Trade and Industry
DTIC: Department of Trade Industry and Competition
EDTEA: Economic Development, Tourism and Environmental Affairs
IP: Intellectual Property
KZN: KwaZulu-Natal
RBT: Resource-Based Theory
SEDA: Small Enterprise Development Agency
SEDFA: Small Enterprise Development and Finance Agency
SEFA: Small Enterprise Finance Agency
SEZ: Special Economic Zone
SMME: Small, Medium Micro Enterprises
TBI: Technology Business Incubators
TIA: Technology Innovation Agency
TVET: Technical and Vocational Education and Training

CHAPTER 1: INTRODUCTION AND BACKGROUND TO THE STUDY

1.1 INTRODUCTION

This chapter introduces the study on developing a framework for technology business incubation for the sustainable growth of small businesses in KwaZulu-Natal. The focus is on technology business incubators (TBIs), which are differentiated from general small business incubation, as they have added aspects of enhancing technology transfer and creating new enterprises (Sanyal & Hisamic, 2018:13). Technology-based entrepreneurship has proven to influence economic growth and improvements in social welfare in various developing countries (Amit & Schoemaker, 2016:1;Anwana & Anwana, 2020:3). Generally, small business incubation is associated with improvement in the general performance of SMMEs (Ayatse, Kwahar & Iyortsuun, 2017:2). Business incubation in SA is a relatively new concept that emerged in 1995 under the Small Business Development Corporation (SBDC) and township hives compared to its origins in the Batavia Institute in 1959 in the United States of America (Lose, 2021:2). This phenomenon has since spread to become a global mainstay in entrepreneurship development as small businesses have embraced technological innovations in creating new opportunities as well as expanding their businesses Jili,(Endris & Kassegn, 2022:2). The incubators are designed to accelerate the development of SMMEs towards financial viability and ability to function independently by providing value-added support and access to essential tools and resources (physical, human and financial) that are inaccessible to entrepreneurs (Lose, 2021:2). The technology-focused small businesses utilise developments in science, computer science, communication and information technologies, or engineering to develop new products and services or to improve on the existing ones Department of Trade(Anwana & Anwana, 2020:2).

The chapter commences by presenting the background and context of this study, leading to the research problem and aims and objectives. The research question

and a brief introduction of the methodology utilised and the adopted approach to data analysis are included. The ethical considerations and presentation of tools for ensuring trustworthiness are briefly described in the study, notwithstanding that these topics are covered comprehensively in the research methodology chapter. Finally, an overview of the chapters provides an outline of the structure of this thesis.

1.1.1 The Role of SMMEs in South Africa

Businesses, irrespective of their size, are not established solely for their interest; they also exist to achieve a singular social objective that will benefit their stakeholders and the Jili, Masuku & Selepe, 2017:1). In developing countries, small business development and entrepreneurship are also essential for creating employment, alleviating poverty, growing the economy, innovation, wealth creation and establishing a competitive and efficient market (Bvuma & Marnewick, 2020:1 and efficient market (Bvuma & Marnewick, 2020:1; Moise, Khoase, Derera, & Ndayizigamiye, 2019:274; Ayandibu & Houghton, 2017:134; Malebana, 2017:74). Therefore, this long-standing developmental role of SMMEs as a solution to addressing the global challenges of downscaling, downsizing, outsourcing, and other business reengineering processes that result in job losses and unemployment is critical for emerging economies like South Africa (Endris & Kassegn, 2022:1; Makwara, 2019:1; Subhan, Mehmood & Sattar, 2013:4; Urban & Naidoo, 2012:148).

The SMMEs present an opportunity for development but face numerous challenges. These challenges, as revealed by the South African National Treasury, relate to the unhealthy scenario of high inequality levels, unemployment, and stagnant economic growth, which is suggestive of an unsustainable economic path (Medium Term Budget Policy Statement 2024) (National Treasury Republic of South Africa, 2024:9; National Treasury Economic Policy, 2018:3). The following subsections will focus on the potential role of SMMEs and small businesses in addressing these national challenges.

1.1.2 SMMEs are a vehicle for economic development and growth

Countries are adopting entrepreneurship and SMMEs as one of the strategies for achieving macro-economic benefits towards economic sustainable growth and development (Manzoor Wei & Sahito, 2021:1; Obaji, 2014:109; Urban & Naidoo, 2012:146). The proliferation of SMMEs has been cited as one of the reasons for the prosperous burgeoning economy of China, Japan, and South Korea through the sector's ability to introduce diversified products, increase the scale of assets, create employment opportunities, and SMMES also contribute significantly to Pakistan's transition from agriculture-led to industrial economies (Malkin, 2018:3; Subhan *et al.*, 2013:4).

The South African SMMEs are also considered vital for sustainable economic growth and development and have reportedly made a substantial contribution (40-42%) to the Gross Domestic Product (GDP) (Department of Small Business Development, 2023:11; (Naicker, Roux, Bruwer & Bruwer, 2017:53; Urban & Naidoo, 2012:146). This trend is also evident from the results of quarter three of 2022, which emphasised that SMMEs contributed 38.2% towards the total turnover of all enterprises (The Small Enterprise Development Agency, 2023:26). These figures highlight the vital role of South African SMMEs in the country's economy through economic activities in the *formal* and informal segments. Hence, there is a need to provide a nurturing environment for emerging entrepreneurs and micro enterprises to increase their pool, growth, and sustainability.

These small labour-intensive businesses are on the growth path, essential for growing the economy and creating jobs (Manzoor *et al.*, 2021:2).

1.1.3 The role of SMMEs in employment creation

South Africa is facing a disabling challenge of growing levels of unemployment that can be traced from 27.2% in the second quarter of 2018, rising to 29.1% (first quarter of 2020), reaching 34,4% (second quarter of 2021) and finally levelling at 33.1% (third quarter of 2024) (Quarterly Labour Force Survey (QLFS) Q2:2024 Risenga Maluleke Statistician-General; Statssa, 2023; Statistics South Africa, 2021; Statssa, 2021; STATSSA, 2020). This evidence suggests that the South African economy cannot provide adequate employment opportunities for its growing population, which was recorded at 51.7 million in 2011, to 58.78 million by July 2019 (Stats SA, 2019) and is currently estimated at 63.02 million (Statssa, 2024). SMMEs' operations demand high labour inputs that are available locally as they are generally premised on minimum capital investment(Rungani & Potgieter, 2018:1). Through primarily self- and secondary employment, which creates employment for others, albeit minimal, SMMEs are amongst the major contributors to the creation of jobs (Dvouletý *et al.*, 2021). Given South Africa's relatively high unemployment rates, finding ways to assist SMMEs in flourishing and enhancing their sustainability is critical, thereby increasing their contribution to employment creation.

1.1.4 The role of SMMEs in addressing inequality

The current economic scenario in SA is that the majority of the population, which comprises South African Blacks, is excluded from the country's economy and has resulted in severe socio-economic challenges that hinder economic development (Majavu, 2023:217; Iwu, Gwija & Cupido, 2016:17). The South African government has identified entrepreneurship as the key to economic growth, employment creation, and addressing inequality, as pronounced in the National Development Plan (NDP) Vision 2030 (SA Government, 2012:144). Therefore, the SA SMME sector is vital to the sustainable development of the SA economy. (Ayandibu &

Houghton, 2017:133); hence, supporting sustainable enterprises will contribute to inclusive growth in South Africa.

1.1.5 The role of SMMEs in technology development and innovation

Entrepreneurs also contribute to the commercialisation of research and development outputs, and with increasing globalisation, innovation is an indispensable tool for economic development for both developed and developing nations (Lukhele & Soumonni, 2021:829). In particular, companies need access to the latest technologies and skilled staff to remain competitive, which requires investments (National Treasury, 2018:3). Mian, Lamine and Fayolle (2016:1) further argue that technology-based enterprises are the building blocks for novel wealth-creating businesses. However, technology development or adoption tends to further strain the SMMEs, which are resource-constrained (Zulu, Zondi & Ngwenya, 2023:3). Resource limitations hinder technology-focused SMMEs' ability to innovate; hence, it is essential for SMMEs to either innovate or gain access to innovation and technology development.

1.2 PROBLEM DESCRIPTION AND PURPOSE OF THE STUDY

This study aims to develop a framework for the technology business incubation for the sustainable growth of small businesses in KwaZulu-Natal by conducting an interpretive phenomenological qualitative inquiry to understand the lived experiences of these programmes' managers, CEOs and directors. The government of South Africa has adopted entrepreneurship and SMMEs as key to a growing economy, employment creation, and addressing inequality as pronounced in the NDP Vision 2030, and further identified SMME incubation as one of the levers for achieving its goals (SA Government, NDP-2030, 2012:144). The study also acknowledges that, to survive, small businesses need to be innovative, competitive, and informed by technology through access to the latest technologies and skilled staff despite their limited resources (Economic Policy

National Treasury, 2018:44; Booyens & Rogerson, 2017:342; Mian, Lamine & Fayolle, 2016:1). Furthermore, the TBIs are regarded as possessing the potential to provide nurseries for SA SMMEs known for high failure rates by offering resources and essential tools for accelerated growth and sustainability (Bushe, 2019:1; Al-Mubarak & Busler, 2013:1). However, the desired outcomes and impacts, which can be described as a flourishing and sustainable SMME sector, have yet to be achieved.

Qualitative research generally allows for the exploration of understudied areas and the search for emergent theories, and the conceptual framework was identified as one of the key components of this study. According to Collins and Stockton (2018:1), the conceptual framework is necessary for situating and grounding the study within the relevant knowledge bases, identifying the principal ideas and the web of relationships between them, and structuring a foundation for the significance of the problem statement and research questions.

The framework presented in Figure 1.1 is further elaborated in Chapter 5, where the researcher developed each intersection to define linkages and relationships. The conceptual framework depicts relationships around the primary focus of the research, so explaining the focal relationships in this study is essential. This study is premised on the relationship between the incubatees that seek support from the technology business incubators (TBIs) and the managers/CEOs/directors that are responsible for the TBI programmes and how these contribute towards the delivery of the desired outcome, which is growing sustainable small businesses in KwaZulu-Natal. This relationship is depicted in Figure 1.1:

Figure 1. 1: Technology Business Incubation



Source: Researcher's creation

The relationship presented in Figure 1.1 proposes that TBI can be understood from the managers' experiences of TBIs. The conceptual framework is embodied within the theoretical framework, which constitutes the existing body of knowledge/theories that describe how and why a particular phenomenon occurs (Dvouletý *et al.*, 2020: 2). This study considers the TBI, and it seeks to explain how this phenomenon occurs, why it is not delivering the desirable results and how it can be improved to ensure its effectiveness. This study seeks to ensure the effectiveness of these incubators as enablers of SMME growth and sustainability in KwaZulu-Natal Province, South Africa.

Given the unwaveringly extreme levels of poverty and unemployment in the country, the South African government has concerted its efforts on SMME development as a critical policy intervention (Zulu *et al*., 2023:1; Masutha & Rogerson, 2014:142). However, researchers in established economies, like those of the European Union (EU) nations, uphold that ascertaining economic growth and employment creation from entrepreneurs is achieved through promoting and funding high-quality and high-growth enterprises (Dvouletý *et al.*, 2021:244). Even though the SA government is funding some of the incubators, there is potential to maximise the benefit from the incubators (Zulu *et al.,* 2023:1; Iwu *et al*., 2015:17). Despite such governmental support, the expected positive impact is yet to be realised. It is, therefore, critical for emerging economies like South Africa to enhance SMME support, which results in growth and sustainability and ensures meaningful contributions to economic growth, employment creation, and reduction in inequality. Therefore, this study purports that through appropriate TBI strategies, the contribution of South African SMMEs, particularly technology-focused small

businesses, may be amplified towards the improvement of the economy and in addressing the socio-economic challenges facing South Africa.

1.3 OBJECTIVES OF THE RESEARCH STUDY

The following are the primary and secondary objectives of this study:

1.3.1 Primary objective

The primary objective is to develop a framework for technology business incubation for the sustainable growth of small businesses in KwaZulu-Natal.

1.3.2 Secondary objectives

To realise the primary objective, the following are the secondary objectives (SO) :

Employing a literature study:

SO^1: Examine the landscape of technology-focused SMMEs in the province of KZN in South Africa.

SO^2: To identify government interventions to support SMMEs incubation and impact on technology and innovation.

SO^3: To describe technology business incubation as an enabler for SMME development and the role of SMMEs in technology development and innovation.

Utilising qualitative empirical research:

SO^4: To explore and describe the mode of operation for technology business incubators.

SO^5: To explore and describe the experiences of technology incubation programme managers and those of the entrepreneurs who are incubatees.

Conclusion and recommendations:

SO^6: To conclude, the strategies that can be utilised to enhance the positive impact of TBIs on technology-focused SMMEs.

SO^7: To recommend the action plans and policy interventions that can be implemented to ensure the success of TBI.

SO^8: Develop a framework for the TBI in the KwaZulu-Natal province in South Africa.

Methodological objectives

To address the primary and secondary objectives, the following methodological objectives (MO) framed the study :

MO^1: To conduct a literature review on technology business incubation in KwaZulu-Natal

MO^2: To conduct a literature review on the government interventions that promote and support technology business incubation in South Africa, particularly KwaZulu-Natal.

MO^3: To conduct a literature review on the experiences of managers/CEOs/Directors of technology business incubators.

MO^4: To develop a conceptual framework to guide and define the study's adoption of a research design and methodology.

MO^5: To identify and select the most appropriate research methods to address the primary and secondary research objectives.

MO^6: To undertake an empirical investigation that will provide insight into the technology business incubation of small businesses in KwaZulu-Natal.

MO^7: To present recommendations, based on the findings of the empirical investigation, for effective technology business incubation for sustainable growth of small businesses in KwaZulu-Natal and make a proposition on the areas of future research in KwaZulu-Natal and South Africa.

1.4 RESEARCH QUESTION

The research question (RQ) is presented as follows:

RQ: What are the experiences, understandings, and meanings that managers/CEOs/Directors attach to the phenomenon of technology business incubation in KwaZulu-Natal?

1.5 RESEARCH DESIGN AND METHODOLOGY

This section presents a brief overview of the research paradigm, theory development, methodological approach, and methodology the researcher adopted for this study. These study components are followed by a discussion of the research methods to achieve the study's objectives, as stated in Section 1.3. These research paradigms, methodologies, sampling approaches, data collection and analysis procedures and matters of rigour and trustworthiness are discussed comprehensively in Chapters 5 and 6.

1.5.1 Research paradigm, methodological approach, and methodology

This research study is premised on the interpretivism paradigm. People of diverse cultural backgrounds make distinctive meanings and create and experience unique social realities under particular circumstances and at different intervals; hence, there can be no universal laws that apply to everybody (Saunders *et al.*, 2019: 149). This research seeks to better comprehend and interpret TBI's world and its contexts. It acknowledges TBI's complex and unique context, whose circumstances and interactions involve people gathering at an appointed time with specific needs. The research focuses on the phenomenologists' understanding of the participants' lived experiences and how these are interpreted. This interpretation was achieved by examining the TBI from the perspectives of the programme's managers/CEO/director.

This research study adopted the inductive approach to collect data to explore the phenomenon of TBI. Therefore, the main variation between the deductive and the inductive approaches is the sequence between theory and data. Induction develops a theory from data, while deduction develops data from the theory (Saunders *et al.*, 2019:155). The induction option is ideal for understanding the interpretations human beings attach to their experiences. It encourages alternative explanations of what is happening, which renders it different and acceptable to social scientists as opposed to the rigid methodologies of the deductive approach (Saunders *et al.*, 2019:155). The induction approach is also concerned with the context within which the events occur and ensures the inclusion of different views on the studied subject. The subjective interpretations and the connection to the humanities render the induction approach favourable to interpretivists.

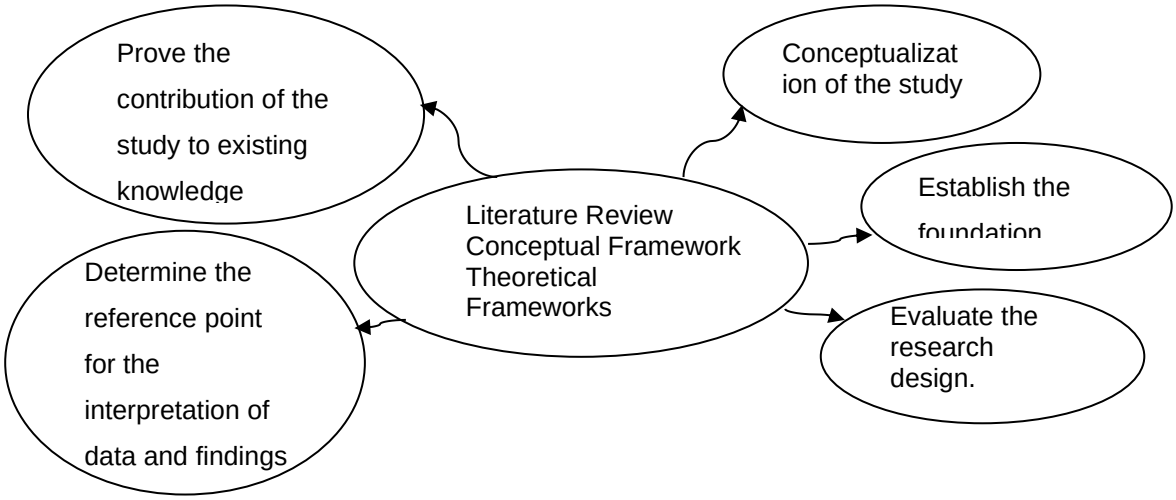
1.5.2 Research methods

This section summarises the research methods and procedures used to collect and analyse data from primary and secondary sources.

1.5.2.1 Secondary data (literature review)

Secondary data was one of the strategies the researcher employed to realise the objectives of this study. The comprehensive literature review encompassed various disciplines and fields of study on technology business incubation for the sustainable growth of small businesses. The relevant literature was sourced from numerous online databases and the University Library. The contribution of the literature review is presented schematically in Figure 1.2 below.

Figure 1. 2: Schematic representation of the literature review



Source: Adapted from Rocco and Plakhotnic (2009:122)

The literature review in this study is presented in three (3) chapters as summarised:

Chapter 2: Technology-Focused SMMEs landscape in the province of KwaZulu-Natal

This chapter focused on the landscape of technology-focused SMMEs in the province of KwaZulu-Natal in South Africa. This chapter acknowledged that while generic challenges face SMMEs, provincial and regional realities present varied opportunities and challenges for small businesses, thus requiring specific and targeted interventions. This chapter also presents recommendations and conclusions on the strategies to improve the effectiveness of the TBIs in developing, growing and sustainable SMMEs and their contribution to job creation, poverty reduction, and economic growth in the province and nationally.

Chapter 3: Government interventions supporting the technology business incubation of small businesses in KwaZulu-Natal

This chapter focused on government interventions geared towards developing technology-based or technology-focused SMMEs in the country and relevant national policies and programmes. It focused on programmes that target the use and development of technology and innovation in SMME support. It also identified entities that may contribute to a vibrant entrepreneurship ecosystem and how these interact with the technology business incubator to develop SMMEs further. This chapter is essential in portraying the technology, innovation, and entrepreneurship development interventions that are key in driving TBIs to create sustainable, growing small businesses.

Chapter 4: Technology business incubation of small businesses in KwaZulu-Natal.

This chapter is focused on the technology business incubation of SMMEs, a concept adopted by various national and international role-players to nurture and sustain technology-enabled SMMEs. It identified the incubators' programmes for supporting small businesses, the service offerings, and the metrics used as success measures. This chapter also identifies the processes of TBIs for enhanced effectiveness in developing sustainable small businesses.

A critical literature review utilised reputable sources of information, including peer-reviewed journals, scientific literature, textbooks on entrepreneurship support, TBI and government publications and policies. The process followed in the critical literature review is highlighted and illustrated in Figure 1.3. Reputable sources of scientific literature were identified, including scientific databases and government websites. Relevant information was extracted from the identified scientific databases based on the keywords and study objectives. The main inclusion criteria for scientific papers are peer-reviewed journals, books, and certified government publications containing empirical research.

Figure 1. 3: Flow of the critical literature review process



Source: Researcher's creation

1.5.2.2 Primary data collection (empirical research)

The empirical component of this study was conducted following the dictates of qualitative research. According to Phillips, Tichavakunda and Sedaghat (2023:2), qualitative research can capture the granular context of human experience, which is at the heart of this research study as it relates to managers/CEOs/directors of the TBIs in KZN. As outlined in Section 1.6, the research objectives indicate that this study sought to explore and describe the mode of operation for technology business incubators. This was achieved by exploring and explaining the experiences of thirteen technology business incubation (TBI) programme managers/CEOs/directors at KwaZulu-Natal. Structured interviews were utilised for data collection.

1.5.2.3 Trustworthiness (Validity and Reliability)

Researchers collectively agree on credibility, transferability, dependability, and confirmability as the general criteria for qualitative research trustworthiness (Wahyuni, 2012:77; Ryan *et al*., 2007:743; Malterud, 2001:483). Credibility in this study was achieved through purposive sampling with a clear description of the profile of participants coupled with source and evaluator triangulation. Transferability was ensured through a clear and concise description of the research setting that will allow the recipients of the research to identify a fit in a different environment and disclose the complete profile of participants.

Dependability was enhanced in this research by providing a detailed, step-by-step explanation of the research processes followed and documentation of the semi-structured interviews, the main research instruments used in this study. Confirmability is usually established when credibility, transferability and dependability are achieved (Ryan, 2007:743). The audit trail was maintained by ensuring that proper research process documentation was available to the study's recipients. These records the entire research process, following the recommendations to enhance rigour (Ryan *et al*., 2007:742).

1.5.3 Ethical considerations

Confidentiality was maintained within the confines of this study, and all reasonable precautions were taken to eliminate unauthorised access to the data. All stipulated regulations governing ethics in research at the North-West University (NWU) were adhered to. Ethical committees are responsible for protecting the rights of the research participants and supporting those identified as vulnerable (Ryan *et al*., 2007:741). This study identified programme managers for participation, and pseudonyms were used. Data is stored for a prescribed period as dictated by the ethics committee of NWU and, upon expiry of this period, will thereafter be destroyed. Data was utilised only for the legitimate purpose of the study. Moreover, respondents were assured that their participation in the study was voluntary. The purpose of the research was clearly explained to all sample cohorts.

1.6 SCOPE AND DEMARCATION OF THE STUDY

This section presents the study's field, the investigated sector, and the geographical demarcation. This research study focuses on technology business incubation (TBI). Entrepreneurship is a sector of enterprise development and support. The geographical demarcation of the study is restricted to the Province of KwaZulu-Natal, one of the nine provinces in South Africa. The map of the KwaZulu-Natal province and its eleven (11) districts is presented in Figure 1.4 below:

Figure 1. 4: Map of KwaZulu-Natal Province



Source: *https://www.researchgate.net/publication/325668506.*

This province has a dichotomous economic profile, being the third key contributor to the country's GDP and the third poorest province (Statistics South Africa, 2019). This province is characterised by diversity and inequality, with a Gini coefficient of 0.63 (KwaZulu-Natal Provincial Government, 2019:17), and remained at 0,63 for 2023 (Trading Economics, 2023:1). These results indicate the province of KZN's potential to increase its contribution to economic development and employment, provided an environment conducive to entrepreneurial activities is created and supported. Chapter 2 extensively deliberates these factors.

1.7 SIGNIFICANCE OF THE STUDY

KwaZulu-Natal is a province of South Africa, a country characterised by an early-stage but thriving technology-focused emerging small businesses with innovative and determined entrepreneurs that are capable of creating jobs averaging 5.8 full-time equivalents (Anwana & Anwana, 2020). To remain competitive, technology-focused enterprises require access to the latest technologies and high-tech facilities as well as skilled staff, which entails investments (Economic Policy National Treasury, 2018: 44). Researchers have reported that without support and resources, SMMEs will be unable to achieve their goals (Rungani & Potgieter, 2018:1). Incubators, as cost-effective instruments of entrepreneurial promotion, have impacted positively on firm survival, turnover, employment and job creation (Ayatse, Kwahar & Iyortsuun, 2017:2). Correspondingly, the incubation support has been reported to increase the survival rates of small businesses post-incubation to levels as high as 70% (Kihonge, 2016:231). Mian, Lamine, and Fayolle (2016:7) also highlighted the need to further develop conceptual understanding and underlying theory(ies) in TBI. Improving conceptual understanding and theories underpinning TBIs and, subsequently, their impact on technology transfer will positively impact the creation of high-tech companies that will increase the country's competitiveness.

In conclusion, this research study aims to shape the TBI interventions to support small businesses in achieving economic development, employment creation, and reducing inequality in KwaZulu-Natal and the entire country. Therefore, South Africa is challenged to promote high entrepreneurial activity to generate a sustainable pool of small businesses. This scenario will realise the desirable increase in SMMEs' contribution to economic growth, employment, innovation, and technology development. The framework developed in this study presents the strategies for effective technology business incubation that will generate growing and sustainable technology-focused small businesses in KZN.

1.8 KEY CONCEPTS

The key concepts for this study are presented:

- **Technology business incubation**

This study defines technology business incubation as incubation support combining technological and business management support.

- **Small business incubation**

For this study, small business incubation is a general term that refers to the developmental support provided to small businesses and SMMEs.

- **Technology-focused small businesses**

These small businesses are founded on technology or rely on technology for their operations and service delivery to their clients.

- **Technological innovations**

Innovations seek to improve small businesses' technologies to enhance their products or operations.

1.9 STRUCTURE OF THE STUDY

This study consists of eight (8) chapters.

As presented in Section 1.5.2.1.1, the literature review consists of three chapters (2.3 and 4). Below is a brief introduction to Chapters 5 to 8.

Chapter 5: Conceptual framework, research design and methodology

Chapter 5 provides a synopsis of the research design and paradigms the researcher embraced for this study. It also presents the researcher’s adopted research design, the corresponding methodological stance, and the justification for

the choices made. Lastly, this chapter discusses the research strategy (research methodology) implemented for this study.

Chapter 6: Research methods and rigour

Chapter 6 discusses and motivates the chosen research methods for data collection, sampling processes, and analysis techniques. Furthermore, this chapter details the trustworthiness and quality of the research design, concluding with an extensive discussion of the ethical considerations that the researcher implemented.

Chapter 7: Discussion and interpretation of findings

This chapter presents the findings relating to the phenomenon of technology business incubation experienced by participants.

Chapter 8: Summary, Conclusions and Recommendations

This final chapter provides an overview and summary of all the chapters. The empirical findings relating to technology business incubation for the sustainable growth of small businesses in KwaZulu-Natal are presented. Subsequently, a framework explaining technology business incubation for the sustainable growth of small businesses in KwaZulu-Natal is presented. From the findings and framework presented, recommendations relating to technology business incubation for the sustainable growth of small businesses in KwaZulu-Natal are emphasised. Furthermore, this chapter presents the contributions of this study, limitations, opportunities for future research, and the researcher's reflections and learnings.

.

1.10 SUMMARY

This chapter of this research thesis elucidated the contextual framework of the research problem statement and comprehensively examined the primary, secondary, and methodological objectives that directed the study. The researcher provided an overview of the study's scope and the research approach utilised to collect primary data. The significance, limitations, and introduction of the chapters were also presented. The following chapter (Chapter 2) presents the landscape of technology-focused SMMEs in the province of KwaZulu-Natal.

CHAPTER 2: TECHNOLOGY-FOCUSED SMME LANDSCAPE IN THE PROVINCE OF KWAZULU-NATAL

2.1 INTRODUCTION

This chapter underscores the potential and the necessity of focusing on the province of KZN, a region ripe with opportunities for technology-focused SMMEs. For this study, technology-focused and technology-based will be used interchangeably as they refer to small businesses whose products or services are founded on technology or rely on technology for their operations. Understanding the profile and the environment of the targeted SMMEs is crucial in ensuring the effectiveness and high impact of enterprise support programmes like TBIs. This chapter reveals the available opportunities and the potential areas of contributions for the TBIs that will lead to further development and survival of these programmes.

This chapter first considered the challenges associated with the definitions and meanings attached to the terms "small business" and "entrepreneurship," concluding by adopting the most suitable working definitions for this study. It then includes an overview of the challenges facing SMMEs in KZN. The chapter concludes with a profile of technology-based or technology-focused SMMEs in the province of KZN and how they can benefit from TBI.

2.2 DEFINITIONAL CHALLENGES FACING THE SMME SECTOR

Global tensions persist in defining SMMEs, with the South African system basing its classification on the business or industry sectors in which they operate (Bvuma & Marnewick, 2020:3). This complexity hampers global efforts to standardise the definition of this business sector. Therefore, aligning the definition of SMMEs with the regulations of the respective country is crucial. The South African Department of Small Business Development (DSBD) provides an amended definition of small

enterprises based on the two factors of the total full-time equivalent of remunerated staff and overall annual revenue. It defines small enterprises as:

> *"a separate and distinct business entity, together with its branches or subsidiaries, if any, including cooperative enterprises, managed by one owner or more predominantly carried on in any sector or sub-sector of the economy mentioned in column1 of the Schedule and classified as a micro, a small or a medium enterprise by satisfying the criteria mentioned in columns 3 and 4 of the Schedule; where Column 3 and 4 refers to the total full-time equivalent of paid employees and total annual turnover respectively for different industry sectors" (Department of Small Business Development, 2019:1)*.

This revised definition of SMMEs and cooperatives still differentiates entities from one sector to another, which the DSBD's 2020/21 Annual Performance Plan (APP) Revised acknowledged as a threat to SMME development (The Department of Small Business Development, 2020:23). It also collapsed very small enterprises into micro-enterprises and eliminated the previous third factor of overall gross asset worth. The South African Revenue Services (SARS) utilises different definitions of small enterprises for a variety of reasons, including Amnesty considerations, where,

> "*a small business is any business with a turnover of up to R10m for Income Tax purposes (Section 12E). A Small Business Corporation (SBC) is defined as a business having a turnover of less than R14m, over and above other qualifying criteria and for Capital Gains Tax, a Small and Medium Enterprise (SME) is described as a business having total net assets of under R5 m."* (Ayandibu & Houghton, 2017:34).

Another view on the classification of small businesses in SA includes "own-account" businesses, which are characterised by having no employees, thus expanding the range of SMMEs from own-account to 49 employees-companies

(Bhorat, Oosthuizen & Stanwix, 2018:16). These definitions are also important as they capture the context under which the SMME operates, which impacts its success and failure prospects. SMMEs are further classified as formal and informal, where formal categorises those with proven registration for Value Added Tax (VAT) or income tax and are also impacted by the environment in which the enterprise is situated (Bhorat *et al*., 2018:16).

For this research study, the adopted classification of SMMEs based on some South African researchers (Bvuma & Marnewick, 2020:4; Jili, Masuku & Selepe, 2017:1) is given as:

> *"Survivalist:* the income generated is below the poverty line, poor capital is invested, and there is hardly any assets. They are often referred to as hawkers, vendors, and subsistence farmers without much training."
>
> *"Micro:* They need more formality in terms of registration. They employ between one and five employees, including spaza/tuck shops and minibus taxis, and may be on household premises."
>
> *"Very small*: they may employ at most ten employees. These include artisans (electricians, plumbers) and other professionals. However, this does not include sectors such as mining and construction, manufacturing, and electricity, but does include professionals such as artisans, electricians and plumbers."
>
> *"Small*: They are seen as more established compared to the very small businesses and may be formal and registered businesses, owner-managed but with more complex structures", and
>
> *"Medium*: They employ a maximum of 100 or 200 people for various sectors, including the mining, electricity, manufacturing, and construction sectors, with

a maximum of 20 employees. They operate on fixed premises with formal requirements."

2.3 PROFILING SMMES IN THE PROVINCE OF KWAZULU-NATAL

This section reflects on the province's characteristics and factors that impact the technology-focused SMMEs in KwaZulu-Natal (KZN) province. It positions the province regarding economic activities, unemployment, population, and poverty. Finally, it concludes with a summary of strengths, weaknesses, opportunities, and threats.

The geographic location for this study is KwaZulu-Natal, one of South Africa's nine (9) provinces. Each province possesses unique strengths and advantages, influenced by the geography of the region that forms the basis upon which regional and local innovation strategies should be developed (Department of Science and Technology, 2017:61). By mid-year 2022, Statistics South Africa estimated the KZN population at 11,5 million, second to Gauteng (at 16m). In addition, 2,96 million of this population are categorised as youth (ages 20-34) residing in this province (Statistics SA, 2022). The unemployment rate in South Africa was recorded at 43% in the first quarter of 2020 (STATSSA, 2020:1) and decreased to 32.6% by the second quarter of 2023 (StatsSA, 2023). The number of social grant recipients is another indicator of the high poverty levels in KZN. This province recorded the highest number of social grant recipients at 4.090 million in 2018 (Kamer & West, 2020:2018), increasing 4 137 649 by March 2023 (SASSA, 2023).

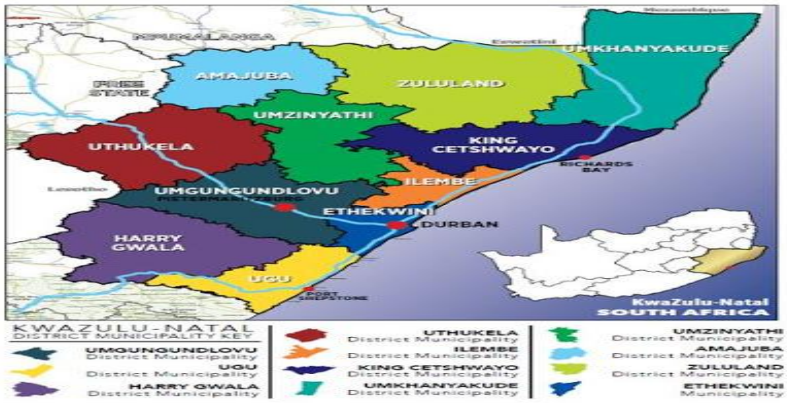
It is also essential to consider the impact of education on unemployment. In the first quarter of 2020, the unemployment report revealed that 54.8 % of the unemployed had less than matric (Grade 12), and only 2.3% were graduates (STATSSA, 2020:1). However, there is a marked improvement in the attainment of higher education in the KZN province. The 2011 census revealed that 10,6% of the KZN population aged 20 years or older had no schooling. Only 30,4% reported

having matric, while 4,8% achieved tertiary qualifications (Statistics South Africa, 2011:44). By 2016, of the 44,898,71 people between the ages 25 and 64, 7.5% had no schooling, 68.2% had attained secondary school learning, and only 10.7% had post-secondary education (Statistics South Africa, 2017:17).

South Africa's GDP growth rate contracted by 1,4% in 2019 quarter four (StatsSA, 2020:2), with manufacturing as the primary contributor. Small businesses continue to benefit the nation's economy as they reach an estimated 57% contribution to the GDP despite the prevailing economic challenges (Nkoana & Mashamaite, 2024:123). The province of KwaZulu-Natal (15.9%) is the second-highest contributor to the country's GDP based on the 2022 economic activities (StatsSA, 2023), which increased by 1.1 % in 2023 (StatsSA, 2024), thus proving that this province has a critical role in SA's economy. This increase has extended the province's input to the GDP to 16 %, positioning it in second place to Gauteng (StatsSA, 2024). The SEDA March 2023 report revealed that KwaZulu-Natal has the second highest number of formal SMMEs (14%), after Gauteng (37%) and the Western Cape (12%). Of these, 28.2% are formal entities, with 66.8% being informal (The Small Enterprise Development Agency, 2023:1; Bhorat *et al*., 2018:7).

To contextualise the geographic scope of the research study, the map of KZN is presented in Figure 2.1, followed by the assessment of strengths and opportunities for technology-focused SMMEs:

Figure 2. 1: Map of the districts of KwaZulu-Natal



%

Source: KZN Top Business/KZN (https://kzntopbusiness.co.za/site/kzn-in-context)

Figure 2.1 illustrates that this province consists of eleven (11) district municipalities, namely, Amajuba, Ethekwini (Metropolitan), Harry Gwala, Ilembe, King Cetshwayo, Ugu, Umgungundlovu, Umkhanyakude, Umzinyathi, Uthukela and Zululand, with each district further divided into local municipalities (KwaZulu-Natal Top Business, 2020:1). The major economic hubs in the province are Durban (eThekwini), Umhlathuze (Richards Bay/Empangeni in King Cetshwayo) and Pietermaritzburg (Capital, Umgungundlovu) and host to two ports in Durban and Richards Bay that are Southern Africa's most active on account of cargo handling by both value and bulk accordingly(KwaZulu-Natal Top Business, 2020:1). This makes KZN key in promoting economic growth in SA. The major contributors to the provincial GDP are manufacturing, finance, government, and trade (StatsSA, 2021:1)KZN also harbours two of the active Special Economic Zones (SEZs) in SA, namely Dube TradePort (Durban, eThekwini) and the Richards Bay Industrial Development Zone (Umhlathuze, King Cetshwayo District) (KwaZulu-Natal Top Business, 2020:1). The following section examines some of the factors associated with operating a small business in KZN. Table 2.1 presents the Strengths, Weaknesses, Opportunities, and Threats (SWOT) for technology-focused SMMEs in KZN.

Table 2. 1 SWOT analysis for technology-focused SMMEs in KZN

Strengths	Weaknesses
• Large Population • Second highest contribution to the country's GDP (16%) • Two active special economic zones (Dube Trade Port- Durban and Richards Bay Industrial Development Zone)	• High unemployment • Stunted economic growth • Poverty • Rural province • limited experience, • low levels of education, • relatively low skill levels
Opportunities	**Threats**
• Local economic development • Pro-poor SMME and Community development. • Facilitate the growth of small businesses • Establishment of regional linkages and partnerships • Supportive Legislative framework • High number of informal vs formal SMMEs	• Limited-resourced SMMEs • Poor infrastructure • High crime statistics

Sources:(StatsSA, 2024; Bhorat *et al.*, 2021:11; Bruwer, 2020:151; KwaZulu-Natal Top Business, 2020:1; Statistics South Africa, 2017:17)

2.3.1 The effects of small business location

According to Ayandibu and Houghton (2017:138), SMMEs should be strategic in choosing the location for their businesses, which has implications on distribution costs, ability to meet customer needs and survival of the competition. This section, therefore, highlights the key characteristics of KZN as a business location. The inadequacy of appropriate logistical infrastructure in SA, which is necessary to facilitate balanced spatial development, is also acknowledged by the 2020/21 APP Revised of the DSBD as a threat to SMME development (The Department of Small Business Development, 2020a:23). KZN is further characterised by a combination of rural and urban environments thus, the population is exposed to different levels of infrastructure development (KwaZulu-Natal Top Business, 2020:1). Small businesses that are located in the cities with their main entrepreneurship support hubs access do not easily access resources effortlessly, thus creating a huge support and finance gap (Swartz *et al.*, 2020:2). SMMEs are usually geographically located on the periphery of the urban areas, thereby creating economic activities

on the outskirts of the main metropolitan parts, resulting in employment opportunities, thus contributing to poverty reduction typical of the rural and outer urban areas (Ayandibu & Houghton, 2017:135).

The NDP 2030 acknowledges that small enterprises operate in diverse environments, and their owners and management are individuals with diverse motivations and aspirations (SA Government, 2012:141). Provincial governments and some municipalities have assumed responsibility for supporting SMMEs and entrepreneurship by establishing development agencies to support small enterprises and cooperatives (Department: Trade and Industry. Republic of South Africa, 2005:9). The role of municipalities in supporting SMMEs is to develop interventions and build partnerships with agencies that can support local small businesses and establish regional linkages geared towards benefiting this sector (Khambule & Mtapuri, 2018:439). This responsibility is embedded in the Strategy for the Promotion of Entrepreneurship and Small Enterprises, which recognised the need to decentralise the development and promotion of entrepreneurship and small businesses to provinces, with the national government assuming leadership (Department: Trade and Industry, Republic of South Africa, 2005:24).

Local governments can facilitate small businesses' growth and advancement by establishing appropriate infrastructure, including water and sanitation, power generation, travel pathways, communications, and land (Khambule & Mtapuri, 2018:441). In an endeavour to promote regional development partnerships and support for industrial clustering between enterprises, the Regional Industrial Development Strategy (RIDS) was promulgated, which resulted in the establishment of SEZ in the form of industrial and logistic parks, industrial estates, and innovation centres (Department: Trade and Industry. Republic of South Africa, 2005:17). In addition, to promote local innovation, the establishment of local incubators amongst other innovation system actors occurred (Department of Science and Technology, 2019b:35).

2.3.1.1 Rural and township SMMEs

The SA urban/rural divide resulted in some areas of the country being characterised by poor or lacking physical planning and inferior network infrastructure (SA Government, 2012114). However, rural and small-town municipalities still face grave capacity challenges in developing these areas (Khambule & Mtapuri, 2018:451). Therefore, the general trend in South Africa is that larger enterprises are located within the key economic hubs that are found in the cities, and some SMMEs are co-located within these economic zones (Bhorat, Asmal, Van & Zee, 2018:8), while others exist in rural areas.

SMMEs outside of cities, which are mainly survivalists, micro and small enterprise categories, experience a severe lack of resources for acquiring infrastructure and must bear the burden of high rental costs (Bvuma & Marnewick, 2020:5). Bomani & Derera, (2018:152), also noted rural areas are also characterised by limited access to markets, associated with low population densities, per capita and household incomes, which characterise rural areas. This factor is even more challenging for technology-focused small businesses, which rely on customers to recover their high input costs. Even informal businesses in the cities have a higher likelihood to grow compared to those outside of cities in places like townships and are considered successful just on survival, which is judged against the owners' ability to take care of his/her family's needs (Bvuma & Marnewick, 2020:5). Rural and township South African SMMEs face severe constraints associated with narrow markets, insufficient financial resources, scarcity and exorbitant input costs, insufficient technical and business expertise, and limited access to reliable communication and transportation amenities compared to urban SMMEs (Bomani & Derera, 2018:153; Lekhanya, 2016:108). Rural and township areas also suffer from one of the Apartheid legacies of limited social capital to access essential resources and markets (Swartz *et al.*, 2020:2). For instance, the inadequate infrastructure may prevent township SMMEs from bringing their needs to the attention of the government and other programmes that can provide much-needed

support (Bvuma & Marnewick, 2020:3). The appreciation of the fact that retailers dominate township commercial activities is also important as they are intended to provide for the consumption of essentials of the residents and hence have a greater focus on foodstuff and beverages, apparel, household appliances and furniture items, and the services sector mainly focused on household and personal care (Mtshali, Mtapuri & Shamase, 2017:5). Hence, there is evident inadequacy in other sectors, such as manufacturing SMMEs.

Rural SMMEs experience greater challenges in starting new enterprises, adopting technologies and delivering products that conform to market standards and comply with applicable legislations (Madlala, 2018:45). However, these resource-constrained SMMEs are more active drivers of economic activity in these areas than large firms (Bhorat *et al.*, 2018:11). This reality strengthens the connection linking the establishment of survivalist enterprises and the poverty and unemployment rates, as the effects of the limited jobs and poverty drive people into businesses to provide for their families (Ranyane, 2015:302). The unwavering and chronic extreme degrees of poverty and unemployment, characteristic of rural and peri-urban areas, create an unstable demand for SMME products (Bvuma & Marnewick, 2020:3). Geographical inequalities are still fundamental in South Africa despite the 26 years of democracy. These present a significant adverse impact on SMMEs in marginalised areas (Bvuma & Marnewick, 2020:3). These facts are crucial, considering that the core of this study is TBI for SMMEs. The identified sectors generally operate on the lower end of technology, implying that the TBI phenomenon might not be favoured or accessible to rural and township SMMEs.

Due to the high levels of unemployment and poverty in the province of KZN, informal enterprises become a survival tool for the unemployed and the poor households, and more so in most township and rural SMMEs, and as a result they experience limited growth and development compared to formal sectors in the cities (Bvuma and Marnewick, 2020:5). The rural market also does not promote growth with most of their local customers living below the poverty line (Lekhanya,

2016:112). The absence of job opportunities is forcing even some well-educated individuals into survivalist entrepreneurship as self-employment becomes a reality for an increasing number of South Africans (Ranyane, 2015:301). Survivalists' business owners are predominantly Black (African) and Coloured people (Mtshali, Mtapuri & Shamase, 2017:2).

SMMEs are generally co-located with large firms and, therefore, tend to be concentrated around the nation's critical economic hubs located in the cities (Bhorat *et al.*, 2018:8). The rural areas, when compared to urban areas and cities, are characterised by a legacy of underdevelopment, high poverty levels and lower entrepreneurial activity rates (Malebana, 2017:75). Rural enterprises are also disadvantaged by their relatively diminutive size, geographical isolation and detachment; and higher business costs of rural undertakings (Lekhanya, 2016:108).

This diversity in the South African economy warrants variations in support mechanisms (Mtshali *et al.*, 2017:2), which results in many needs and support requirements. Small business needs, irrespective of location, are not limited to an enabling economic infrastructure but also access to skills, markets, and information (The Department of Small Business Development, 2020:3). However, rural and township SMMEs require more resources based on their configuration and geographic setting. The apartheid legacy resulted in townships' small businesses that are predominantly black-owned, being typically small, and informal subsistence-oriented enterprises that provided essential products to low-income earners (Mtshali *et al*., 2017:2).

Bvuma and Marnewick (2020:3) argue that the environment and historical backdrop of SMMEs pose unique challenges, comprising inadequate access to basic infrastructure and the usual issues such as accessing finances, especially those operating in townships and outside of cities. The insufficient transportation and communications infrastructure, specifically in rural KZN, implies that rural

SMMEs need more access to timely market information and limit their ability to participate in high-value markets (Lekhanya, 2016:109).

An earlier document, The *Review of Ten Years of Small Business Support in South Africa 1994 to 2004,* established a need to ensure accessible SMMEs' support services and fairly distributed between urban/metropolitan and rural areas (Department: Trade and Industry. Republic of South Africa, 2005:22). More recently, similar findings were also detailed in the *Annual Review of Small Businesses in South Africa 2007-2014* (Department of Small Business Development, 2014:24). These two reports, which span over 20 years, indicate that SMMEs' support services are not benefiting small businesses outside of the cities. Supporting urban SMMEs through government and private sector interventions has proven to be more accessible and less costly, resulting in uneven growth of enterprises between these entities and those in marginalised areas (The Department of Small Business Development, 2020b:4). This skewed degree of support affects mainly Black people who reside in townships as part of the apartheid legacy; however, as these residential areas are situated around cities, they provide homes for city workers, and their proximity to cities has placed them in better proximity compared to rural areas. (Bvuma & Marnewick, 2020:3).

This KZN province recorded the highest number of social grant recipients, which accounted for 36% (4.09 million) of the total (17,8 million) 2018 recipients (Kamer & West, 2020:1). Another crucial factor to consider is that SMME employees earn lower average wages than large firm employees, the underlying factors being slightly lower average years of education and higher rural employment in SMMEs (Bhorat *et al.*, 2018:15). Low skills and education and a shortage of resources are added challenges for rural SMMEs, thus rendering them susceptible to failure (Lekhanya, 2016:111). South Africa's transformation obligations necessitate increasing the geographical footprint of innovation, thus encouraging contribution to the advancement of indigenous economies by strengthening the role of

innovation in developing rural areas and supporting local and regional innovation systems (Technology Innovation Agency, 2010:1).

2.3.2 KZN small business ownership along racial lines

The economy's fragility emanates from the biased patterns of proprietorship and economic segregation generated by apartheid policies, which is still manifested in both unemployment rates and income disparities (SA Government, 2012:110). Amongst the diverse racial groups in South Africa, black and coloured people's formal business activities are limited and characterised by being informal, survivalist, and designed to cater for the needs of a family or individual (Mtshali *et al.*, 2017:2). A study conducted on the racial mix of SMMEs in Durban, eThekwini, revealed that 36.4% of the individuals that participated were black, 37.4% Indian, 15% white, and 9.3 % Coloured (Ngcobo & Sukdeo, 2015:508). While these results do not represent the whole province, they are a good indicator as Durban is KZN's central and Gauteng's second-busiest economic hub. This relatively high number of black-owned SMMEs is encouraging in a metro that houses predominantly White and Indian businesses (Ngcobo & Sukdeo, 2015:508).

The NDP 2030 also recognises racial inequality in business ownership and, therefore, dictates that the government must construct a favourable environment for small businesses and entrepreneurs to flourish. This will encourage the passion for entrepreneurship in schools, reduce the price tag associated with establishing an enterprise in the economy and reduce impediments to participation in this industry (SA Government, 2012:139). In response, the DSI developed guidelines that are implemented with the assistance of relevant NSI partners to utilise intellectual property from publicly funded research and development to cater to women and black entrepreneurs in instances of commercialisation of that intellectual property as a means of influencing the transformation of the demographic ownership profile of technology-focused SMMEs (Department of Science and Technology, 2019:35).

2.4 OVERVIEW OF CHALLENGES CONFRONTING SMMES IN THE KZN PROVINCE

New entrepreneurs confront several challenges in launching, raising, and sustaining small businesses (Sanyal & Hisamic, 2018:10). The challenges are embedded in the history of South Africa, resulting in structural, cultural and institutional barriers to entrepreneurship and subsequently compromised performance of SMMEs compared to other emerging economies. The interventions that seek to support SMMEs should be based on the challenges facing this sector in South Africa, particularly in KZN. It is, therefore, essential to identify and discuss some of the challenges that SMMEs face and subsequently deliberate on how these can be alleviated through the TBI programmes. This research study also considers that these SMME challenges can be internal or external and outside the business owner's control.

2.4.1 High failure rates

Various researchers have also argued that most South African SMMEs fail to achieve their applicable financial goals of attaining profitability (income higher than expenditure), remaining solvent (with a net asset value that is positive), ensuring liquidity (having enough cash on hand), and good reputation with relevant stakeholders (being in good standing with providers, patrons and financiers) (Nkoana & Mashamaite, 2024;123; Bruwer, 2020:150). The astronomical failure ratio of SMMEs, as a result of a myriad of internal or external trials that adversely impact their survival and sustainability, is among the main factors that inhibit economic expansion and creation of employment in SA (Botha, Smulders, Combrink, & Meiring, 2021:148;Bruwer, 2020:148; Moise, Khoase, Derera & Ndayizigamiye, 2019:271).

Research has shown that 75 % of SMMEs fail within 36 months of operation (Bruwer 2020:150), with some researchers citing 70 to 80% failure rates within the first year of operation (Hewitt & van Rensburg, 2020:2). This high failure rate is

particularly concerning since SMMEs are considered vital in contributing to a growing economy, creating jobs, and reducing poverty (Lose, Tengeh, Maziriri & Madingi, 2016:698). Amongst the key areas identified as having a major contribution to SMMEs' high failure rate are inadequate business expertise, unpredictable and hostile exchange rates, high tariffs of electricity and water, stringent government regulations, excessive crime statistics, gangsterism, corruption and unpredictable supply and/or demands for their commodities (Bruwer 2020:151; Kanayo & Duncan, 2019:804). Bhorat *et al.* (2018:11) further indicated that the age profile of SMMEs revealed that young business owners dominate the sector due to limited experience, low levels of education, relatively low skill levels, and low average wages are among the general characteristics of these individuals.

2.4.2 Limited employment creation ability

There is a relationship between SMME activity and unemployment, which supports that entrepreneurship is regarded as a substitute for jobs as the DSBD reported that the 2019 increase of 4.4 % in the SMME sector was accompanied by a 0,4% decrease in employment across the economy (The Department of Small Business Development, 2020b: 21). This can be attributed to the tendency to provide labour-intensive operations that are key to SMMEs' ability to increase employment, thus contributing positively and meaningfully to the delivery of job prospects, the creation of revenue and, finally, the decline in poverty (Ayandibu & Houghton, 2017:134).

Even globally, SMMEs are recognised as key contributors to economic prosperity as they create jobs and initiate sales that form the basis for tax and fiscal revenue (Botha *et al*., 2021:153). The survivalist nature of most of the self-employed is evident in their attitude and practices as this group also tends to be own-account entities, which renders them informal and with limited growth opportunities (Bhorat *et al*., 2018:11). Hence, one of the NDP 2030 goals is substantially reducing

unemployment from 25% to 6%, with 90% of employment created by small and expanding enterprises (SA Government, 2012:115). By the first quarter of 2020, the "official unemployment rate" had risen to 29.1% (StatsSA, 2020), and COVID-19 was a substantial contributor. However, SA must still reach its NDP 2030 employment and economic growth goals.

According to Ayandibu and Houghton (2017:133), the formation and growth of innovative enterprises are responsible for generating a high stake in overall new jobs, given their propensity to require higher labour-intensive manufacturing processes compared to larger businesses. Evidently, for the opening quarter of 2019, the SMME segment provided jobs for an estimated 10.8 million individuals, which translates to 66% of total jobs created (16.5 million), including the owners themselves, which accounted for 2.55 million (The Department of Small Business Development, 2020b:21). This contribution to improving employment trends and the reduction of inequality is hampered by limited growth, which is essential given that 58% of SMME workers come from medium-sized businesses that employ between 10 and 49 employees (Bhorat *et al*., 2018:6); hence, the promotion and support of the SMME economy is accepted as a strategic vehicle for job creation in a slow growth phase of new employment prospects in large formal companies (Masutha & Rogerson, 2014:142; SA Government, 2012:116).

2.4.3 Low levels of entrepreneurial activity

Aspiring and confident entrepreneurs are desirable as the country's DSBD has also acknowledged the low levels of early entrepreneurial activity as a threat to SMME advancement (The Department of Small Business Development, 2020:23). The province of KwaZulu-Natal recorded a decline in the number of SMMEs for the period 2021Q3 to 2022Q3 (Small Enterprise Development Agency, 2024) Therefore, entrepreneurial support is still critical to encourage self-employment, escalate the number of new start-up enterprises and facilitate small business growth (Malebana, 2017:76). The effectiveness of entrepreneurship support is in

its ability to expose and nurture these qualities in an entrepreneur. Promoting the proportion of start-up businesses is as important as ensuring growth, as this has a direct link to increasing the enterprises' contribution towards GDP and job creation (Brownhilde & van Aardt, 2013:3048; Smorfitt, 2008:41). Even within the SMME sector, micro and very small businesses require particular attention as vehicles to reduce the rate of unemployment while contributing positively to the economy of this country, and the DSBD has a prominent role to play in this regard (Botha *et al.*: 2021:167).

2.4.4 Limited growth

The intention of the SA government to create an inclusive and growing economy fueled by the SMME sector is evident in one of SEDA's impact statements, which states that the agency seeks to achieve “accelerated inclusive economic growth and more decent jobs created and sustained” (Small Enterprise Development Agency, 2020:12)According to Bruwer (2020: 150), sustainability denotes the projected long-term existence of an enterprise through appropriately executed economic, social, and/or environmental commitments that correspondingly yield the targeted economic, social, and/or environmental objectives.

SMMES must grow as research has revealed that both business survival and growth increase with the size of the enterprise, while business growth is inclined to decrease as the business ages (Lekhanya, 2016:108). Hence, firms need to grow and stabilise if they are to survive. The three key success factors are encapsulated in the outcomes for the former SEDA, an agency mandated by the government to nurture SMMEs. These are increases in income, the workforce and the reduction of the failure rates (Small Enterprise Development Agency, 2020:12). Growth, as one of the desirable outcomes for small businesses in South Africa, is essential given that this segment is targeted for employment creation. Moreover, research justifies that their contribution to jobs needs improvement, given the lack of growth in these enterprises (Brownhilde & van Aardt, 2013:3048).

Furthermore, SMME growth is not only key to their contribution to employment but is also generally associated with an increase in turnover. Turnover is critical for building wealth in the economy, while employment is vital in addressing inequality and ensuring social stability in the country. Hence, those entering the entrepreneurship space must not only be successful but capable of growth given that as their revenues increase, they will increase the number of employees and likely increase wages, thus addressing the inequality gap (Anwana & Anwana, 2020:1; Bhorat *et al*. 2018:2).

Government support remains essential for the growth and evolution of SMMEs (Botha *et al.,* 2021: 153). However, the numerous interventions introduced by the SA government are often tailored for larger businesses and not ideal for other entities. One of the strengths noted by the DBSD 2020/21 APP Revised (The Department of Small Business Development, 2020a:2) is a sound governance framework through the department's agencies. These incorporate comprehensive government policies to advance entrepreneurship and business development, including cooperatives and informal businesses. However, the same report also raised concerns regarding these policies' inconsistencies and varied implementation.

2.4.5 Low levels of literacy, education and technical skills

Entrepreneurship education and training are critical determinants of enterprise survival and growth as they inculcate the philosophy of self-reliance, thus enabling entrepreneurs to create a cultural and industrious environment and fostering innovative attitudes and cultures for achieving potential challenges (Lekhanya, 2016:109). Education remains a critical factor for a prosperous SMME sector, as Booyens (2011:67) established that higher educational levels characterise small enterprises in highly developed economies. Ngcobo & Sukdeo (2015:508) maintained that entrepreneurs should be appropriately qualified and updated on

developments in areas relevant to their businesses to navigate the challenging SMME landscape.

Limited access to quality education is one of the disabling challenges facing SA SMMEs (Kanayo & Duncan, 2019:804). They are generally characterised by low levels of skills and experience profiles suitable for business growth and development, with SMMEs having fewer years of education than owners of large corporations(Bhorat *et al*., 2018:7). The DSBD has also noted that SMMEs are generally characterised by low literacy and technical skill levels (The Department of Small Business Development, 2020:23).

The SMMEs' challenge of limited skills and knowledge is also evident and reinforces poor management skills and inability to develop and sustain good relations with customers, thus highlighting the importance of education and training (Bvuma & Marnewick, 2020:5). This is one of the chronic challenges confronting the SMME sector as it was also noted earlier by Mogale (2007:352) that most micro-entrepreneurs are inflicted by limited business experience or exposure coupled with inadequate skills, which then restricts their choices in products and services, resulting in overtrading in one sector and poor profit margins. The skills and education gap becomes evident in such a space, which requires the identification of the leader or manager. However, business acumen and managerial skills are also reported to need improvement in the SMME sector (Bvuma & Marnewick, 2020:5). Therefore, entrepreneurial support should be designed to encompass all an entrepreneur's desirable abilities and competencies. Skills development for small business owners and their employees might be vital in facilitating growth in this sector. Research has proven that entrepreneurs who invest in entrepreneurial education while managing their businesses produce higher levels of entrepreneurial effectiveness (Hewitt & van Rensburg, 2020:8)

However, government interventions for skills development that require employers to pay a tax levy of 1% of their payroll, which can be claimed against implemented

skill development programmes, is also not benefitting SMMEs given the cumbersome processes associated with claims (Nieuwenhuizen, 2019:671). Over 70% of SMME employees operate in low-to-medium-skill jobs, and most perform rudimentary roles (low-skill). Only 18% operate in high-skill-intensive environments, notably those of professionals and technical and associate professionals (Bhorat *et al*., 2018: 6-7).

Education is also a key to accessing and/or understanding the role of R&D. It is important to inventive entrepreneurs and small businesses with high-tech and high-growth potential, as it encourages novel product development at the initial growing stages of such firms (Booyens, 2011;69). The competent workforce is one of the key determinants of the innovative capacity of the business; hence, a larger portion of human resources consisting of scientists and engineers is necessary to enhance the innovativeness and competitiveness of an enterprise (Booyens, 2011:69). Owners of small enterprises have reported lower levels of education in comparison to persons having larger businesses, and this is important given that education and training are critical to developing essential skills for successfully starting and growing a business (Bhorat *et al.,* 2018:24).

Ngcobo and Sukdeo (2015:508) revealed that 2.8% of the eThekwini SMMEs who were participants in the study did not possess a matric (Grade 12) qualification, 18.7% had completed matric, an overwhelming 78.5% had a post-secondary school education in which 16.8% had a post-matric certificate, 27.1% had a diploma, 22.4% had a degree, 7.5% had an honours degree and 4.7% had a master's degree. While it does not represent the entire province, it indicates entrepreneurs who can understand and assimilate high technology in their business enterprises. The findings from the study conducted by (Okeke-uzodike & Blose, 2018:66) at the Msunduzi Municipality (KZN) revealed that 3.4% were either without formal education or had exited after primary school; 37.1% had completed secondary education; 32.6% possessed Certificates or Diplomas, while 10.1% had undergraduate degrees and 13.5% had postgraduate qualifications.

There is a clear indication of high literacy levels in urban vs. rural municipalities. This scenario confirms the perception that SMMEs in rural areas are operating with an additional challenge of lower levels of education. The two studies demonstrate that the poor quality of the education system, low throughput rates, and the shortage of opportunities to gain employment experience have adverse effects on entrepreneurial skills. For these reasons, the Organisation for Economic Co-operation and Development (OECD) calls for measures to enhance the quality of education to realise an increase in human capital growth and reduce the extreme levels of inequality (The Organisation for Economic Co-operation and Development (OECD), 2021:3).

Therefore, the support requirements of SMMEs will vary in line with the availability of low—and high-skilled SMMEs, thus proving that South African SMMEs are heterogeneous. Enterprise owners confront different challenges to growth and development, with further complexities subject to the specific kind of business (Bhorat *et al*., 2018:11). Skills and technical comprehension are critical as the TBIs are the support system for SMMEs.

Lack of technological skills, the absence of infrastructure, inadequate finance and/or access to credit are amongst the factors that hamper the SMMEs' ability to adopt technology (Bvuma & Marnewick, 2020:5). SMME development is further constrained by skills shortages, which are exacerbated by the incongruity between skills, supplied through the higher education system and those required by industry (Booyens, 2011:71). The education profile of business owners reveals that on average, owners of large companies possess post-secondary school education, while majority of those of small businesses have not graduated at secondary schools (Bhorat *et al.,* 2018:11). Furthermore, the SA NDP 2030 also recognizes nation is skills shortages that renders it incapable of competing with advanced manufacturing states like Germany, and therefore can only contest in the manufacturing and service areas requiring minimum skills, and markets that do not

involve large economies of scale (SA Government, 2012:115). This scenario is indicative of the need for technical knowledge for SA SMMEs. These technical abilities are functional competencies indicative of knowledge and capability in a specific activity or discipline, particularly where critical strategies, systems, methods, or procedures are (Moise *et al.*, 2019:275). This scenario increases the pay for skilled labour, enlarging the salary gap between the skilled and the unskilled people, further exacerbating the inequality levels. According to Mapila, Chiliya and Chiliya (2014:119), frequent technological changes hamper the success of SMMEs, who need access to highly skilled labour that can make the necessary adjustments. Countries that can get out of the middle-income trap invest in human capital, product development, and technology (SA Government, 2012:111), hence the importance of education, skills, technology, and innovation as tools for economic growth.

2.4.6 Lack of competitiveness

Competition has also been cited as the second major growth constraint for SMMEs, followed by infrastructure (Bhorat *et al*., 2018:59). Increasing the competitiveness of enterprises has the advantage of driving the economy into a highly efficient and productive arena (Ayandibu & Houghton, 2017:135). For small businesses, innovation has long been considered the key that promotes competitiveness and improves the potential to engage in global trade, resulting in enhanced growth prospects (Booyens, 2011:68). Competitive advantage requires adopting one of the three approaches: cost leadership, niche markets and differentiation. However, SMMEs are less likely to be competitive through cost; hence, they generally consider either differentiation or niche markets (Smorfitt, 2008:36). SMMEs are also losing local customers as the general population has access to means to travel to shopping malls to satisfy their desires for greater variety from large shops, which SMMEs, with limited resources, cannot afford (Mapila *et al.*, 2014:119).

Lowering the cost of conducting business is one of the critical interventions necessary from the government to ensure a booming SMME sector (SA Government, 2012:116). The inability of SMMEs to be competitive emanates from the high costs associated with product and service variations and limited marketing skills (Bvuma & Marnewick, 2020:5). The lack of collateral and unstable cash flows are added burdens for individual entrepreneurs and start-up firms, thereby limiting their ability to innovate (Booyens, 2011:69). To ensure that SMMEs have access to technology is one of the essential requirements towards strengthening their competitiveness according to the 2020/21 APP Revised of the DSBD (The Department of Small Business Development, 2020:23). SMMEs are, therefore, crucial in promoting innovation and enhancing the province's competitiveness.

2.4.7 Financial constraints

Emerging South African entrepreneurs have inadequate funding alternatives as there are limitations on angel investors, crowdsourcing opportunities, and venture capital, resulting in financial constraints for small business growth and sustainability (Swartz et al., 2020:2). The area of access to finance is among the long-standing challenges to SMME development in SA. Venture capital is vital to the next stage of business development and government support in establishing new venture funds for SMMEs (Department: Trade and Industry, Republic of South Africa, 2005:17). The lack of access to adequate finance has been labelled as one of the barriers to productivity and technological innovation, particularly seed and initial-stage funding (Naidoo, 2009:237). SMMEs are generally less resourced (physical, human, and financial) and face several challenges, resulting in a high failure rate of start-ups irrespective of the sector (Mapila *et al.*, 2014:119). However, there is a view that SMME's inability to access finance is not due to a lack of financial capital by funding institutions but rather the lack of knowledge, ability, and entrepreneurship skills to warrant that loans made to these firms will be sound financial investment and guarantee good returns (Lekhanya, 2016:109).

Through the former DTI and now the DSBD, the SA government has been providing an extensive range of service offerings, including loans and incentives through grants, which provide conduits for small businesses to access (Department: Trade and Industry. Republic of South Africa, 2005:8). The DSBD aso reported, through its 2020/21 APP Revised, that financial support that targets SMME development exists throughout the different levels of government (The Department of Small Business Development, 2020:22). However, there is still limited uptake of such services which can be attributed to lack of awareness of funding opportunities and coupled with inadequate financial knowledge(Small Enterprise Development Agency, 2024:41). SMMEs continue to face financial constraints to growth and survival. This scenario was also confirmed by a study conducted on SMMEs accessing finance in Pietermaritzburg and Maseru, which confirmed that despite interventions that seek to assist SMMEs with funding, they are still experiencing challenges in accessing finance (Khoase & Ndayizigamiye, 2018:68).

Accessing credit remains a constraint for both SMMEs and larger firms. It is, however, a more significant challenge for entry and possible growth of SMMEs as they are generally regarded as posing a more significant threat than larger enterprises (Botha *et al*., 2021: 167; Bhorat *et al*., 2018:5). Furthermore, the limited financial resources amongst SMMEs is also partially attributed to exorbitant interest rates and the failure to raise the necessary securities to access finance from institutions (Khoase & Ndayizigamiye, 2018:68). Insufficient financial resources also limit SMMEs' ability to employ the required number of employees. Other matters of financial challenges are attributed to the capabilities of the small business owners themselves; hence, there is a view that owners of SMMEs should enhance their business management capabilities to guard against the possibility of mismanagement of funds obtained through the diverse programmes that provide support to small businesses (Khoase & Ndayizigamiye, 2018:68).

The lack of resources to finance infrastructure that is key in supporting businesses, in particular transport networks, communication systems, utilities and land, hampers the promotion and sustenance of the emergence, growth, and success of SMMEs (Bhorat *et al*., 2018:34). As a result, the lack or inadequate infrastructure is listed among significant SMME challenges in South Africa (Ayandibu & Houghton, 2017:136). Given the resource-constrained environment of SMMEs, support will also assist in sustaining the employment creation ability of these enterprises (Bhorat *et al*., 2018:2). Supporting small businesses should also involve establishing business links that will subsidise the cost of training and development, including any business costs that will improve the performance of the small business (Ayandibu & Houghton, 2017:136).

2.4.8 Access to markets

SMMEs are further challenged by access to markets coupled with poor marketing skills and limited financial resources to acquire such expertise (Bvuma & Marnewick, 2020:5). They are also vulnerable when collaborating with well-resourced large firms since such relationships are typically asymmetric (Booyens, 2011:71). According to the 2020/21 Annual Performance Plan Revised of the DSBD, leveraging the public sector procurement's sizeable purse is another opportunity for development and support of SMMEs especially township and rural enterprises (The Department of Small Business Development, 2020). Such initiatives will also strengthen enterprise supplier development networks, channels and processes.

2.4.9 Navigating the legal and entrepreneurship support environment

There is an added burden on small business owners or managers to perform all functions, including issues of compliance when large enterprises employ a variety of people to undertake similar responsibilities (Bhorat *et al.,* 2018: 41). Business licensing and administrative procedures continue to be a challenge for SMMEs in SA; hence, there is an urgent need to reduce the red tape and remove barriers to entrepreneurship (The Organisation for Economic Co-operation and Development (OECD), 2021:2). SMME owners believe that the bureaucratic process from both the government and large private sector, coupled with ensuring conformity to laws and regulations, including issues concerning the Department of Labour and the SARS, as being the main obstacles to establishing a small enterprise (Botha *et al*., 2021:167). This reality persists even though the DSBD was established with a mandate to improve the legal and regulatory environment for SMMEs specifically; other aspects being entry to diverse markets and access to funding, addressing the national skills shortages and improving the availability of information and ensuring active participation of all institutions that promote small business growth (Botha *et al*., 2021:167). In its 2020/21 APP Revised, this Department also noted areas for improvement in the system, mainly relating to inconsistent and varied implementation (The Department of Small Business Development, 2020:22).

Furthermore, it has been postulated that the burden of compliance, which encompasses government procedures and processes and the associated time and cost requirements, is among the deterrents preventing SMMEs from rising above the informal sector (Bhorat *et al.*, 2018: 41). The regulatory burden facing the SMMEs was identified as early as in the 1995 White Paper where it is described as:

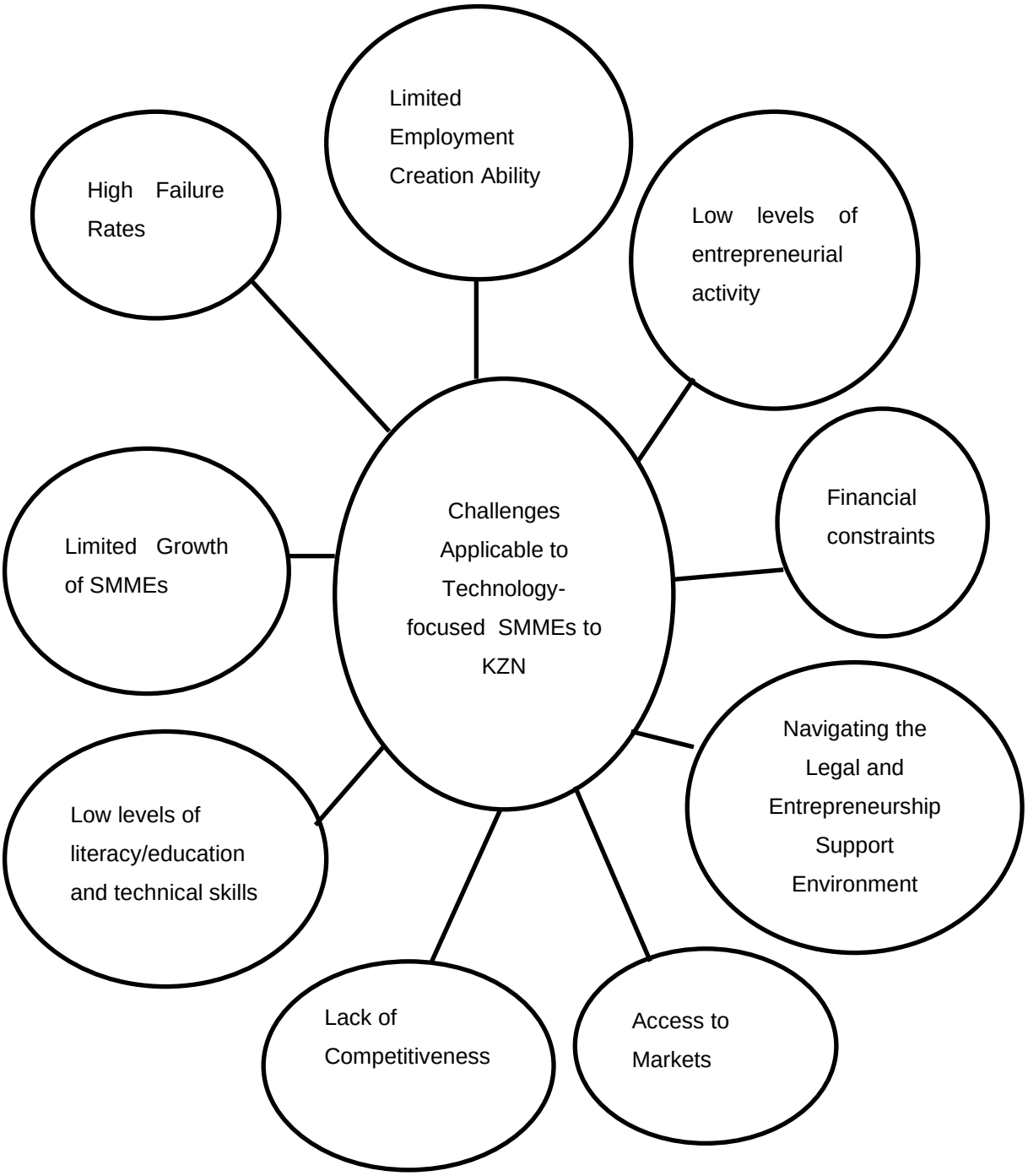
> "*inappropriate or unduly restrictive legislative and regulatory conditions are often viewed as critical constraints on the access of small enterprises into the business sector and as obstacles to their growth." (The Department of Trade and Industry, 1995:23).*

Even though larger companies face similar environments and challenges, access to resources leaves them at an advantage compared to the less-resourced SMMEs (Nieuwenhuizen, 2019:667). The resource constraints in the SMME sector have been discussed. This scenario of a regulatory environment that inhibits the growth of SMMEs calls for the review of the policies affecting small businesses (Botha *et al.*, 2021:154). To avoid the burden of legislation, SMMEs tend to remain informal as a way of reducing the costs of operating and in favour of increasing personal wealth and survival, a scenario which robs the government of tax base and economic growth (Nieuwenhuizen, 2019:672). Reducing the burden of compliance is, therefore, beneficial to both the SMME sector and the government. Therefore, entrepreneurs need support to navigate the precarious economic, political, and legal environment in the KwaZulu-Natal province.

Incubators, including those focused on technology-based enterprises funded by the government, promise to aid and support SMMEs as these are considered vehicles to address these challenges. Given their limited resources, SMMEs need assistance meeting the demand for greater variety. Hence, the government funds several small business incubators to ease the financial burden on small businesses.

Figure 2.2 presents a diagrammatic summary of the challenges facing SMMEs. It should also be noted that these challenges are not specific to only technology-focused SMMEs.

Figure 2. 2 Summary of challenges applicable to technology-focused SMMEs in KwaZulu-Natal



Source: Researcher's creation

2.5 PROFILING TECHNOLOGY-BASED/ENABLED/FOCUSED SMMES IN KWAZULU-NATAL PROVINCE

The SA entrepreneurship landscape is weak when compared to other emerging economies, a scenario exacerbated by the slow economic growth and the COVID-19 pandemic (The Organisation for Economic Co-operation and Development (OECD), 2021:2). The astronomical failure rates of SA SMMEs are also associated with inadequate access to technologies and equipment (Nkoana & Mashamaite, 2024:124) Therefore, the provincial government must promote the technology-focused SMME, which is premised on the sustainable support of TBIs to ensure a healthy ecosystem. The TBIs are usually founded as public-private partnerships between universities, industry, and government and are aimed at encouraging technology transfer and diffusion, subsequently advancing the course of local innovative businesses (Mian, Lamine, Fayolle, 2016:1). Matching the needs and profiles of SMMEs with the services provided by these support programmes is critical in ensuring maximum benefit for SMMEs and effective resource utilisation. Chapter 4 of this study will extensively discuss the concept of technology business incubation and the support provided to small businesses.

2.5.1 Support/Interventions for technology-based/focused SMMEs

SMMEs provide a substratum for innovations and are pivotal in responding to the nation's aspirations of improving economic growth through technology and innovation (Booyens, 2011:67). Innovative and technology-based new businesses have the potential of becoming gazelles; however, encouragement and reinforcement are essential to ensure that there are adequate numbers (Ayandibu & Houghton, 2017:133). The 2019 White Paper on Science, Technology and Innovation seeks to increase investment in technology-based SMMEs to support grassroots and social innovation projects and create a more empowering environment that sustains innovation (Technology Innovation Agency, 2021:6).

This moves the agenda from the survivalist to sustained space to stimulate innovation.

Entrepreneurial support is capable of fostering entrepreneurship development by inspiring entrepreneurial intention and positive feelings regarding a career in entrepreneurship, thus enhancing a person's confidence in his/her capability to engage in a business (Malebana, 2017:76). The promulgation of the 1996 National Small Business Act, support organisations such as the SEDA (to provide finance, training, franchise opportunities), the National Empowerment Fund (NEF) (funding targeting black-owned SMMEs), Khula Finance Limited (funding) and the Industrial Development Corporation (IDC) (funding) were established (Bruwer, 2020:168); however, even though the SA government has promoted and supported the SMME sector over the last two decades, evidence indicates that more extraordinary efforts are still required to yield ideal impacts (Botha *et al.,* 2021:). Mentorship and incubation programmes are critical opportunities for supporting SMMEs at provincial and local levels, as the DSBS (2020:23) identified in its 2020/21 Revised Annual Performance Plan.

2.6 TECHNOLOGY BUSINESS INCUBATION IN THE PROVINCE OF KWAZULU-NATAL

The importance of developing thriving and flourishing technology-focused SMMEs is evident in the new indicators for the SEDA, which intends to monitor and ensure the improvements in the number of technology start-up businesses and the upsurge in the number of SMMEs receiving technology transfer and technical assistance (Small Enterprise Development Agency, 2020:15). The same aspirations will apply to the province of KwaZulu-Natal. The incubator services and support systems contribute towards alleviating the financial constraints of the SMMEs by providing reasonably priced office areas, tailored support services and an environment of peer-learning and support amongst the incubatees, and creating beneficial networks (Ayatse, Kwahar & Iyortsuun, 2017:3). At the core of TBI

service offerings is the intention to assist start-up businesses to survive, scale up, and flourish (Mian *et al*., 2016:2). The need for technology and business support for SMME development is highlighted in two (2) of the four (4) strategic interventions of the SEDA, which state that the need to "improve access to business development support through ecosystem facilitation" and "increase the provision of sector-specific technical support to SMMEs" (Small Enterprise Development Agency, 2020:12).

These combined strategic interventions support the notion that SMMEs need both technological (technical specific) and business support to thrive, which is the basis of technology business incubation (TBI). It is also supported by the reports stating that technology alone is not capable of generating business prosperity and enterprise growth (Okeke-uzodike & Blose, 2018:99). Gazelles and high-expectation ground-breaking small businesses frequently arise from novel businesses focused on innovation and technology-intense processes. However, these sought-after enterprises can only be effective if their numbers are high (Ayandibu & Houghton, 2017:133). Based on these concerns, the need for technology-focused support anchored on sound business management practices is essential for nurturing a strong, high-growth, and sustainable SMME sector.

Innovative and technology-based small businesses tend to generate gazelles and high-expectation entrepreneurial enterprises; however, a substantial supply of these is essential for meaningful contributions to economic growth (Ayandibu & Houghton, 2017:133). TBI is about encouraging general entrepreneurial activities in a manner that does not solely guarantee enhanced entrepreneurship but should tie to an increase in the number of innovative high-growth firms. A focused approach considering all angles of the business is critical for the survival of technology-focused SMMEs. Research has shown that SMMEs usually find themselves in situations where decisions are reached arbitrarily rather than founded on concrete business information (Ayandibu & Houghton, 2017:134). TBI is, therefore, key to addressing the developmental needs of SMMEs.

2.7 SUMMARY

Chapter 2 examined the landscape of technology-focused small businesses in KwaZulu-Natal. It commenced with the definitional challenges associated with SMMEs, which have resulted in countries and regions adopting varying classifications and designations for the small business sector. Some classifications are based on the industry sector (Bvuma & Marnewick, 2020:3). Variations in definitions within the same country are also possible, as evident in the case of South Africa, where the Ministry of Small Business Development, as it applies to the country and the Province of KwaZulu-Natal development (The Department of Small Business Development, 2020:23). The SARS adopted a definition based on amnesty and capital tax gains (Ayandibu & Houghton, 2017:34). This study's operational definition of SMMEs spans the entire spectrum of entrepreneurs, from survivalists who engage in business to survive poverty to medium-sized entities with multiple employees. The researcher believes that this definition truly reflects SMMEs in the province of KwaZulu-Natal, given the high unemployment rates, poverty, and slow economic growth.

The economic profile of KZN, as discussed in this chapter, indicates its potential to contribute positively to the development of high-tech or tech-enabled enterprises. The SEZs provide fertile ground for nurturing high-tech or tech-enabled SMMEs, and the ports of Richards Bay and Durban provide a gateway for SMME products/services to the rest of the continent and the world. However, the SEZs in Southern Africa have not delivered the expected impacts of economic growth and employment creation (Karambakuwa, Matekenya, Mishi, Jeke & Ncwadi, 2020:23). Hence, the contribution of these institutions to the development and promotion of high-tech SMMEs in KwaZulu-Natal needs to be confirmed.

This chapter also considered some of the challenges confronting the SMMEs, incorporating the harsh business environment, personnel with inadequate skills, arduous laws, punitive economic environments, inadequate access to finances, and the exorbitant costs of engaging employees. As discussed in this chapter,

these challenges lead to the astronomical failure rates of SMMEs The high failure rates of SMMEs have a crippling effect on their survival and sustainability and are therefore considered crucial among the main obstacles to a prosperous KwaZulu-Natal economy. Understanding the challenges that face SMMEs is essential in guiding policymakers and those responsible for formulating and implementing government interventions.

This chapter also considered the importance of technologically appropriate skills and education for the development and promotion of technology-focused small businesses. The study revealed that KZN SMMEs reflect a poor skills profile of entrepreneurs and the available local human resources, which is regarded as an impediment to growth, based on the fact that skills, experience and education are vital necessities for the evolution and developing a pipeline of incubatees for the TBIs.

This chapter also demonstrated that the expected benefit of employment creation by SMMEs is limited to self-employment as high failure rates and stunted growth thwarts the prospects of employing others. SMMEs in rural KZN face the added challenge of lower literacy levels than their urban counterparts. Thus, skills development efforts targeting entrepreneurs and their workforce present an empowering factor for growth and expansion in the SMME sector. This realisation is considered critical in supporting the training services provided by the incubators, including the TBIs.

Excessive red tape concerning requirements of labour regulations, human and industrial relations, tax and tax-related issues, conformity with legal requirements, municipal bylaws and inadequate provision for new businesses are amongst the fatal hindrances experienced by SMMEs. The Ministry of Small Business Development also acknowledges some of these; hence, it is imperative for the provincial government to constantly revisit its policies and interventions and make the necessary adjustments.

SMME support remains vital for the SMME sector marred by internal and external challenges, resulting in high failure rates and a lack of meaningful growth. This reality also calls for varying SMME support, from functional interventions that provide generic programmes to selective and targeted interventions. TBI is a selective intervention given the vital focus on technology, which becomes a constraint due to either lack of resources or entrepreneurial competencies relating to education and skills. This combination of technology-based enterprising and innovation results in innovative entrepreneurship, breeding novel businesses founded on innovative concepts.

CHAPTER 3: GOVERNMENT INTERVENTIONS SUPPORTING THE TECHNOLOGY BUSINESS INCUBATION OF SMALL BUSINESSES IN KWAZULU-NATAL

3.1 INTRODUCTION

This chapter focuses on government interventions that guide, support and influence technology business incubation of small businesses in the province of KwaZulu-Natal. These will include the relevant national policies and programmes that target promoting and regulating using and developing technology and innovation among small businesses. This chapter also explored the concept of technology business incubation as a possible strategic tool utilised by the government to address consistent economic development, sustained employment creation, increased GDP, and minimising the inequality gap. It revealed some of the government entities and interventions that were developed as critical elements of a vibrant technology, innovation, and entrepreneurship ecosystem and their effect on incubators that support technology-focused small businesses in KwaZulu-Natal. Given the government structure adopted by South Africa, the policies and programmes that affect technology business incubators in KwaZulu-Natal are developed and implemented at the national level, with the provinces operating through provincial economic development departments.

3.2 BACKGROUND

Researchers and policymakers have long recognised entrepreneurship and small business promotion as key drivers of sustained and enhanced economic development and growth in both developing and developed countries (Meyer, 2015:6). The SA government is no exception, as evident from the promulgation of the Integrated Strategy on the Promotion of Entrepreneurship and Small Enterprises (Department: Trade and Industry. Republic of South Africa, 2005:3). Thus committing to developing and implementing interventions that will benefit

micro- and informal businesses, entities owned by black people, women and youth, and growth-orientated enterprises. These post-apartheid interventions were essential not only to boost economic growth but also to address apartheid-era legislation, which enforced spatial segregation, thus forcing many black South Africans into informal dwellings outside of the city centres and physically detached from labour market opportunities (Bhorat *et al.*, 2018:17). However, the government's efforts were not yielding the expected results, as the NDP 2030 acknowledges that South Africa is in a low-growth, middle-income trap (SA Government, 2012:110) and that it has a comparatively low start-up rate, which is comprised of a high proportion of survivalist enterprises (SA Government, 2012:141). Therefore, Bvuma and Marnewick (2020:3) argued that the acute challenges preventing SMMEs from effectively participating in the economy are still prevalent despite the government's political will and interventions.

Therefore, the South African Government's challenge was twofold: first, to create a more enabling environment for SMMEs to flourish and increase their operations and jobs, and second, to create the conditions for new enterprises to attract more entrepreneurs to the market (SA Government, 2012:141).

3.3 GOVERNMENT PERSPECTIVE ON SMALL BUSINESS INCUBATORS

Technology business incubators are among the institutional support available to SMMEs for financial and non-financial assistance provided by the government and related organisations, educational institutions, business associations, and professionals (Moise *et al.*, 2019:275). The concept of adopting business incubation as a critical component of entrepreneurial infrastructure and a tool for nurturing innovative enterprises capable of contributing to economic development and job creation has long been recognised by various governments (Al-Mubarak, Busler, Al-Ajmer & Aruna, 2013:896). The Integrated Strategy for the Promotion of Entrepreneurship and Small Businesses proposed exploiting business incubators to develop start-ups, focusing on the targeted groups, essential sectors, and the

embattled geographic areas (Department: Trade and Industry, Republic of South Africa, 2005:31). TBI programmes provide streamlined business and technological assistance to fast track the growth of novel start-up enterprises into organisations that financially and operationally independent (Masutha & Rogerson, 2014:141). The economic effects of incubators accrue on their ability to grow an entrepreneur's idea into a successful graduate business capable of contributing positively to the economy by increasing job opportunities and diversification of the economy, as these have a positive overall impact on the country's economy (Sanyal & Hisamic, 2018:12; Al-Mubarak *et al*. 2013:896). Therefore, the question of whether these centres and units adequately deliver on generating SMMEs that address these national challenges arises. Knowledge gaps have been identified in developing an ideal model for effective and successful incubators and their effectiveness in supporting SMMEs.

3.4 MIGRATION TO TECHNOLOGY AND INNOVATION-BASED ECONOMY

South Africa's economy has been traditionally developed through mining and the exploitation of non-renewable resources, thus requiring new technologies to complement the depleted resources to sustain economic growth (Technology Innovation Agency, 2021:33). The NDP 2030 also recognises that developments in science, technology and innovation profoundly change how individuals live, converse, and do transactions (Technology Innovation Agency, 2021:6). Governments of developing countries, confronted with increasing labour costs and a slackening economy must facilitate the evolution from a low-input manufacturing-informed economy to advanced technology and innovation-charged economy (Sun, Zhang, Cao, Dong, & Cantwell., 2019:105).

Technology and innovation are viewed as enablers for high growth; however, the analysis of merchandise exports demonstrates that SA is relatively competitive in the medium-technology sectors but has a comparatively low share in high and low-technology sectors (Department of Science and Technology, 2017:45).

Furthermore, one of the job drivers propagated by the New Growth Plan (NGP) is capturing the prospects of emerging economies from technological innovations through sound programmes, institutions, and systems to transfer novel technologies to SMMEs (The Government of South Africa, 2011:24). Innovation is the formation of new or modification of current products, services, processes, and organisational methods informed by new knowledge (Booyens, 2011:68; Van Zyl, 2011:38). Furthermore, according to the Technology Innovation Act (Act 26 of 2008), technological innovation refers to "the application in practice of creative new ideas, which includes inventions, discoveries and the processes by which new products and services enter the market and the creation of new businesses" (The Government of South Africa, 2008) Technology and innovation are, therefore, catalysts for change in the development and prosperity of the country (SA Government, 2012:115).

3.5 CONTEXTUALIZING GOVERNMENTAL INTERVENTIONS

This section will discuss the instruments the South African Government has designed to create an enabling environment for SMMEs. This focus is on the policies and macroeconomic strategies the Government is developing and supporting SMMEs. Suitable political, economic, social, and legal conditions define a conducive entrepreneurial environment. It also looks at the policies and strategies that seek to address the apartheid legacy, which was characterised by policies designed to exclude Blacks from participating in the mainstream economy as well as in the small business sector, as reinforced by the segregation of areas based on race, is an added burden for the SA government (Bvuma Marnewick, 2020:3). The policymakers, therefore, have the responsibility to strategise on the assortment of policies and support programmes that will encourage economic growth and entrepreneurial activity (Malebana, 2017:74)Public policy should support enterprise development by reducing barriers to entry, eliminating regulatory red tape, and ensuring a conducive entrepreneurial environment for SMME development (SA Government, 2012:115). This section commences by

elaborating on the policy environment affecting KwaZulu-Natal's technology-focused small businesses.

3.5.1 Policy environment

There is a history of South Africa's SMME policies, which is a dichotomy of expected outcomes of alleviating poverty while increasing national economic growth through employment generation and income distribution (Booyens, 2011:70. Therefore, the reconfiguration of the SA policy landscape that allows for the separation of the objectives that target achieving growth from those geared towards development is essential. For any policy to be effective, it must be a policy of the entire government and not limited to one or a few departments to ensure consistency and programme alignment. Government programmes and plans seem to face failure because of the lack of policy coordination, programme alignment and integrated support across government departments (The DTIC, 2017:55). This lack of integration and alignment at both the policy and government levels negatively impacts the desired outcomes and effective utilisation of resources.

Silicon Valley's success has inspired many governments to introduce policies guiding university-industry collaborations and promoting regional and national innovation ecosystems (Sun *et al.,* 2019:104). Reliance on technology and innovation can adequately leverage the entire manufacturing value chain in the Digital Industrial Revolution (Cannavacciuolo, Ferraro, Primario, & Quinto, 2023:1).Hence, innovation policy should enable all segments of society to have fair accessibility to knowledge infrastructure and free participation in realising and actualising innovation prospects while ensuring that all persons enjoy the benefits of innovation (Department of Science and Technology, 2019b: 38). However, incoherencies at a policy level impede the ability to maximise new growth opportunities. One key aspect was that achieving a dynamic market segment that will be agile, efficient, dynamic, and self-correcting requires supporting policies and institutions that assist firms in discovering new lines of competitive advantage (SA

Government, 2012: 131). The current societies are knowledge-driven, hence the need to maintain a rich, vibrant innovation ecosystem critical for economic development (Sun, Zhang, Cao, Dong, & Cantwell, 2019: 104). Through legislation, the Government has ensured the use of publicly funded IP to support grassroots innovation and increase benefits to the public (Department of Science and Technology, 2019b: 38).

The following discussion identified the policy landmarks that have shaped the current status of technology-focused SMMEs in KwaZulu-Natal.

3.5.1.1 1970/80

The acknowledgement of SMMEs as potential enablers for employment creation and economic growth only came into effect in SA around the 1970s/80s, resulting in the formation of the Institution of Small Business Development Corporation (SBDC) in the early 1980s (Bvuma & Marnewick; 2020:3). However, the promotion and development of SMMEs took centre stage as a developmental tool in South Africa since 1994 as government considered strategies to address the imbalances of the past. (Masutha & Rogerson, 2014:142).

3.5.1.2 1995

A breakthrough in the SA economic policy development landscape was the publication of the 1995 White Paper on National Strategy for the Development and Promotion of Small Business in South Africa, as it communicated new guidelines for assisting SMMEs by the then DTI (Bvuma &Marnewick, 2020:3; Masutha & Rogerson, 2014:142; Department: Trade and Industry. Republic of South Africa, 2005:3). The White Paper articulated the Government's justification for SMME promotion as being necessitated by job creation, sustainable and equitable growth, SMMEs entering new markets and overall expansion of economies in inspired and innovative ways, Government providing an enabling environment resulting in

diversification in the economy, elevated productivity levels, investment stimulation and a flourishing entrepreneurship landscape (Department: Trade and Industry. Republic of South Africa, 2005:3).

The 1995 White Paper on National Strategy for the Development and Promotion of Small Business identified numerous constraints experienced by small enterprises, mainly in the areas of the legal and regulatory space, inaccessible markets, finance limitations and unaffordable business properties, sourcing of skills and management expertise, lack of routes to appropriate technology, the burden of tax compliance, and poor quality of the business infrastructure in deprived areas or poverty nodes (Department Trade and Industry. Republic of South Africa, 2005:3). However, overtime and despite government support programmes, these constraints are still prevalent in the sector. As reported by recent research studies, such issues as the legislation compliance burden, limited resources, crime and corruption, education and skills, competition, the unfavourable state of the economy, and the pace of changes in technology continue to hamper the success of SMMEs (Bhorat *et al*., 2018:58; Mapila *et al*., 2014:119). These intersecting factors are typical of developing countries, ranging from labour and marketplace regulations, discovering the correct markets for goods, locating sources of finance, educating and training entrepreneurs and a general lack of infrastructure for research and development (Sanyal & Hisam, 2018:10).

3.5.1.3 1996

National Small Business Act 102 of 1996

The National Small Business Act 102 of 1996 identified SMME development and the empowerment of entrepreneurs as critical avenues towards economic growth in SA (South Africa, 1996). This Act preceded numerous legislation and programmes of the SA Government that sought to ensure the realisation of this

entrepreneurship promotion endeavour. The SA government has revised this Act to provide for the establishment of a single agency that will ensure the provision of both financial and non-financial support to small businesses(Republic of South Africa, 2024:2).

The legislations that followed Act 102 of 1996 are discussed.

3.5.1.4 2005

Integrated Strategy on the Promotion of Entrepreneurship and Small Enterprises

The SA government recognised the need for coordination in the area of small business development and identified the former Department of Trade and Industry (the DTI) and its agencies as the focal point through the promulgated of the Integrated Strategy on the Promotion of Entrepreneurship and Small Enterprises (Department: Trade and Industry. Republic of South Africa, 2005:24). The key objective of this strategy was to safeguard the total undertaking of nurturing entrepreneurship and endorsing SMME, as pronounced in numerous government policies and strategies, and further ensure complete and efficient commissioning that will result in a superior level of performance and guarantee success overall policy and action areas (Department: Trade and Industry, Republic of South Africa, 2005:24). It rests on three (3) strategic pillars of increasing the supply of financial and non-financial support services to SMMEs, creating the demand for goods and services generated by the SMMEs, and the reduction of regulatory constraints for small enterprises (Department: Trade and Industry, Republic of South Africa, 2005:4).

According to the Integrated Strategy on the Promotion of Entrepreneurship and Small Enterprises, the Government has to focus on three (3) vital strategic areas, which are summarised in Table 3.1:

Table 3. 1: Key strategic areas and action plans

Key strategic area	Action Plan
Improve the supply of financial and non-financial assistance	Collective approaches to rationalising public sector resources and crowding out from private sector resources.
Establishing the demand for SMME offerings	through renewed policy mandates in the public sector buying strategy and B-BBEE codes of best practice to leverage demand.
Lessen SMME regulatory restrictions.	Create a conducive environment, determine a regulatory impact evaluation framework, and a business environment monitoring system.

Source: Researcher's Creation

Hence, integrating government efforts in developing and supporting entrepreneurship and small enterprises was emphasised. The government's "Think Synergy First" approach seeks to minimise duplication of services, products or delivery strategies and ensure that new programmes reinforce the existing ones by addressing gaps and enhancing effectiveness and efficiencies in the support mechanisms (Department: Trade and Industry. Republic of South Africa, 2005:25).

This integrated strategy for developing small businesses was followed by the Accelerated and Shared Growth Initiative South Africa (AsgiSA) (2006), which outlined the numerous focal points in the acceleration of small enterprise advancement and business growth that should be monitored and reinforced through appropriate policies, approaches, and programmes (Department: Trade and Industry, Republic of South Africa, 2005:16). It is one of the macro-economic strategies engaged by the Government to address the weakening economic activity leading to unemployment and poverty (Ranyane, 2015:301)This initiative promoted identifying products or services that small enterprises can provide to State-Owned Enterprises (SOEs) and government projects and easing their regulatory burden, with particular emphasis on reviewing labour laws and their tax

requirements (Department: Trade and Industry, Republic of South Africa, 2005:17).

3.5.1.5 2011

The New Growth Path 2011

This National Growth Path (NGP) identified the need for a technology policy that involves adaptation and diffusion of technologies in targeted sectors to support employment creation and growth given the need to strengthen current measures and institutions, thus ensuring positive impacts on rural development, small and micro enterprises, and cooperatives (Black & Gerwel, 2014:242;The Government of South Africa, 2011:54). The New Growth Path further emphasises the support for the SMME economy, which is championed by the Department of Trade, Industry and Competition (DTIC) under its mandate of economy and enterprise development (Masutha & Rogerson, 2014: 143). This New Growth Path is among the significant guiding economic strategy and policy documents. The NGP is a framework for mass-scale job creation by government through identifying areas where employment opportunities capable of producing substantial changes in national and global conditions exist and developing a policy package to facilitate such (The Government of South Africa, 2011:6). The NGP strategy also aims at developing an equitable economy and society (The Government of South Africa, 2011:6). The South African economy remained one of the most inequitable in the world accompanied by high levels of joblessness (The Government of South Africa, 2011:10). Enterprise development through promoting small business and entrepreneurship; eliminating unnecessary red-tape is one of the ten (10) programmes identified by the NGP that will support an inclusive economy, social equity and regional development (Hendriks, 2013:5;The Government of South Africa, 2011:48). Through the NGP, the Government acknowledges the need for formidable institutions to transfer new technologies to SMEs coupled with increased support for R&D and tertiary education that is inclined to growth potential

(The Government of South Africa, 2011:74). SMMEs are, therefore, critical for the implementation and realisation of key government policies like the black economic empowerment (BEE) initiatives by enticing blacks into the SMMEs sector where they can enjoy ownership of economic enterprises (Mapila, Chiliya & Chiliya, 2014:118).

3.5.1.6 2016

Black Industrialist Programme

The challenge of inclusive development, growth and sustainability of small businesses has received considerable attention from the SA government. This is evident from the series of interventions introduced to address these challenges simultaneously, such as the Black Industrialist Programme. The programme is an intervention of the government through which it sought to accelerate Black Economic Empowerment and the industrialisation of the whole country (Vilakazi & Moore, 2023:5). The DTIC defines the term Black industrialist as:

> *"a juristic person, which includes co-operatives incorporated in terms of the Companies Act, 2008 (as amended) that are owned, managed and controlled by black people as defined by the Broad-Based Black Economic Empowerment (B-BBEE) Act, that creates and owns value-adding industrial capacity and provides long-term strategic and operational leadership to a business. A black industrialist can be a natural person"* (Department of Trade Industry and Competition, 2024:5).

This program sustained the increase in the number of Black industrialists, producing an estimated turnover of R183 billion and creating 160,000 jobs by March 2024. Although this intervention has achieved some positive outcomes, inclusive industrialisation can only be effective if the government of South Africa

improves coordination among its departments and the private sector (Vilakazi & Moore, 2023:9).

3.5.1.7 2019

White Paper on Science, Technology, and Innovation

White Paper on Science, Technology and Innovation was adopted by the Government in March 2019 to address issues of transformation and inclusivity and to strengthen strong links within the National System of Innovation (NSI), thus signalling a substantial policy shift for actions related to science, technology and innovation (Department of Science & Technology, 2019:2; Technology Innovation Agency, 2020:6). The institutions that policymakers have developed to foster the conception and propagation of knowledge and technologies within a nation or region are indicative of the country's preferred governance framework for innovation systems (Uctu & Essop, 2012:4). The objectives of this White Paper include bolstering the ethos of innovation in Government and society and establishing a conducive environment that fosters innovation; promoting Indigenous innovation ecosystems; and growing investment in technology-focused small businesses and sustenance to grassroots and community innovation projects (Technology Innovation Agency, 2020:6). This Paper was also part of interventions by the Government to improve policy soundness and efficient budgeting and programme coordination (Department of Science and Technology, 2019b: 12).

The following section will focus on the government departments instrumental in supporting and promoting technology-focused SMMEs in KwaZulu-Natal.

3.6 GOVERNMENT DEPARTMENTS

The mission of promoting general entrepreneurship and small business impacts a broad range of policy areas; hence, this responsibility rests on numerous government departments cascading down to all three spheres of Government (Department: Trade and Industry. Republic of South Africa, 2005:24). Several government-initiated structures have emerged and all of them with a single intention of contributing to the development and promotion of small businesses. The focus of this research is on technology-focused small businesses. Hence, the contribution of only three departments will be explored as these are particularly active in promoting technology-focused small businesses. These departments are Trade, Industry and Competition (DTIC), the Department of Science and Innovation (former Department of Science, Technology, and Innovation, DSTI) and recently the Department of Small Business Development (DSBD). The discussion will focus on those programmes managed by these departments and that specifically target the development and support of technology-focused SMMEs.

3.6.1 Department of Trade, Industry and Competition (DTIC)

The former Department of Trade and Industry (DTI) has always been a custodian of small business development until the introduction of the DSBD in 2014 (Section 3.7.1.4). The former DTI department developed various SMME support initiatives under its auspices. These programmes include the Small Enterprise Development Agency (SEDA), the Industrial Development Corporation (IDC), incorporating Khula Enterprise Finance (for small and medium enterprise finance) and the Ntsika Enterprises Promotions Agency and Samaf **(**for micro-finance), which services the lower end of the SMME spectrum and focuses on survivalist, micro-sized and very small enterprises (Booyens, 2011:71; Department: Trade and Industry. Republic of South Africa, 2005:24). The SEDA operated in all nine provinces, including KwaZulu-Natal through provincial offices supported by branches in key economic areas of each province.

3.6.1.1 Small Enterprise Development Agency (SEDA)

The object of the SEDA was "to provide non-financial business development and support services for small enterprises, in partnership with other role players in the small business development environment" (The Department of Small Business Development, 2020b: 61).

The SEDA was also established to manage the SA Micro-Finance Apex Fund (Samaf) as an instrument for micro-financial support, reposition Khula to promote a concise retail tactic that will benefit SMME finance, with a greater focus on black-owned businesses, cash-strapped start-ups requiring loans without the necessary financial securities, as well as those in impoverished provinces (Meyer, 2015:8; Bates *et al*., 2005:87). This is a critical turning point for black entrepreneurs who lacked resources to finance their businesses and also could not provide the necessary collateral to qualify for businesses loans from commercial banking institutions (Saah & Musvoto, 2020:413). To assist with financial support, the Small Enterprise Finance (SEFA) was created as a vehicle for developmental finance that will bolster the survival and growth of small businesses, thus enhancing their contribution to the alleviation of poverty and unemployment (Pheiffer & Mphidi, 2024:546). SEDA's presence nationwide, through its provincial offices and a network of independent partners, is evident in the government's undertaking to ensure accessible business development support for SMMEs (Department: Trade and Industry. Republic of South Africa, 2005:9). The important role of SEDA in promoting technology-focused SMMEs was demonstrated through the establishment of a vehicle with a specific focus on technology-based SMMEs. This vehicle, coined the SEDA Technology Programme, will be discussed.

3.6.1.2 Seda Technology Programme (STP)

Amongst the technology business incubation programmes is the SEDA Technology Programme which operates nationally through a network of incubators

and technology-support centres by financing technological and technical support for SMMEs (Department: Trade and Industry. Republic of South Africa, 2005:10). This focal support point resulted from an amalgamation of all programmes that seek to provide support regarding accessing science and technology, technology transfer, general business support and incubation to SMMEs (Madlala, 2018:49; Booyens, 2011:71). Key to the goals of the STP is to facilitate the acquisition and transfer of technology to small enterprises, particularly those operating in the second economy (Small Enterprise Development Agency, 2013:1). This programme was also instrumental in the establishment of the South African Business and Technology Incubation Association (SABTIA) as a vehicle to position SA entrepreneurs globally (Department: Trade and Industry. Republic of South Africa, 2005:10). The purpose of the STP was presented as "to provide technology and innovation-oriented interventions, including quality and product improvement support to small enterprises and cooperatives. To enable incubated clients to improve their survival rate beyond the first challenging two years of business start-up by providing support to improve their product offering and other business development support" (Small Enterprise Development Agency, 2020:26). In 2014, the government established a new department specifically focusing on small business development.

3.6.2 Department of Small Business Development (DSBD)

One additional indicator of the high stages of policy allegiance to small business development in SA was the establishment of a focused Ministry for Small Business Development as part of government reorganisation in 2014 (Masutha & Rogerson, 2014:142). The DBSD has a vision of "a transformed and inclusive economy driven by sustainable, innovative SMMEs and cooperatives sector" (The Department of Small Business Development, 2020:3). Through the DSBD, the government envisages the transformation of an inclusive economy driven by sustainable and innovative small businesses (The Department of Small Business Development, 2020:5).

The desire for a flawless coordination stage is intrinsic to the success of every system, characterised by a multitude of role players and regionalised service approaches. This department is mandated to provide leadership and coordination of a unified approach towards the development and advancement of entrepreneurship, small businesses, and cooperatives, as well as to ensure an aiding legislative and policy setting to promote their growth and sustainability. The government has also devised a National Small Enterprise Masterplan, which focuses on ensuring the integration of small businesses, at a value chain level, in accessing and dedicated support measures to ensure their competitiveness and active participation in the mainstream economy (The Department of Small Business Development, 2020:4). The establishment of this department bears testimony to the government's intention to address a myriad of challenges facing SMMEs, including limited business experience, inadequate infrastructure, and restricted access to finance (The Department of Small Business Development, 2020:3). The envisaged outcome of the government support should assist enterprises from pre-start-up and start-up level to fully-fledged and growing entities (The Department of Small Business Development (2020:14).

3.6.2.1 2024: Collaboration of SEDA and SEFA

The 2024/25 SEDA Annual Performance Plan revealed the intention of the Department of Small Business Development to synchronise the operations of the SEDA and the SEDA as a measure of improving access to enhanced financial and business support for small businesses (Small Enterprise Development Agency, 2024). This move towards collaboration emerges on the bedrock of the research reporting irregularities and inappropriate oversight functions, resulting in a lack of efficiencies within the SEFA (Pheiffer & Mphidi, 2024:551). Other researchers have cited ignorance and lack of information on the side of small business managers as hindrances to their ability to access finance (Saah & Musvoto, 2020). The DSDB’s 2020/21 APP Revised report alluded to the absence of coordinated service

delivery provision (including replication of programmes) even to the point that the duplication of service delivery may even occur within the same DSBD departmental programmes across the DSBD, SEDA and the Small Enterprise Finance Agency (Sefa). Through the National Small Enterprise Amendment Act 21 of 2014, the SA government created a new entity titled the Small Enterprise Development and Finance Agency (SEDFA) to replace the SEDA, SEFA and the Cooperative Banks Development Agency (Republic of South Africa, 2024:2). This Act further clarifies the role of this new agency as that of providing financial and non-financial support to small businesses.

The Department of Science, Technology, and Innovation is another department that promotes technology-focused SMMEs. Its programmes will be discussed.

3.6.3. Department of Science and Innovation (DSTI)

The change of title of the Department of Science and Technology (DST) to the Department of Science, Technology and Innovation (DSI) testifies to the importance accorded to innovation by the Government. In particular, the 1996 White Paper on Science and Technology was reviewed and adopted as the 2019 White paper on Science, Technology, and Innovation (Department of Science and Technology, 2019b: 2). The outcomes of the DSTI are a transformed, inclusive, responsive, and coherent National System of Innovation, thus enhance the utilisation of information for economic expansion through energising existing industries and encouraging R&D directed industrial development; (Technology Innovation Agency, 2020:8). Furthermore, it seeks to develop social capabilities and skills for the economy and development; augmented knowledge production and innovation output; and the usage of knowledge for inclusive advancement (Technology Innovation Agency, 2020:8). The DSI sought to achieve these goals through its entities via government policy directives as discussed in this section. The Government employed this macro-economic strategy to develop a capable and transformed state. Successive Decadal Plans are designed as implementation

plans for the White Paper, determined in collaboration with the pertinent NSI role-players and guided by analysis, foresight, and the government's priority results as presented in the NDP to ensure that government policy is coherent and responsive to the needs of society (Department of Science and Technology, 2019b: 12). The NSI will be discussed.

3.6.3.1 National System of Innovation (NSI)

The active participation of all private and public stakeholders is essential within a vibrant and self-sustaining innovation ecosystem (Sun *et al.,* 2019: 114). The National System of Innovation (NSI), adopted through the 1996 White Paper on Science and Technology as the concept for organising a framework for science, technology and innovation policy and implementation; hence, one of the strategic goals is to ensure that the national system of innovation is responsive, coordinated, and efficient (Department of Science and Technology, 2019a: 52)**.** An innovation system configuration incorporates institutions, structures, and measures the Government introduces to support innovation and the supply of enticements to agents within the industry, including the rules and regulations that administer the workings amongst the diverse role-players (Uctu & Essop, 2012:3). In an attempt to define the NSI, the 2019 White Paper on Science, Technology and Innovation refers to firstly the concept of "the network of institutions in the public and private sectors whose activities and interactions initiate, import, modify and diffuse new technologies" and secondly "that set of distinct institutions which jointly and individually contribute to the development and diffusion of new technologies and which provides the framework within which governments form and implement policies to influence the innovation process. As such, it is a system of interconnected institutions to create, store and transfer the knowledge, skills and artefacts which define new technologies" (Department of Science & Technology, 2019: vii). According to Van Zyl (2011:39), the NSI comprises the stakeholders (government entities, industry, knowledge generators), the activities (R&D, human capability, knowledge transmission), the linkages (partnership, agreements,

grants), the outcomes (employment, development, wealth) and the impacts (well-being, culture modification, regional and global transformation). The critical NSI institutions managed by the DSTI are the Technology Innovation Agency (TIA) and the National Research Foundation (NRF) (Department of Science & Technology, 2019:8).

An active NSI can bring expertise, co-funding, networks, and knowledge of technology trends through its key stakeholders in industry, the research community, and other international experts (Technology Innovation Agency, 2020:28). The hierarchies and programs constituted by governments must consider stakeholder needs given the high probability of failure for any intervention that ignores crucial industry stakeholders (Uctu & Essop, 2012:4). According to Van Zyl (2011:39), the TIA ought to locate itself to be a clearing establishment for ideas and a fountain of data relating to the NSI.

The system of innovation can be developed at all levels of government. The National Spatial Development Framework 2050 calls for the innovation and information production, packaging and trade, enlargement, modernisation, and re-modification of the post-school education segment towards expanding and promoting innovation through the medium term while guaranteeing inclusive localised development (Technology Innovation Agency, 2020:6). Countries can therefore opt for a centralised or decentralised NSI governance model. The degree of centralisation or decentralisation of the National System of Innovation governance framework impacts the realisation of the intended outcomes. Some countries have adopted a centralised approach to the governance of innovation systems. However, this approach is associated with high levels of departmentalisation and political administration sectorisation coupled with poor interaction, exchange and cooperation amongst various government departments and other public agencies and institutions (Uctu & Essop, 2012:4). A decentralised national innovation system framework, as adopted by the developed countries, tends to be more flexible and practical in incentivising industry role-players (Uctu

& Essop, 2012:4). However, institutional and political leadership remains vital for any form of governance framework, whether centralisation or decentralisation to result in meaningful, positive impact.

Organisations like the TIA have adopted the ecosystem approach to innovation to address resource constraints and to ensure that interventions benefit from knowledge endowments and the capabilities of the National System of Innovation (Technology Innovation Agency, 2020:28). Given the myriad of activities and knowledge that is required to navigate the NSI, small business incubators effectively are amongst the critical role players in the active innovation ecosystem since the success of innovation depends on the availability of many complementary resources and capabilities (Sun *et al.,* 2019: 107).

The effects of the TIA Act and the establishment of the TIA are discussed.

3.6.3.2 The Technology Innovation Agency (TIA) and the IPRPFR Act

The competitiveness and long-term economic growth of nations are associated with technological progress (Department of Science and Technology, 2019b: 2). For SA to remain globally competitive and possibly realise upward mobility in the value chain, the three required interventions are the promotion of employment through labour-market reforms; promotion of productivity gains and new entry by enterprises; and research and development (R&D) for innovation (SA Government, 2012:115). The SMMEs are vital contributors to technical innovation and new product developments (Ayandibu & Houghton, 2017:133). In this regard the SA government established the TIA in 2008 to “provide for the promotion of the development and exploitation in the public interest of discoveries, inventions, innovations and improvements...” (The Government of South Africa, 2008(a):2). According to the TIA Act, “the object of the agency is to support the State in stimulating and intensifying technological innovation to improve economic growth

and the quality of life of all South Africans by developing and exploiting technological innovations" (The Government of South Africa, 2008(a): 3).

The TIA acknowledges that its primary mandate revolves around supporting and enabling technology innovation and further achieving socio-economic rewards and enhanced global competitiveness (Uctu & Essop, 2012:2). It is an agency established:

> *"to promote the development and exploitation, in the public interest, of discoveries, inventions, innovations and improvements and thereby supporting the state in stimulating and intensifying technological innovation to improve economic growth and quality of life for all South Africans by developing and exploiting technological innovations"* (Technology Innovation Agency, 2020:5).

It is a single public agency formed from a merger of seven DST-funded organisations: Tshumisano, Lifelab, BioPAD, Plantbio, Cape Biotech, the Innovation Fund, and the Advanced Manufacturing Technology Strategy (AMTS) (Uctu & Essop, 2012:10). Another key objective and function of the TIA is to develop human capital for the industry in innovative fields (Uctu & Essop, 2012:11).

New ideas have limited chances of resulting in sales and marketability. The commercialisation of innovations entails substantial risk, thus generating a situation where there are limited investments in R&D activities that are necessary for the general public (Booyens, 2011:69). Hence, public support for innovation is essential to correct the imperfections in the capital markets that push investment towards innovations with highest expected returns ignoring those that are socially desirable. Governments are, therefore, expected to initiate programmes and introduce legislation and policies that address this need for socially desirable innovations. The TIA, established in 2008 as part of the then DST's Ten-Year Plan, targeted to grow SA's potential in diffusing a considerable portion of local R&D into industrial products and services (Uctu & Essop, 2012:2). The Government

acknowledges the fact that the responsibility of driving innovation in the country should be shared with various stakeholders and will require resources hence according to the DSI, the TIA provides customer-focused technology development financing and support; and establishing an empowering environment for technology innovation in cooperation with other stakeholders (Department of Science and Technology, 2019a: 42).

The TIA's future expansion and diversification plans include adapting the existing collection of science, engineering and technology support and increasing the reach to marginalised societies through replicas such as Living Labs, technology incubators and walk-in centres, thus enhancing spatial inclusivity and providing pathways for capturing grassroots innovations (Technology Innovation Agency, 2020:41). This plan will be achieved through the TIA's Technology Stations providing critical innovation infrastructure facilities and the requisite support. The TIA is the Government's instrument that addresses "market failure" and aims to link numerous role-players and to develop institutional connections throughout the innovation value chain (Uctu & Essop, 2012:11).

The acknowledgement by the Government that the country requires a strong and coordinated Intellectual Property (IP) rights framework resulted in the promulgation of Intellectual Property Rights from the Publicly Financed Research and Development Act (Act 51 of 2008) to support innovation and technology development and adoption. The object of this Act is to "provide for more effective utilisation of intellectual property emanating from publicly financed research and development; to establish the National Intellectual Property Management Office and the Intellectual Property Fund; to provide for the establishment of offices of technology transfer at institutions; and to provide for matters connected in addition to that" (The Government of South Africa, 2008(b):2).

3.6.3.3 TIA's Technology Stations Programme (TSP)

One of the strategic objectives of the DSI is utilising knowledge and innovation for economic development to drive financial growth and job creation within its socio-economic transformation agenda (Department of Science and Technology, 2019a: 57). This objective is supported by Uctu and Essop (2012:11), who emphasise the functions of the TIA, in encouraging the development of technology-based products and services and inspiring the development of both public and private technology-based enterprises which ultimately contributes to the South African economy. The Technology Stations provide "innovative science, engineering, and technology solutions for complex engineering challenges within various industrial sectors to support government's socio-economic priorities, and TIA will position the stations to support the effective implementation of various sectoral master plans" (Technology Innovation Agency, 2020:41) as envisaged in the White Paper on Science, Technology, and Innovation.

The TIA's TSP, formerly known as the Tshumisano Trust, is located at universities of technology and facilitates innovation and technology adoption through technology transfer between these educational institutions and small enterprises (Department: Trade and Industry, Republic of South Africa, 2005:9, Uctu & Essop, 2012:10). The goal of the TSP aims to "contribute towards improving the competitiveness of industry through the application of specialised knowledge and technology, facilitating the interaction between industry and academia, to enable innovation" (Technology Innovation Agency, 2010:1). This programme also fosters the spirit of entrepreneurship by exposing students to small enterprises as project participants and through internships (Department: Trade and Industry, Republic of South Africa, 2005:9).

TIA provides a wide range of science, engineering and technology aid through its countrywide system of 18 Technology Stations, serving as technology transfer centres that provide support to entrepreneurs and access to advanced equipment,

coupled with expertise in specific fields to develop novel products and processes (Technology Innovation Agency, 2020:40). The services of the TIA include "innovation financing, which incorporates several stages of funding over the life-cycle of a start-up biotech firm for development of commercially viable, technology-based goods and services; technology development, including technical and advisory services; promotion of domestic and foreign investment linkages; technological and enterprise expertise; and capacity-building, and institutional and human capital development" (Uctu & Essop, 2012:11).

The TIA's Technology Stations are expected to grow and to be repurposed as a suite of contributions within the NSI, taking advantage of complementary aspects with other governmental and industrial support tools and these plans will also guarantee that the science, engineering, and technology assistance given to entrepreneurs and SMMEs is strategically directed and regionally dispersed through numerous initiatives (Technology Innovation Agency, 2020:41). However, the agency does acknowledge that the Technology Stations model is no longer suitable to support the desires of an growing innovation landscape hence there is a need to employ continuous improvement measures to ensure efficient and practical support to SMMEs.

3.7 SITUATING TECHNOLOGY BUSINESS INCUBATION PROGRAMMES

The DSBD has developed the 2019-2024 SMME Support Plan, which incorporates incubation and digital hubs to provide business and technology support (The Department of Small Business Development, 2020:3). The question raised by the NDP 2030 on what needs to be done to stimulate new businesses and improve their potential to grow can be addressed through TBI (SA Government, 2012:141). The expected duration of the Incubation and Digital Hubs support is a minimum of three years with services offered in-house or remotely and success measures stipulated as more than doubled yearly revenue; product or services diversified market; and profitable business (The Department of Small Business Development,

2020:3). Innovative entrepreneurship, characterised by new enterprises founded on new or inventive ideas, resulting in high growth entities capable of becoming gazelle companies can enhance the envisaged levels of growth can be enhanced (Ayandibu & Houghton, 2017:133). This section will also discuss government programmes that provide for scientific R&D and technology development.

3.7.1 Demarcating the role of R&D and technology development

An extensive research and development sector, enabled by innovation commercialisation, is critical for ensuring fast-tracked technological advancement and condensed product life cycles, enhancing prospects for novel industrial enterprises to venture into uncharted product segments (SA Government, 2012:131). According to Uctu and Essop (2012:11), the driving objectives and roles of the TIA are to establish a platform that links the formal research and development-informed knowledge base with the actual economy (where goods and services are commercialised). The relationship between research and innovation is that research converts investments into knowledge. In contrast, innovation translates knowledge into money, hence the key and necessary relationship between knowledge producers (doing research) and social and economic entrepreneurs generating innovations (Van Zyl, 2011:38).

Another factor that impacts on the innovative and creative abilities of SMMEs is that the general funding needs for small businesses greatly surpasses the available funding for R&D and innovation (Booyens, 2011:71). The TSP is one of the programmes of the TIA through which it responds to DSI's Outcome 2 (knowledge utilization for economic advancement in revitalizing present industries and propelling research and development-led industrial development), by providing financial and non-financial support to SMMEs to exploit market opportunities (Technology Innovation Agency, 2020:8). Also, to ensure that researchers utilize intellectual property derived from publicly financed R&D for the benefit of the community, the Government enacted legislation entitled the

Intellectual Property Rights from Publicly Financed Research and Development Act, 2008 to be implemented through the National Intellectual Property Management Office, resourced by the Intellectual Property Fund which will fund the creation of Technology Transfer Offices (TTOs) (Uctu & Essop, 2012:6). The object of this Act is "to make provision that intellectual property emanating from publicly financed research and development is identified, protected, utilized and commercialized for the benefit of the people of the Republic, whether it be for a social, economic, military or any other benefit" (The Government of South Africa, 2008(b): 4).

3.8 SMALL BUSINESS INCUBATORS AS ENABLERS NAVIGATING THE SA POLICY ENVIRONMENT

To support the maturation and growth of technology-intensive SMMEs is envisaged to occur under the auspices of establishments that will provide generic support and coaching/mentorship services, markets and enterprise expansion, intellectual property policy development and exposure to strategies that address regulations, administration, and legal requirements (Department of Science and Technology, 2019b: 35). These high-tech or technology-intensive SMMEs may include university spinout companies and SMMEs in high-technology sectors. Technology business incubators are some of the institutions established by the Government to nurture small businesses and position them to take advantage of market opportunities. Innovation will develop a new suite of technologies that will require localisation of the design and manufacture of these technologies in South Africa while instituting measures to ensure that workers have the necessary skills (Booyens, 2011:67).

The clustering of similar, interconnected, and competitive businesses is among critical interventions for increasing job creation, entrepreneurship and small business development, leading to enhanced competition and innovation (Meyer, 2015:11). Small businesses stimulate domestic competition through the creation

of niche areas in their local markets (Mapila, Chiliya & Chiliya, 2014:118). The description of entrepreneurs also supports this view as individuals capable of adding value and wealth by inventing new processes and developing novel ideas, gathering resources and assuming the responsibility to action (Meyer, 2015:7). This enables innovation as the enterprises consider the competitive edge over their competitors. SMEs are established as enabling change and improving competition (Booyens, 2011:67). However, innovation and technology development require technology mastery, skills and investment within an enabling infrastructure.

Furthermore, the snowballing multiplicity of sources of innovative concepts has broadened to embrace entrepreneurs that are external to the formal systems of innovation, to include grassroots innovators, non-governmental organisations, and other community-based organisations, as opposed to only the scientific community (Technology Innovation Agency, 2020:41). In addition, it acknowledges the presence of rurality hence an appropriate governance framework is imperative for effective public decision making of scientific and technological development, and promoting innovation (Uctu & Essop, 2012:2). Therefore, encouraging general entrepreneurial activities should not only increase the number of entrepreneurs but also the innovative high-growth firms (Ayandibu & Houghton, 2017:133). Providing incubators and mentorship to entrepreneurs and small business owners could accelerate growth potential (Meyer, 2015:11).

According to Masutha and Rogerson (2014:153), despite the growing popularity of small business incubators among policymakers and LED practitioners, their operations have attracted only limited scholarly attention. The lack of integration and alignment of policy at the government level negatively impacts the effective utilisation of crucial government instruments, and technology localisation is one of the areas that has been negatively affected by this disconnect (The DTI, 2017:55).

Peters and Naicker (2013:15) indicate that the SA industrial segment is dominated by SMMEs based on the number of entities. Based on entrepreneurship's

significance to the economy's growth, global governments engage in programmes designed to support entrepreneurship. The DTI Integrated Strategy on the Promotion of Entrepreneurship and Small Enterprises demonstrates that the responsibility of the Government is that of "fostering an enabling environment for the creation and growth of small enterprises" (DTI, 2005:3). This is an indication of the acknowledgement by the Government that if small businesses are instruments of change, support will be essential as they are not capable of independently achieving the societal goals (of poverty alleviation and creation of employment). Small business incubation is critical to SMME development for the South African Government, given that SMMEs, as viewed by the Government, are vehicles for employment creation, and, as discussed in Chapter 2 of this study, their inability to grow limits the potential of these enterprises to absorb job seekers.

3.9 ACKNOWLEDGING INEQUALITY – INCLUSIVE ECONOMY

In the NDP 2030 (SA Government, 2012:110), South Africa set some critical objectives to achieve its socio-economic goals. One of these goals is the substantial reduction of inequality, as South Africa appears among the countries with a high inequality gap. Economic transformation and job creation are the priorities of the Government's 2019-2024 Medium-Term Strategic Framework, which serves as the implementation strategy for the second phase of the NDP (Technology Innovation Agency, 2020:6).

Given the history of this country, the policy emphasis of the SA national government is on attaining an alteration of the prospects for those businesses that are owned by black South Africans who were formerly underprivileged under apartheid (Masutha & Rogerson, 2014:142). Using scientific knowledge and innovation through appropriate technologies is one of the critical tools to be used by the Government through the DSI to accelerate inclusive development (Department of Science and Technology, 2019a: 60). The issues of transformation and inclusivity are some of the critical interventions that the Government targets

through the 2019 White Paper on Science, Technology, and Innovation (Technology Innovation Agency, 2020:6).

The TIA will intensify efforts to support the localisation and diffusion of technologies through Technology Stations' existing and new technology-based support interventions (Technology Innovation Agency, 2020:41). Government interventions in preferential procurement, licensing, and other means of economic payments have been identified as possible solutions for addressing the gaps in racial patterns of income and wealth ownership (SA Government, 2012:114). Reassuringly, emerging and amended policies targeting improving the business environment for SMMEs (Nieman & Nieuweuhuizen, 2009:197) have been announced since 1994. In 1995, the Small Business Development Corporation (SBDC) started what happened to be regarded as the "hives of industry" (Masutha & Rogerson, 2014:144). Undoubtedly, these programmes are intended to assist in creating supplementary job opportunities and shrink the poverty levels of the average Black South African. Unfortunately, regardless of the SA government's presumed commitment to backing SMMEs, not much positive impact has followed regarding their performance (Ligthelm, 2013:58; Mago & Toro, 2013:19). Evidence of this challenge is recorded in the 2012 Global Entrepreneurship Monitor report (Turton & Herrington, 2012:6-9).

Chapter 3 of the NDP 2030, which focuses on the economy and employment, identified that SA requires hastened and more inclusive growth as the critical developmental points to lessen poverty and shrink inequality by raising the levels of employment and, through productivity expansion, the earnings of employees (SA Government, 2012:109). However, skills and low levels of education are among the factors contributing to the challenges of attaining the ideals of the NDP-2030. According to the South African Science, Technology, and Innovation Indicators (Department of Science and Technology, 2017:13), skills and human capital are necessary to support an inclusive growth path, as these will drive R&D and training activities in critical areas related to technological innovation. The TIA's

mission is to contribute to employment creation with a specific emphasis on previously disempowered persons and communities through commercialising intellectual property from publicly funded research institutions and supporting the creation of technology enterprises (Technology Innovation Agency, 2020:6).

Gender inclusivity is also a priority for the Government. In an endeavour to promote women-owned, technology-based enterprises, the former DTI established the Technology for Women in Business programme, which was also incorporated into the SEDA Technology Programme (Small Enterprise Development Agency, 2013:1). Subsequently, the focus of the national and provincial levels of Government is on using business incubators as instruments of more comprehensive policy drive to elevating the role of the small businesses in the local and national economic advancement programmes especially for employment creation (Masutha & Rogerson, 2014:153). The DSI has identified the Technology Stations Programme and the Technology Localization Programme as vehicles for the localisation and diffusion of technologies (Department of Science and Technology, 2019b:34). Despite the prevalence of the Government SMME interventions, small businesses operating outside of the cities do not have access to relevant information on these and other stakeholders' support programmes (Bvuma & Marnewick, 2020:5).

In the quest for an inclusive innovation ecosystem, specific attention should focus on supporting small businesses in informal communities, rural settings and cooperatives (Department of Science and Technology, 2019b: 35). The TSP is one of the programmes of the TIA through which it responds to DSI's Outcome 5 (the use of knowledge for inclusive development), by supporting grassroots innovation (Technology Innovation Agency, 2020:8). The Township Entrepreneurship Programme focused on supporting SMMEs in marginalised townships and rural areas and guaranteeing that the majority of the individuals are accommodated in the conventional economy was approved by the SA Cabinet on the 4th March 2020.

There was also a corresponding establishment of the Township Entrepreneurship Fund (TREP) as the instrument to fund this programme (The Department of Small Business Development, 2020:1). There is also an expectation that rural and peri-urban enterprises will benefit from the District Development Model (DDM), which aims to promote collaborations amongst various social partners in support of districts development (The Department of Small Business Development, 2020:4). The broad-based black economic empowerment (B-BBEE) strategy also supports small business development by advocating for a significant upsurge in the number of black persons who are owners with controlling stake in existing and novel enterprises in the priority sectors of the economy (Department: Trade and Industry, Republic of South Africa, 2005:18).

3.9.1 District Coordination Service Delivery Model/District Development Model (DDM)

The Government approved the District Development Model (DDM) in August 2019 to streamline planning across all levels of Government throughout the country's 44 districts and 8 Metros over five years commencing in 2020/21 (Technology Innovation Agency, 2020:7). A component of such a model is small businesses, which also function as providers of needs in a community and reasserts their space as contributors to LED (Meyer, 2015:7). SMMEs are also victims of crime, a condition that is exacerbated by the lack of legal knowledge and inadequate financial resources, thus rendering them unable to protect and defend their business interests (Bvuma & Marnewick, 2020:5). Consequently, improved service delivery will also benefit SMMEs through the adequate provision of essential services and infrastructure improvements. Through this model, the Government sought to alter the face of rural and urban landscapes by guaranteeing better alignment amongst urban and rural developments, with an intentional focus on Local Economic Development (LED), through partnering with civil society

comprising communities, private industry, and labour by ensuring appropriate project management and tracking (Technology Innovation Agency, 2020:7).

3.10 SUMMARY

The SA Government perceives SMMEs and entrepreneurship as catalysts for economic growth, job creation, income minimisation, and tools for ensuring economic inclusivity. Similarly, these desired outcomes also apply to the province of KwaZulu-Natal. As SMMEs continue to confront several challenges in spite of numerous government-legislated programmes and interventions, a need arises for a critical review of these interventions to identify strategies for improving their effectiveness. This reflexive approach will assist the Government in realising its mission. The primary aim of the study was to develop a framework for technology business incubation for sustainable growth of small businesses in KwaZulu-Natal. Given that technology business incubation supports technology-focused small businesses, the study examined the strategies that can be utilised to improve its effectiveness. The chapter considered the legislation and the government departments that play a critical role in supporting and sustaining the technology-focused SMMEs in the country and, subsequently, in the province of KwaZulu-Natal. This chapter also revealed nine (9) challenges confronting small businesses, ranging from the resources necessary for business growth and sustainability to the skill sets of the small business owners and the environmental and legal factors.

South Africa recognises the incubation of small businesses as a facilitative mechanism for SMMEs to grow and become world-competitive businesses. These businesses have the prospects of creating employment, alleviating poverty, empowering previously disempowered groups, and ultimately contributing to the growth of both national and provincial KwaZulu-Natal economic development.

SMMEs are still challenged by innovation to accomplish research and development, gain access to knowledge, and engage new technology; hence, governments like the TBI interventions that provide equipment and support in product and technology commercialisation remain essential for the growth and sustainability of SMMEs. Incubation programmes providing technology nurseries also assist by alleviating access to infrastructure challenges. However, these strategies require coherence in designing support programmes for small business incubation to address national challenges effectively. Fragmentation, the lack of coordination and integrated service delivery support, and programme duplication are other areas of concern. Incubation programmes that also provide technology nurseries assist by alleviating access to infrastructure challenges.

Policy development should also consider the inherent heterogeneity in the SMME sector resulting from high inequality that runs along the race, gender, and age disparities. Any policy disconnect impedes the country's positioning to benefit from the new expansion opportunities linked to the Digital Industrial Revolution and promote collaborations between the private and civil sectors. However, the challenge of increasing awareness of government entrepreneurial support initiatives remains critical in maximising the usage of these support programmes; hence, increasing access to these programmes will also increase the impact of government policies and support programmes.

CHAPTER 4: TECHNOLOGY BUSINESS INCUBATION OF SMALL BUSINESSES IN KWAZULU-NATAL

4.1 INTRODUCTION

This chapter underlines the critical role of technology business incubators in supporting small businesses in the Province of KwaZulu-Natal. It commences by providing a comprehensive literature review on general business incubation, leading to a specific focus on TBI. It also offers the groundwork for understanding the challenges and successes of business incubation in South Africa. The chapter also scrutinises the current state of technology business incubators in KwaZulu-Natal. It discusses the extent to which TBIs have successfully fostered the country's start-up culture. This aspect of the TBIs is a crucial step towards examining the implementation of the business management model for the distribution and development of small business support programmes by the SA government and the private sector (Rungani & Potgieter, 2018:2).

4.2 WHY SMALL BUSINESS INCUBATION?

The majority of small businesses in South Africa struggle to survive beyond a few years due to various challenges such as deficiencies in technical competencies and education, lack of infrastructure and facilities, and an inadequate sustenance system (Rens, Iwu, Khan & Esambe, 2021:215; Sanyal & Hisamic, 2018:16). These challenges are discussed extensively in chapter 2 of this thesis. Small business incubators are primarily designed to address the challenges that hinder the success, growth and sustainability of these SMMEs (Hewitt & van Rensburg, 2020). Entrepreneurs, therefore, require substantial support to overcome these persistent challenges. In response to the challenges, the President of South Africa, Mr Cyril Ramaphosa, in his 2018 and 2019 State of the Nation Address (SONA), focused on measures to support and sustain SMMEs (Schutte, 2019:1). This stark reality of SMMEs struggling to achieve significant growth has prompted scholars,

management professionals, and the government to collectively seek ways to enhance the success of these entities (Rungani & Potgieter, 2018:2). Thus, providing the necessary support to SMMEs was essential for their success as they are generally less resourced regarding physical, human, and financial assets.

For over two decades, the concept of incubation has attracted the interests of governments and business communities as these are viewed as an essential element of the entrepreneurship ecosystem based on the factors presented in Table 4.1 and expected benefits to countries:

Table 4. 1: Incubation of small businesses

Process	Expected outcomes	Expected Impact
• catalyst, • value-added support, • access to essential tools and resources that would otherwise not be accessible to entrepreneurs, • mentorship support.	• accelerating the entrepreneurship process, • generating small businesses with high growth potential, • increased survival rates of small businesses post-incubation, • produce financially viable enterprises, • produce small businesses capable of functioning independently,	• an instrument of economic development, • creation of jobs, • upsurge wealth creation, • increase the contribution of SMMEs to the national economy • sustainable businesses

Source*:* Adapted from: (Rens et al., 2021:215) (Rungani & Potgieter, 2018:11; Sanyal & Hisamic, 2018:13;Kihonge, 2016:231; Obaji, 2014:109. Al-Mubarak*et al., 2013: 896;* Dee, Gill, Lacher, Livesey & Minshall, 2012:4).

Small business incubation has been employed globally by governments, universities, and business organisations as a mechanism for supporting and encouraging new businesses (Swartz, Marks, & Scheepers, 2020:1; Schutte, 2019:1). Hence, several developing countries, including South Africa have sought to increase the emergence of technology-focused small businesses and have approved the business incubator approach to enhance their economies, increase technology transfer, and create new enterprises (Sanyal & Hisamic, 2018:13).

Studies have also revealed that some incubatees join incubators out of desperation or lack of alternative employment. A study conducted in Spain

established a positive relationship between incubator services of training and the incubatees' ability to start a business; however, most citizens indicate a preference for jobs over entrepreneurship (Sanyal & Hisamic, 2018:13). It is evidenced by these realities that entrepreneurship incubation is vital to the developmental aspirations of South Africa. Providing an environment that forges cooperation amongst small business practitioners through the amalgamation of finances, competencies, technological know-how, ideas, and added resources safeguards a much-needed healthy supply base, critically deficient in the SMME sector (Rungani & Potgieter, 2018:10).

4.3 DEFINITION AND CHARACTERISTICS OF INCUBATION

According to Biraldi and Havenvid (2016:54), incubator definitions generally include common themes relating to place, resources, services, control, and time issues. One such definition contends that business incubation is “an economic and social program which provides intensive support to start-up companies, coaches them to start, and accelerates their development and success through a business assistance program” (Al-Mubarak & Busler, 2013:1). Similarly, according to Masutha and Rogerson (2014:143), a 'small business incubator' covers a suite of specialised business and technological support services that should aid the growth of new and micro start-up enterprises into economically and operationally autonomous entities. Small business incubators are usually hybrid organisations established through collaboration amongst university, industry and government departments or entities (Mcadam, Miller and Mcadam, 2016:70). According to Lyken-Segosebe, Montshiwa, Kenewang and Mogotsi (2020:3), technology business incubation connects technology, know-how, entrepreneurial ability, opportunities and resources (both tangible and intangible) to incubatees.

Incubators can be physical and/or virtual facilities (Dee *et al.,* 2012:6) necessary to conduct business as support for the development of early-stage SMMEs, which may/may not be accompanied by a suite of comprehensive services and funding

opportunities (DTI, 2014:2). Nkosinathi and Robert (2014:643) further points out that the incubation of fledging businesses suggests an ability or desire to preserve set and regulated conditions conducive to the development of the enterprise through well-defined firm-supporting programmes. Some researchers even identify incubation as a tool for economic development (Al-Mubarak & Busler, 2013:1). An incubator is an umbrella notion which incorporates a varied group of institutions; hence the term “business incubator” may also be used for establishments such as science parks, technology/business centres and economy incubators (Nkosinathi & Robert, 2014:643; Dee *et al.,* 2012:6). Some researchers differentiate between accelerators and incubators. The concepts of science parks and accelerators as programmes that incubate small businesses will be discussed in detail in the following section, including the modern concept of virtual incubation. This discussion will provide a typology of technology business incubation categories, thus contributing to the foundation for this study.

Science parks are shared spaces designed for companies specifically established under the auspices of and through university technology transfer activities, with owners who are usually scientists and lack softer skills (Díez-vial & Montoro-sánchez, 2016;42). These technology hubs and parks are generally regarded as incubators for new technology-based enterprises and are also referred to, based on focus, as technology business incubators (Kim & Jung, 2010:273). For this reason, this study will consider the science parks and techno hubs under the study of technology business incubation.

According to Sanyal and Hisamic (2018:11), accelerators are concerned with advancing the growth of already developed small businesses, while incubators foster the growth of new businesses in a local community. They, therefore, provide the shift from physical office areas to nonphysical, open and high-value services, which include fostering external knowledge capabilities, experiential education, personal interactions, and synergistic relationships (Mcadam, Miller & Mcadam, 2016:70). However, in South Africa, incubators aid both enterprises that are

starting up as well as established SMMEs (Masutha & Rogerson, 2014:151), in particular those funded by the government under the former Small Enterprise Development Agency (SEDA), now Small Enterprise Development and Funding Agency (SEDFA). Testing the viability of the traditional approach to incubation has led to the evolution of models that include virtual constructs (Dee *et al.*, 2012:5), whereby embryonic SMMEs can access incubation support with no dwelling within a formalised incubation unit, a trend influenced mainly by the knowledge economy (Mcadam et al., 2016:70). The advent of COVID-19 and the subsequent lockdown forced some KZN incubators to operate remotely (Chapter 7 of this thesis). Therefore, incubators assume different forms and purposes depending on factors like ownership, environmental challenges, and the influence of critical stakeholders.

4.4 INCUBATION AS AN ENABLER FOR SMME DEVELOPMENT

One critical factor that has emerged in policy standing over the past decade is instituting a web of entrepreneurship incubators to adopt groups of emergent SMMEs (Masutha & Rogerson, 2014:143). Business incubators provide solutions that enable SMMEs to navigate the precarious environment during the early developmental stages (Sanyal & Hisamic, 2018:10). It is at this stage that incubation can provide the necessary support to realise the vision of the entrepreneur and provide a conducive platform to nurture ideas. This kind of support increases the overall contribution of SMMEs to the country's GDP, proving their ability to alleviate social development challenges facing South Africa (Rungani & Potgieter, 2018:2).

The governments identified SMMEs and entrepreneurship as facilitators of economic development, thus making incubator interventions capable of mitigating various challenges confronting this sector (SA Government, 2012:140). As a result, governments fund most incubators in developing nations, even though there is a dual increase in the participation of private organisations and venture capital

companies in financing incubator programs (Sanyal & Hisamic, 2018:12). Incubation of small businesses has been identified as a tool for economic development (Al-Mubarak & Busler, 2013:4). They strengthen the local economies because the survival rate of their small business tenants and clients can be as high as 89%- 90% (Hewitt & van Rensburg, 2020:5) (Al-Mubarak *et al.,* 2013:896). National and provincial governments are engaging incubators as a component of broader policy pushes to elevate the role of small businesses in economic development programmes, specifically as tools for creation (Masutha & Rogerson, 2014:153). This scenario assists local governments in addressing various socio-economic policy requirements, including employment and wealth creation (Sanyal & Hisamic, 2018:10).

4.5 TECHNOLOGY INCUBATION AND THE PROMOTION OF INNOVATION

The evidence of business incubators being the instruments for economic development with outcomes ranging from the creation of entrepreneurs, companies, and jobs is well documented (A-Mubarak *et al.,* 2013:97). However, incubators are also functioning as vehicles for the transfer of technology and the advancement of innovation in the SMME sector (Madlala, 2018:46; Sanyal & Hisamic, 2018:10). Innovativeness relates to the enterprise's ability to direct the industry towards the creation and introduction of novel products or services and approving new technologies to design future products or services (Díez-vial & Montoro-sánchez, 2016).

Technological innovations boost the nation's productivity position, enhance the living conditions of its nationals, and lead to the sustainable economic development of the economy, thus necessitating governmental aid that emphasises science and knowledge-based innovations (Obaji, 2014:111). Therefore, SMMEs are essential for economic growth, producing goods and services and establishing new markets in South Africa (Rens *et al.*, 2021). This emanates from entrepreneurs being regarded as individuals capable of exploiting

and commercialising technological discoveries that drive industrialisation, resulting in employment and economic growth (Bhikolimana Tutuba & Tundui, 2022:10) . Therefore, developing new technology-intense small businesses is integral to economic growth. For South Africa to fully engage as a competent player in the digital industrial revolution space, it should be able to leverage its comparative natural resources advantage with advanced technologies to complement the primary sectors of mining and agriculture (Danja & Wang, 2024:2; DTI 2017:55). Rungani and Potgieter (2018:2) affirm the role of SMMEs in South Africa as a conducive platform for entrepreneurship and innovation, given their small size and, therefore, high flexibility.

Research has revealed that SMMEs need more access to innovation and technology enablers like technology command, investment in plant and enabling infrastructure, and skills to ensure growth to fully-fledged enterprises (Nkosinathi & Robert, 2014:642). However, some researchers argue that innovative entrepreneurship based on novel or original ideas can only partially and sometimes be attributed to research (Ayandibu and Houghton, 2017). Institutions working within science parks and higher education institutions can provide meaningful knowledge and encourage innovation amid their co-located enterprises (Díez-vial & Montoro-sánchez, 2016:41).

Extracting from the State of the Nation Address (SONA), the government's understanding of the role and function of the incubator is that of a facility that supports SME development and promotes innovation and entrepreneurship (SONA, 2019). This ideal is possible when incubatees combine their knowledge with that provided by the institutions and through networking with other incubatees, thereby improving their capacity to innovate (Díez-vial & Montoro-sánchez, 2016). This expectation of promoting entrepreneurship and innovation challenges incubators to provide programmes that respond to a dichotomous yet contradictory package of expectations. Small businesses' developmental requirements are likely

to differ in addressing the promotion of innovation and national and global competitiveness goals.

According to Al-Mubarak and Busler (2013:1), incubators have three goals: supporting regional development through job creation, aiding in the growth of new ventures, and fostering technological innovation and industrial renewal. The advantage of SMME-created activities is the technology development that includes new or improved processes (Subhan, Mehmood & Sattar, 2013:4), thus expanding the country's productivity into novel spaces while creating pathways for foreign direct investment. According to Tang *et al.* (2013:54), a robust national innovation system will improve the nation's innovation capacity. This system embraces the "triple helix" concept, involving close collaborations between universities, government, and industry, with incubation as an instrumental tool.

The digital industrial revolution can provide leverage in the entire manufacturing value chain by triggering innovation and technology development, which in turn requires technology mastery, skills and investment in plant and enabling infrastructure (DTI 2017:55). These assertions substantiate the view held by numerous governments of developing countries that small business incubators are effective tools for nurturing innovative enterprises capable of contributing to economic development and job creation, and as such are critical components of entrepreneurial infrastructure. The degree to which a firm has access to both inferred and explicit external knowledge sources impacts its ability to exchange and combine this knowledge and generate innovation (Díez-vial & Montoro-sánchez, 2016:42). Therefore, firms' innovative capacity relates to their access to different external knowledge sources and their ability to identify new ways of conjoining these knowledge sources.

4.6 TECHNOLOGY BUSINESS INCUBATION

TBIs have become an essential tool as intermediaries whose actions typically serve to reduce transaction costs, promote science-industry-government interactions, and support the creation of new innovative ventures (Tang *et al.*, 2013:34). Innovative SMMEs lead to new market generation, further accelerating technological developments and creating a conducive environment for the transformation of South Africa's economy (Kanayo & Duncan, 2019:805; Obaji, 2014:111). Technology business incubators (TBI) are essential to nurturing high-growth companies in industries promising for future growth.

SMMEs also need innovative ideas and technology to survive the early years and grow into sustainable organisations. Firms can innovate through an interactive relationship with the university, where the university sometimes leads the development of new technologies and sometimes focuses on problems posed by prior developments or buyer feedback (Díez-vial & Montoro-sánchez, 2016:42).

One expectation from incubators is access to innovative ideas and the latest and advanced technologies that will result in business expansion and economic growth. Such incubators offer support designed to accelerate the capacity and growth potential of SMMEs involved in targeted high-growth or priority economic sectors (Masutha & Rogerson, 2014:142).

There is an established trend among policymakers to consider the science/technology parks/hubs and university-owned (research-based) incubators as a knowledge-based economic development strategy that encourages and supports the start-up and development of innovation-led industry (Madlala, 2018:46; Kim & Jung, 2010). At the heart of incubation and technology parks is the drive for the innovative transformation of companies such that their competitiveness capabilities can meet local and international standards (Sanyal & Hisamic, 2018:11). According to the 2020/21 Annual Performance Plan Revised

(The Department of Small Business Development, 2020:23), ensuring that technology is accessible to SMMEs to strengthen their competitiveness. TBIs are, therefore, identified as enablers for innovative emerging technology-intensive enterprises that will assist them in navigating the volatile business environment.

4.7 TECHNOLOGY BUSINESS INCUBATION SERVICES

The services commonly provided by incubators include shared office space and utilities like internet connections, assistance in marketing products, managerial advice and guidance, access to venture capitalists and angel investors, access to bank loans, links to established businesses, networking opportunities, skills development, and assistance in the commercialisation of technology (Sanyal & Hisamic, 2018:12). The services provided by incubators aims at strengthening the company's ability to function competitively and independently as incubation occurs over a short period (DTI, 2014:12). TBIs are therefore considered as a means of providing exceptional business development service through innovations (Sanyal & Hisam, 2012:11). However, incubators vary significantly in the way they deliver their services; in their organisational structure and the types and needs of clients, they serve.

According to Urban and Naidoo (2012:147), SMMEs face the challenge of high mortality and attribute this problem to, among other issues, entrepreneurs' need to gain the essential technical and industry-specific competencies that are key to sustainability. Tang *et al.* (2013:35) categorised incubation support along the value chain as primary and public platform (financial, marketing, consulting, and training) services. Essential services entail infrastructure and office support, including ICT networks. SMMEs require a high-end skill set to be capable of developing and /or adopting the latest technologies to remain innovative and profitable in highly competitive domestic and global markets. Even though there is an expectation for SMMEs to engage the unemployed, the skills/education profile of job seekers is limited and while it is not addressed adequately, especially in a period that

increasingly requires advanced technical skills to succeed in a fiercely competitive global economic environment (DTI, 2017:21).

However, programmes targeting SMMEs are demand-driven to avoid a mismatch between SMMEs' expectations and the support provided (Rungani & Potgieter, 2018:11). An incubator is expected to provide the physical plant with low market rents, shared service, and logistical support, and business consulting services. It should link effective talent, technology, capital and know-how to accelerate the development of new technology-based enterprises and speed up the commercialisation of technology (Tang *et al*., 2013:34). Hence, incubators are ideal for start-up enterprises with limited resources to acquire the necessary skills and facilities. Although facilities and office space are essential, the true worth of an incubator lies in the services it provides to fledgling entrepreneurs (Sanyal & Hisamic, 2018:12).

4.7.1 Training and networking

Training and the provision of networking opportunities are some of the critical support measures required by SMMEs (Rungani & Potgieter, 2018:2). The other critical service is providing mediation services by acting as an intermediary, which connects incubatees to critical organisations within its external networks (Hewitt & van Rensburg, 2020:8; Baraldi & Havenvid, 2016:55). The networking amongst incubatees is an advantage as firms tend to learn from one another; however, not all firms can benefit to the same extent given their different levels of absorptive capacity (Díez-vial & Montoro-sánchez, 2016:43).Therefore, training becomes essential in improving the incubator's ability to understand and assimilate new knowledge gained from external sources.

4.8 INCUBATOR PERFORMANCE

The apparent lack of a standard methodology for measuring incubator performance is a source of concern in assessing the effectiveness of incubation programmes (Dee *et al.*, 2012:8). This chronic challenge of the absence of generic performance measurement guidelines extends to technology business incubators in spite of contributions from various researchers (Fithri, Hasan, Syafrizal & Games, 2024:2). This emanates from the myriad of strategies, models and stakeholder relations that prevail within the incubation space. The quality of support provided to SMMEs by both the public and private sectors is vital for the success of SMMEs; therefore, there is a need to evaluate how business support interventions function (Rungani & Potgieter, 2018:2).

According to Sanyal and Hisam (2018:12), government-funded incubators tend to inherit national developmental objectives, such as job creation, profitable enterprises, research commercialisation, entrepreneurship awareness, export revenues, policy impact and income generation. Government-funded incubators promise to aid and support SMMEs as these are considered vehicles to address these challenges. Hence, the five main objectives of the incubators are economic development, technology commercialisation, property venture/real estate development, entrepreneurship, and job creation (Al-Mubarak*et al., 2013:896)*. Therefore, the essential question arises of how well these centres and units deliver on generating SMMEs that can address these national challenges. To address this question and knowledge gaps identified that hinder the development of an ideal model for effective and successful incubators, as well as the effectiveness of these centres in supporting SMMEs. The government needs to explore options to derive maximum benefit from the incubators.

A study conducted by Nkosinathi and Robert (2014:642) identified successful graduation enablers for University of Technology Business Incubators (UTBIs) as stringent selection processes and admission criteria, the business support

services, financial resources, university entrepreneurial network/mediation and organisational resources. In a dated study comparing success indicators amongst the US and Korean university technology business incubators, fourteen (14) factors grouped into four areas of goal/operations strategy, physical/human resources, incubator services and networked programmes were identified as critical (Lee and Osteryoung, 2004:419). A comparative study conducted by Tang *et al.* (2013:34) on Indian and Chinese incubators employed indicators such as venture capitals, incubation funds, employees, number of tenant firms, incomes of tenants and incubators, survival rates of tenant firms and the number of graduated tenants. Another study identified six Key Performance Indicators (KPI) for incubators: 1) incubator goals, 2) incubator types, 3) services offered by incubators, 4) foundation year, 5) the number of client firms inside the incubators, and 6) the number of graduate firms from incubators (Al-Mubarak *et al.,* 2013:906). An Indonesian study concluded that external support, knowledge inertia and knowledge management contribute towards incubator performance (Fithri *et al.*, 2024:14). In an early South African study, Buys & Mbewana (2007:357) identified eight (8) correlated factors critical for incubators' success.

These indicators or factors should be compelling enough to guarantee the desired outcomes or to deliver the appropriate benefits to beneficiaries. Ideally, at the programme development or design stage, it should be demonstrated that there is a strong relationship or correlation between the indicators monitored and the desirable outcomes. A Kenyan study aimed at establishing the entrepreneurs' perception of the importance of business incubators revealed that although incubators are considered necessary, there were concerns over the misalignment of actual services delivered and the expectations of incubatees (Sanyal & Hisamic, 2018:13). Incubators connect science, technology, education, knowledge, entrepreneurial talent and capital (Mcadam *et al.*, 2016:70). Nevertheless, not all SMMEs derive similar benefits as knowledge assimilation differs; incubatees develop varying degrees and types of relationships and interactions amongst themselves and with stakeholders. Knowledge networks are essential for

incubatees to benefit from knowledge available within science parks. Studies in Brazilian incubators revealed that their relative success is due to benchmarking for excellence with a focus on specific industries, robust monitoring and evaluation of tenants' progress, and a move towards financial viability and sustainability after three years post-establishment (Sanyal & Hisamic, 2018:12).

4.9 TBI FOR HIGH-GROWTH TECHNOLOGY-BASED/ENABLED SMMES

Some researchers regard incubation as a catalyst to systematically accelerate the entrepreneurial process, thereby institutionalising the support of ventures with potential for high growth (Dee *et al.*, 2012:4). Incubation has emerged as a critical contributor to regional economic growth, with incubation models viewed as effective vehicles of job creation and tools to initiate and revitalise industries and regions, thus emerging as one of "the mainstays of high technology industrial development within regions" (Mcadam, et al., 2016:70). Enterprise growth is one critical consideration for research that aims to study and contextualise the body of knowledge on entrepreneurship incubation (Dee *et al*., 2012:30). The two components that are considered critical for high-growth technology firms are mentorship and access to capital (Mian et al., 2021:17) One major challenge in business support interventions for SMMEs in South Africa is the lack of emphasis on the crucial areas that enhance the success rate and sustainability of SMMEs (Rungani & Potgieter, 2018:2). Knowledge improves an enterprise's capacity to introduce commercial innovation by providing diverse sources of ideas, experiences, and new technologies (Díez-vial & Montoro-sánchez, 2016:47)Incubation should target businesses with a vision to grow and should, therefore, in principle, exclude survivalist entrepreneurs and those with the potential for perpetual residency (DTI, 2014:12). However, this view is challenged as the government is funding some of the incubators and looks at all SMMEs as potential contributors to reducing poverty, unemployment, and inequality. However, there is potential to maximise the benefit from the incubators.

Governments are also expected to provide a supportive policy and resource-rich environment conducive to promoting entrepreneurship (Fernández et al., 2019:54; Obaji, 2014:110). Despite such governmental support, the expected positive impact is yet to be realised (Chux *et al*., 2016:17). This challenge is fundamental for private and government-funded incubators. In response, some researchers suggest that support should target enterprises with potential for growth instead of supporting start-up companies (Sanyal & Hisamic, 2018:10; Obaji, 2014:113).

A German study conducted by kfW Research (Zimmerman, 2017:1) revealed that an enterprise's critical success factors are a competent workforce or human capital, which can assist the organisation in acquiring a competitive edge in the market. This study by Zimmerman (2017:1) found that the likelihood of high growth increases by two-fifths if an enterprise has graduates compared to one with no graduates. With low literacy levels in South Africa, training becomes an essential service the incubator provides. However, to be effective, training offered by an incubator should be specific to a client with a clear intention of imparting skills necessary for growth, thereby excluding survivalists (Rens *et al.*, 2021:240; DTI, 2014:12).

Client-specific training is essential for growth and quick exit from the incubator, as perpetual or long-stay incubation is discouraged. Factors identified as key to the development of high growth, high technology or technology-enabled enterprises include the age of incubatees and levels of education. All these conditions, investment, assets, social and cultural context, and experience with technologies and markets propel firms towards a specific learning path determined by the prior and historical knowledge of the firm and reflected in their specific routines and procedures (Díez-vial & Montoro-sánchez, 2016:43).

4.9.1 Level of education of incubates

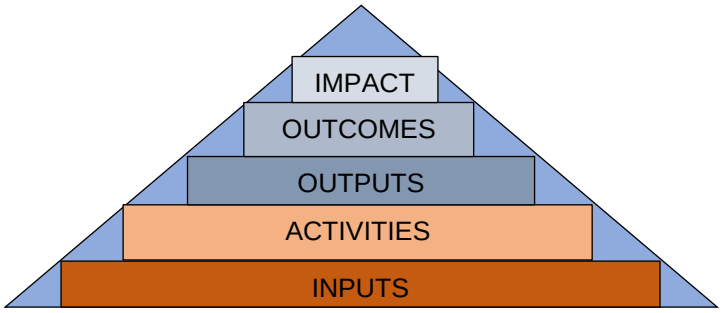
Incubatees' level of education and experience enhances the absorptive capability, thus promoting cumulative advancement as it builds on acquired knowledge (Díez-vial Montoro-sánchez, 2016:43). Hence, the level of education, experience, and prior knowledge will influence how efficiently the incubatees absorb knowledge and, consequently, how successful they will be during incubation. This assertion was also confirmed by a study conducted in Germany, which reported that enterprises with graduates have a 40% chance of success compared to those without higher qualifications (Zimmerman, 2017:1). Another study conducted by Díez-vial and Montoro-sánchez (2016:47) revealed that product innovation is positively related to knowledge from the university as well as the strength of the entrepreneur's knowledge network. Therefore, proximity to universities or knowledge-generating institutions positively affects SMMEs' innovation abilities. In South Africa, 20% of incubatees in public incubators in 2013 owned a tertiary qualification, and even though fewer had a post-graduate qualification, this was accorded to the increase in the levels of educational qualification in comparison to previous surveys (Masutha & Rogerson, 2014:151). According to Rungani and Potgieter (2018:9), in a study conducted on SMME needs in the Eastern Cape province, 68% of the respondents indicated the need for more training as support from the private and public sectors. In selecting tenants or project incubators, owners may base the decision on the entrepreneur's quality or the very idea (Baraldi & Havenvid, 2016:55). Education is also essential to assist the firm in assimilating the knowledge provided. Product innovation is positively related to knowledge from the university and the incubatees' knowledge networks (Díez-vial & Montoro-sánchez, 2016:47). The successful acquisition of external knowledge requires not only a similar knowledge base that allows for a certain degree of mutual understanding among firms and other local institutions, but firms also need to show higher cognitive proximity to the knowledge provided (Díez-vial & Montoro-sánchez, 2016:42).

4.10 INCUBATION PROCESSES

The process of incubation varies and incorporates mentoring and knowledge exchange between various stakeholders to enhance sustainability and growth (Mcadam *et al.*, 2016:69). Al-Mubarak *et al.* (2013:896) noted that studies on incubators lacked guidelines for the successful implementation and evaluation of both business and technology incubators. This scenario applies to both developed and developing countries. Both these factors are critical in developing a framework for practical technology business incubation of small businesses. Further to this argument, Baraldi and Havenvid (2016:54) view incubators as typical of any organisation that gathers inputs or resources and processes these through some activities to outputs, creating value over a specific time and space. For these reasons, the approach adopted in this research study follows the results-based approach to understand the processes within the incubator.

The incubation process will be analysed using the results-based pyramid adopted by the South African Department of Monitoring and Evaluation (DPME), as depicted in Figure 4.1. This results-based approach is preferred as it links the programme's inputs, short-term outputs, and medium-term outcomes to long-term desirable impacts.

Figure 4. 1: The results-based management pyramid



Source: Adapted from the National Evaluation Policy Framework (Ministry of Performance Monitoring Evaluation and Administration, 2011:5)

To enhance understanding of SMME incubation processes, the elements of the results-based management pyramid have been aligned with the incubator's different development paths. Table 4.2 presents the outcome of this alignment.

Table 4. 2: Comparison of the results-based management pyramid and incubation processes

Level	The element of the results-based pyramid	Elements of the incubation development process
0	-	Design stage
1	Inputs	Resources
2	Activities	Services provided by the incubator
3	Outputs	Results of the activities
4	Outcomes	Short-term goals of the incubation process
5	Impact	Long-term goals of the incubation process

Source: Researcher's creation

4.10.1 Incubator design: Level 0 in the results-based management pyramid

Incubator design involves a decision regarding the incubator's location and a feasibility study to determine site-specific needs, challenges, risks, and mitigation measures.

4.10.1.1 Ownership and formation

Incubators can be private or public entities and even co-owned or cofounded by the public/private sector, with a unifying characteristic that the main stakeholders and sponsors di(Hewitt & van Rensburg, 2020:4). Ownership and sponsorship have a direct impact on the incubator's goals, including the determination of its profit or non-profit agenda (Baraldi & Havenvid, 2016:55). Therefore, the

incubator's ownership is critical in shaping its formation, strategic direction, and goals.

4.10.1.2 Location

Incubators respond to the need for provincial economic development by revitalising the local entrepreneurial community and innovation systems. According to Baraldi and Havenvid (2016:54), the location is one of the seven critical components of the incubation process. Most studies consider that there is a high level of tacit knowledge exchange among firms and institutions in geographically concentrated spaces, and this is generally considered the primary location advantage (Díez-vial & Montoro-sánchez, 2016:42)advantage (Díez-vial & Montoro-sánchez, 2016:42). As TBIs are expected to contribute to the economy and play active roles in the local, regional, and international economy (Table 4.1), those located around the KwaZulu-Natal province should promote general regional development through the creation of high-skilled jobs, which will retain the local graduates and attract others from other provinces.

4.10.1.3 Feasibility study

The best practices in incubator design dictate that a feasibility study maximises the success of the TBI by involving community stakeholders in programme development to ensure alignment with incubatees' needs (Al-Mubarak *et al.,* 2013:898). Thus highlighting the importance of involving both the stakeholders and potential beneficiaries. The analysis of the feasibility study will also determine the ideal tenant mix for the incubator, which can range from those who decide to specialise in specific technological domains to generalists (Baraldi & Havenvid, 2016:55). The desirable outcomes and impacts of the TBI and its ideal positioning within the wider innovation, entrepreneurship and small business development ecosystem.

4.10.1.4 Incubation Space

The incubation space is among the vital physical resources for the incubation process (Baraldi & Havenvid, 2016:54). Incubators can be physical and/or virtual facilities necessary to conduct business as support for the development of early-stage SMMEs, which may/may not be accompanied by a suite of comprehensive services and funding opportunities (DTI, 2014:12). Baraldi and Havenvid (2016:54) also consider the incubation as the space for interaction and collaboration amongst various organisations. The incubatee's ability to learn and adapt depends on the available investments and corresponding assets (Díez-vial & Montoro-sánchez, 2016:43).Hence, access to relevant infrastructure is essential for SMMEs. The advent of COVID-19 increased the use of online or virtual platforms for engagements, so there is an expectation that TBI offerings can also be designed or modified to conform to these realities.

4.10.1.5 Facility

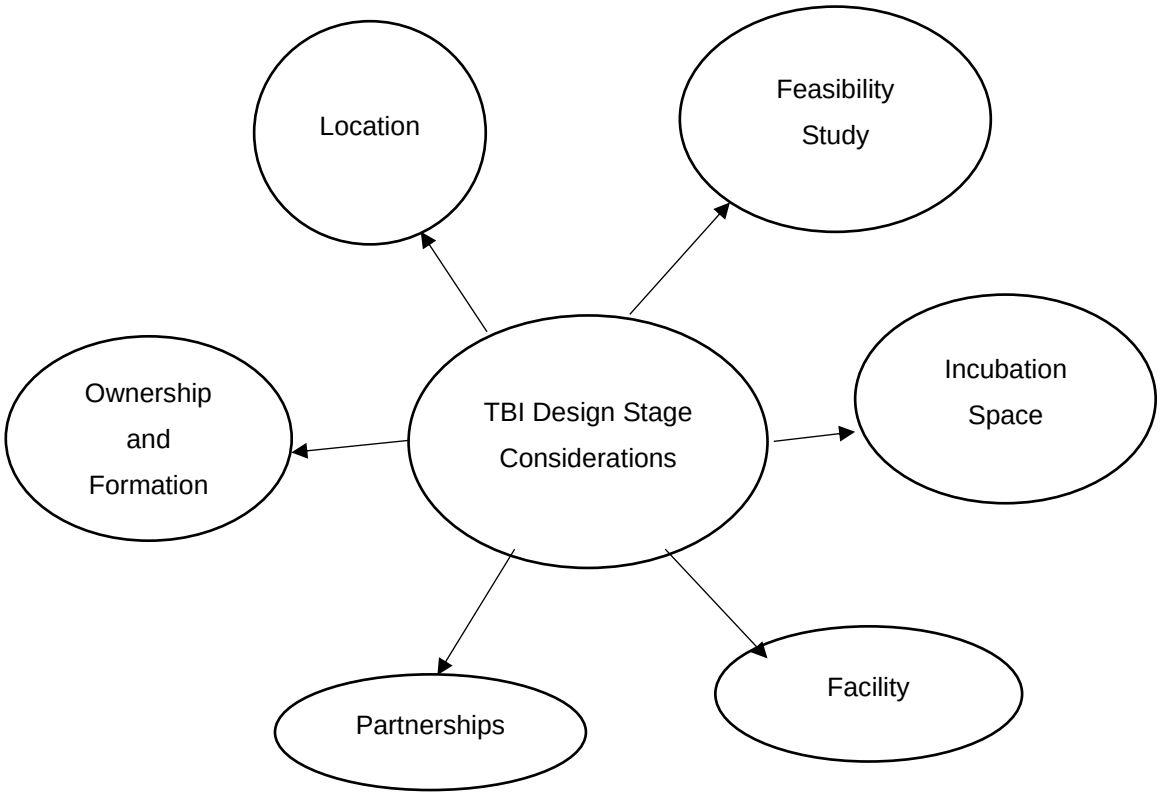
In instances where a physical building is deemed necessary, it must be well equipped to ensure successful incubation, as a lack of appropriate facilities can fatally damage the programme (Kim & Jung, 2010:274). Hence, incubator expenses include maintenance and compliance costs for facilities and equipment. The material resources of the incubator, like facilities and equipment, are essential as shared resources and for creating economies of scale (Baraldi & Havenvid, 2016:55). This factor is considered important in relation to TBIs as access to facilities and high-end equipment, and infrastructure is necessary for technology-focused small businesses.

4.10.1.6 Partnerships

Some of the opportunities noted by the 2020/21 Revised Annual Performance Plan (The Department of Small Business Development, 2020:23) relate to leveraging

strategic public and private partnerships. Incubation is a collaborative procedure usually comprising inter-organizational alliances between government, higher education institutions, industry, and end-user stakeholders (Mcadam Miller & Mcadam, 2016:69). Therefore, partnerships are essential for a successful and effective incubation programme. These partnerships and networks can also be classified as essential immaterial resources for the technology incubator and tend to benefit incubatees as well through legitimacy and knowledge (Baraldi & Havenvid, 2016:55); hence the linkages and partnerships between technology business incubators and universities are essential. Networking opportunities that spawn internally and externally within the greater ecosystem and are grounded on sharing information, innovations and business opportunities are essential for technology-focused small businesses (Abrahams, 2020:6). The summary of the crucial elements of the design phase is presented in Figure 4,2.

Figure 4. 2: TBI Design stage considerations



Source: Researcher's creation

4.10.2 Incubator inputs: Level 1 in the results-based management pyramid

Inputs into the incubator include funding, partnerships, facilities, staff and incubatees.

4.10.2.1 Funding

Public and private sectors can initiate and fund incubators, including non-profit organisations. The source of funding, however, has a strong bearing on the goals of the incubator as funding is generally linked to ownership and formation (Section 4.11.1.1). The South African government funds established incubators to address societal and economic trials (SONA 2019). Hence, government-funded TBIs target the general public goals like job creation, increasing the tax base, economic development and diversification. Profits motivate poverty reduction and private sector funding (Sanyal & Hisamic, 2018:12). Other incubators aligned with universities provide research and business opportunities to staff members, alumni, and other interest groups (King & Jung, 2010:274). Funding of the TBIs influences issues of ownership, strategic direction and targeted incubatees.

4.10.2.2 Incubator practitioners

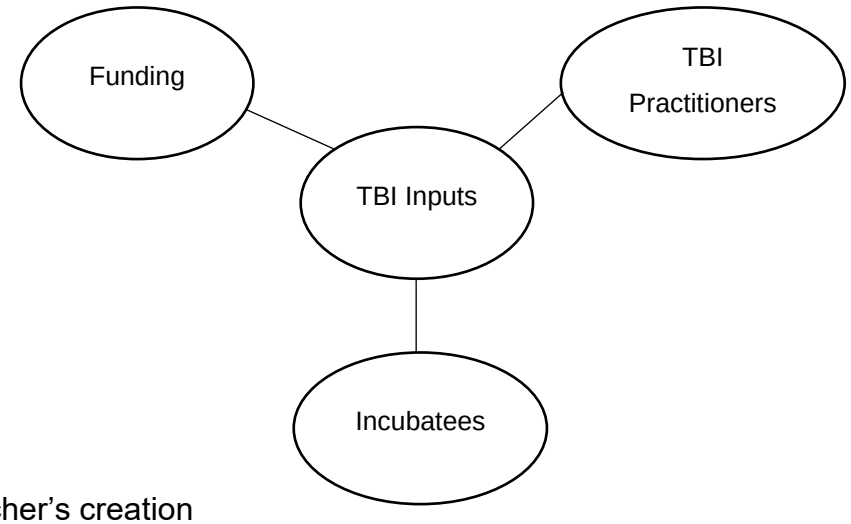
The necessity for business development experts and enhanced relations between the management team and incubatees, coupled with improving sharing of best practices amongst SMMEs, was highlighted by the Masutha and Rogerson study (2014:152) as an imperative. TBI management should be fully equipped with management and business coaching skills (Al-Mubarak & Busler 2011:457). These are essential for companies to develop and eventually graduate from the incubator and become self-sustainable independent enterprises. The incubatee also enjoys exposure to industry professionals who render advice, consulting services and managerial expertise. The South African experience reveals that successful incubation emerges from professional management possessing

adequate skills in business and financial management, business plan development, marketing and funding, coupled with clearly defined networking linkages that will connect incubatees to markets and investors (Masutha, 2014: 34). Managers should also understand that innovation does not solely reside within their core and acquired knowledge but also depends on their ability to source externally from wells like universities and other small businesses (Díez-vial & Montoro-sánchez, 2016:48).

4.10.2.3 Incubatees

The incubatees are a unique stakeholder alliance within the society where the degree of engagement may differ and will influence the demanding role within the incubation ecosystem, thus directing the economic focus to the incubation practice (Mcadam *et al.*, 2016:69). According to Baraldi and Havenvid (2016:55), tenants or what they describe as sources, are one of the critical components of the incubation process. Hence, the incubatee selection process is possibly a vital factor to be considered by the incubator, thus requiring an efficient criterion linked to the identified success factors (Mian *et al.*, 2021:11). Therefore, the incubatees are carefully chosen based on pre-determined criteria with continuous progress monitoring. Incubation programmes have well-defined criteria for admission, and these may include feasible ideas based on a solid business plan (Sanyal & Hisam, 2018:12). The incubatee selection procedure should be a predictable and a well-regulated ranking of fledgling enterprises with the potential to grow (Hewitt & van Rensburg, 2020:4). Incubators need to apply selection rules to different potential incubatees or projects, and these can range from a stringently scientific concept emanating from a university to any portable entrepreneurial idea (Baraldi & Havenvid, 2016:55). A summary of the TBI inputs are summarised in Figure 4.3.

Figure 4. 3: TBI Inputs



Source: Researcher's creation

4.10.3 Incubator Activities: Level 2 in the results-based management pyramid

Incubator activities relate to the actual operations undertaken in service to the incubatees (Baraldi & Havenvid, 2016:55).

4.10.3.1 Services

According to Tang *et al.* (2013:35), the role of incubators has evolved to value-added services and systematic incubation processes. Incubator activities respond to the goals established to achieve, and its operations should be geared towards ensuring efficiency and effectiveness. Incubation activities intend to support new enterprises with high growth potential and aim to generate value through technology (Dee *et al*., 2012:1); hence, this research study is focused on technology business incubation. The key idea behind the incubator's services is to create and nurture new businesses and ensure their growth and development into sustainable independent enterprises. Services offered by incubators can incorporate unique types of office areas, flexibility in rental terms, proximity to

technology, funding, and technical aid in the fields of marketing, legal, finance, human resources, and other enterprise development support (Sanyal & Hisamic, 2018:10; Masutha & Rogerson, 2014:143). Business incubation offers operational and strategic assistance for the prosperity and progress of entrepreneurship (Sanyal & Hisam, 2018:11). The other activities of the incubators include facility renting, coaching, training, and networking (Baraldi and Havenvid, 2016:53). In these sites, small businesses can easily engage personally and exchange information informally, thus creating a trust-based environment so that coalitions and partnerships can flourish (Díez-vial & Montoro-sánchez, 2016:41).

The South African Handbook on Incubation (DTI, 2014, 12) excludes generic training, indefinite support, support for established revenue-earning SMMEs, and businesses solely requiring funding. Tang *et al*. (2013:35) categorise incubation support along the value chain as a fundamental and societal platform (financial, marketing, consulting, and training) services investment that an entrepreneur requires.

SMMEs require a high-end skill set for them to be capable of developing and /or adopting the latest technologies to remain innovative and profitable in highly competitive domestic and global markets; hence, incubators also provide R&D support, which generates enhancement of innovation aptitude (Kim & Jung, 2010:273). By placing entities that are identical or complementary within proximity to one another, the incubator can also perform the essential function of formally and informally promoting knowledge transfer (Sanyal & Hisamic, 2018:10). Even though there is an expectation for SMMEs to engage the unemployed, the competencies/education profile of job seekers is low and is not receiving the necessary attention, especially in the current era where the demand for advanced technological skills is critical to success in this ferociously competitive world economic atmosphere (DTI, 2017:21).

4.10.3.2 Self-sustainability

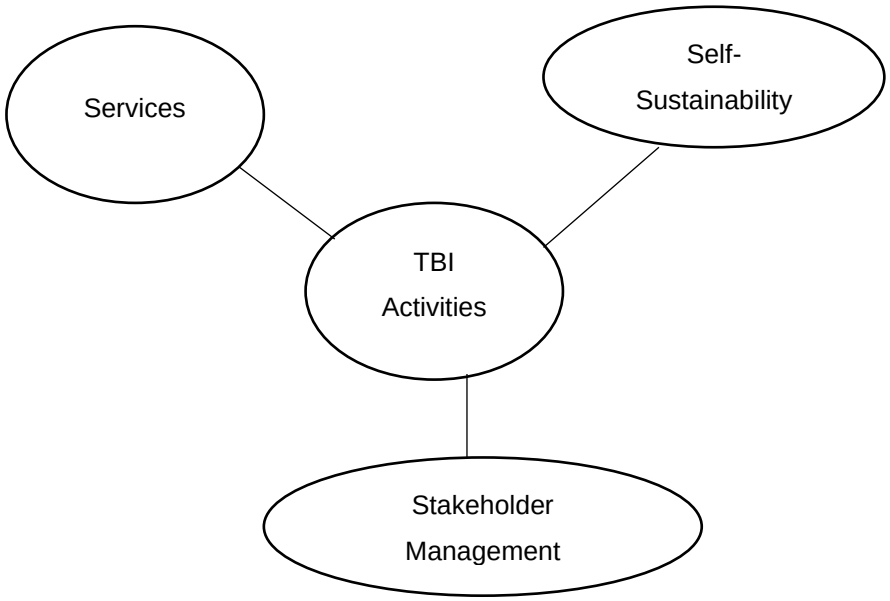
Self-sustainability should be one of the goals of the incubation programme (Al-Mubarak & Busler, 2011:457). Irrespective of the formation or ownership structure, the proper functioning of the incubator requires the liberty to exert direct control over its incubatees through a well-defined monitoring function (Baraldi & Havenvid, 2016:55). Sustainability in economic development relies on the prompt of innovation and new small business establishment within regions (Mcadam *et al.*, 2016:69). Regional innovation systems are a critical component in research studying the bodies of knowledge on entrepreneurship incubation (Dee *et al.*, 2012:30). However, innovative entrepreneurship research and knowledge is inadequate (Ayandibu & Houghton, 2017:133). The TBIs are, therefore, challenged to devise strategies that will ensure their long-term sustainability.

4.10.3.3 Stakeholder management

Incubators are ingrained in a regional ecosystem comprised of critical stakeholders such as industry clusters, post-school education, research centres, financial houses and investors (Fernández, Santo & Jimenez, 2019:42; Mcadam *et al.*, 2016:70). The effectiveness of the incubator is dependent on the continuous relationships it builds with other members of the entrepreneurship and innovation ecosystem. Stakeholder management is also critical, as the incubator needs to secure its position within the regional innovation system. Stakeholder attributes include power, as the assumed aptitude to effect organisational accomplishment; legality, which renders stakeholders' engagements as necessary, suitable or proper; and earnestness, as it relates to the extent to which stakeholder privileges are seen demand instant attention (Mcadam *et al.*, 2016:71). The small business incubation industry relies on cooperation rather than competition with other entrepreneurship support agencies or programmes (Al-Mubarak & Busler, 2011:457). According to Baraldi and Havenvid (2016:53), the degree of engagement of incubators with other stakeholders, such as public agencies,

financiers, and established firms, needs to be better scrutinised, save for mere acknowledgement. There is also a need to understand incubation systems at the meso level, which, in the framework of incubation, condenses several relations amongst internal and external role-players within the quadruple helix model having unique organisational characteristics (i.e. culture, resources, and skills) (Mcadam *et al.*, 2016:71) as a means of promoting entrepreneurship and innovation, incubator managers must adopt an educational role amongst communities about their product offerings, goals, and achievements, which may result in increased revenue and enhanced reputation, including membership of relevant national and international associations to ensure continuous improvement (Al-Mubaraki & Busler, 2011:457). The critical TBI inputs are summarised in Figure 4.4.

Figure 4. 4: TBI activities



Source: Researcher's creation

4.10.4 Incubator Outputs: Level 3 results-based management pyramid

Outputs of the incubator are generally classified as statistics that relate to clients that benefitted and services rendered. These outputs are managed through the TBI's periodical monitoring and evaluation exercises. The government-funded

incubators should assist the government in reaching out to the targeted sectors of the communities. As part of the monitoring and evaluation processes, incubator managers need to demonstrate their effectiveness by reporting on the number of clients it was able to service or support and indicate the range of services that are considered essential for the sector, for sector-specific incubators, or the business survival for non-sector specific incubators (Kim & Jung, 2010:274).

4.10.5 Incubation outcomes: Level 4 results-based management pyramid

The outcomes anticipated from the incubation process tend to differ, given the varying goals and ownership arrangements. Baraldi and Havenvid (2016:55) classify outcomes as those relating to the incubation process's initial side, such as tenancy rates. Others are concerned with the performance of the incubatees (including capitalisation and patents) till graduation and even those that relate to the economic standing of the incubator, such as income, capital, and financial position. According to Al-Mubarak and Busler (2013:2), there are four strategic outcomes for incubators: entrepreneurial conditions, commercialisation of technologies, job creation, innovation, and diversification of regional economies.

The differentiated views on outcomes can be aligned with the founding organisations' or governments' ownership, values and goals. In a comparative study of Chinese and Indian incubation programmes, Tang *et al.* (2013:), considered outcomes such as venture capitals, incubation funding, staff, number of incubatees, residence income, survival statistics for incubatees and the number of graduated entities. These studies illustrated the varied expectations of incubator performance for the different regions of the globe with stratified developmental levels. A study conducted in the Oman Sultanate reported an increase in revenue demonstrated by graduates of incubation programmes (Sanyal & Hisamic, 2018:13).

4.10.5.1 Graduate Incubatees

The primary function of the incubator is to increase the prospects of an enterprise surviving the seminal years (Dee *et al.*, 2012:4). Incubators, by design, are meant to shorten the development of the enterprise; hence, this process is time-bound, and the incubation programme is therefore meant to be a short-term intervention (Baraldi & Havenvid, 2016:55). Most businesses must use their facilities once self-sustainability has been established and fulfil the graduate criteria of the program (Sanyal & Hisamic, 2018:12) hence one of the incubator's significant outcomes is the generation of independent self-sustainable businesses. Baraldi and Havenvid (2016:55) further argue that the incubator's experience and learning curve also impact the incubation period's length.

4.10.5.2 Fostering an entrepreneurial climate

Incubators are a support instrument that structures new entrepreneurs by providing them with assistance and sustenance necessary for growth. The incubator environment aims to nurture and support start-up companies to the extent they can independently operate. The creation of new businesses is at the heart of the intent to accelerate the growth of the local industry. Masutha & Rogerson (2014:15) reported that 40% of incubatees in public incubators entered incubation programmes armed with the idea that was subsequently delivered into an operating enterprise, with (60%) having owned businesses before joining the incubator.

4.10.5.3 Commercialization of technologies, innovation, and economic diversification

New entrepreneurs face several trials in initiating, growing, and nourishing their enterprises and these range from regulations governing labour and market issues, identifying and securing appropriate markets and funding for their products, limited

access to education and training and inadequate R&D infrastructure (Sanyal & Hisamic, 2018:10). From 1995, the South African government introduced a roll-out of key policy initiatives and establishments targeting enhanced support for the SMME-based economy premised on international best practice. Amongst these was the promulgation of the TIA Act (Act 26 of 2008) in 2008, which saw the establishment of the public agency, TIA, which was mandated to promote the competitiveness of the nation through innovation (South African Government, 2008:4).

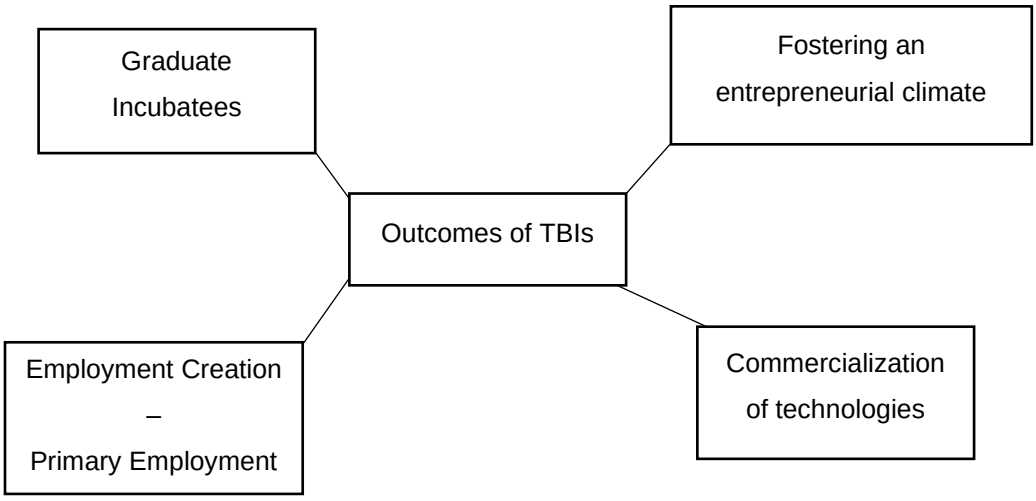
In essence, the TIA Act instituted this agency as a purpose agent that will promote and sustain inventions innovated through public finances. To further provide support to the TIA Act, the SA government instituted the Intellectual Property Rights from Publicly Financed Research and Development Act (Act 51 of 2008) (South African Government, 2008a: 3). The objective of Act 51 of 2008 is to ensure that intellectual property (IP) resulting from publicly funded R&D is recognised, protected, utilised, and commercialised in favour of the citizens of the Republic, and such benefits may accrue in the areas of a communal, financial, army or any other advantage (South African Government, 2008b: 6). The function of ensuring compliance with this Act is for the National Intellectual Property Office (NIPMO) (South African Government, 2008b:6).

TBI programmes provides an opportunity to promote a diversified economy by promoting and supporting technology and innovation amongst SMMEs. This opportunity is made real through technology transfer and commercialisation of innovation. The presence of incubators should promote identifying potential spin-in or spinout business opportunities. Incubators' other strategic goal is to promote entrepreneurship amongst the designated groups, including women. The Oman Sultanate government is looking at promoting SMMEs and incubation as a measure of diversification of its economy from heavy reliance on a hydrocarbon-intensive economy (Sanyal & Hisamic, 2018:14).

4.10.5.4 Employment Creation – primary employment

This study will differentiate between the two kinds of employment associated with incubators. The first kind is the creation of employment for owners of start-up companies or entrepreneurs, and this will be the primary employment and among the outcomes of the incubation process. This differentiation is essential because technology-intensive businesses may not create jobs in large numbers, especially during their nascent years. Secondary employment is that of business employees, which is discussed under the impacts of incubation. The study conducted by Masutha and Rogerson (2014:152) revealed the limited growth of businesses, with each enterprise adding, on average, one employee since joining the incubation programme. The summary of the expected outcomes of the TBIs are presented in Figure 4.5.

Figure 4. 5: Outcomes of TBIs



Source: Researcher's creation

4.10.6 Incubator Impacts – level 5 results-based management pyramid

The desirable impacts of incubation are economic development, job creation, poverty reduction and inequality redress. The ultimate incubator economic impact is realised when the original idea that an entrepreneur presented is nurtured into a sustainable graduate enterprise that is making a positive contribution to the economy through employment creation, diversification and growth of the economy, and ultimately improving the livelihoods (Sanyal & Hisamic, 2018:12; Al-Mubaraki *et al*. 2013:896).

4.10.6.1 Employment Creation - Secondary

One of South Africa's grand societal challenges is the extreme unemployment rate, which currently stands at 43% (STATS SA, 2023). This challenge speaks directly to SMMEs' reliance on operations that are intensive in terms of labour and require minimal capital investments, as they tend to absorb local human capital (Rungani & Potgieter, 2018:1). Considering the continued persistently elevated levels of poverty and unemployment throughout South Africa, SMME advancement remained a priority for government policy (Masutha & Rogerson, 2014:142), a situation which is yet to change. However, researchers and scholars confirmed the positive impact of business incubators on job creation, including the Business Incubation Industry study of incubators in North America, which showed that 19,000 companies and more than 245,000 jobs have contributed to the economy (Sanyal & Hisamic, 2018:12).

Universities provide access to knowledge and resources from other firms and institutions, thus establishing links between incubatees, external companies in similar industries, and local institutions (Díez-vial & Montoro-sánchez, 2016:42).

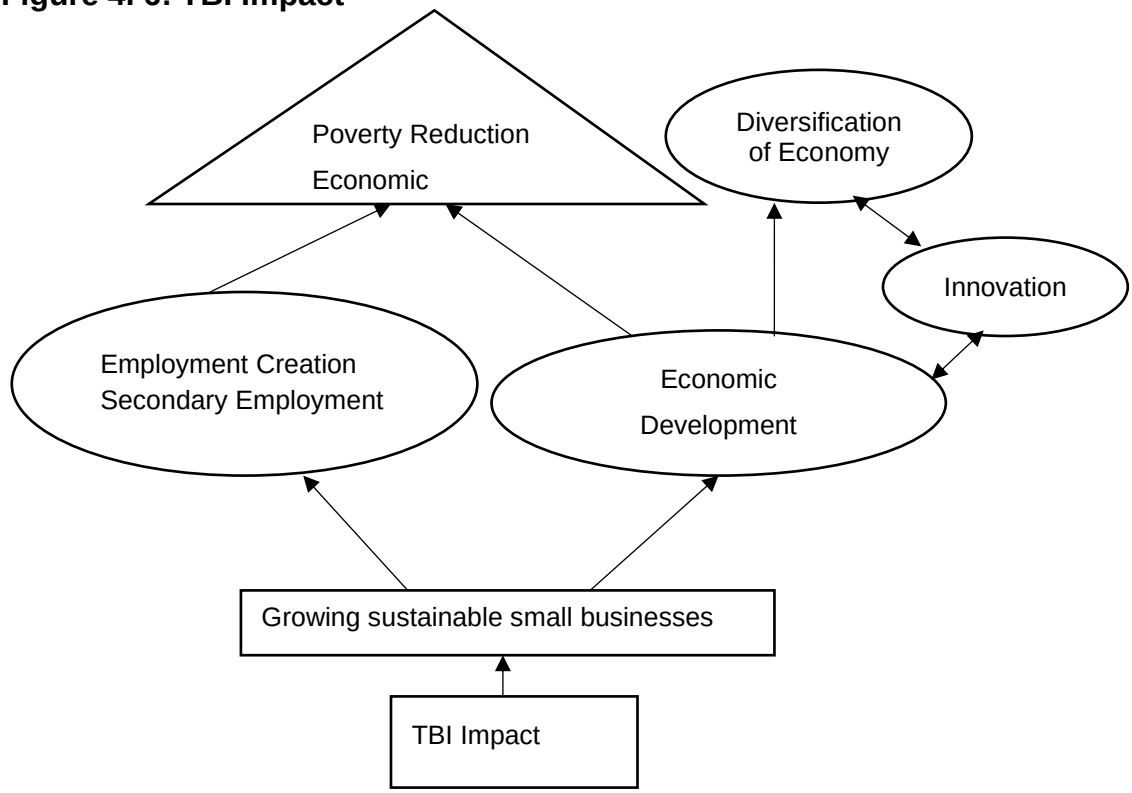
4.10.6.2 Economic development

Some researchers even identify incubation as a tool for economic development (Al-Mubarak & Busler, 2013:2). Services provided by incubators should strengthen the company's ability to function independently as incubation is meant to be a short period (DTI, 2014:12). Perpetual or prolonged stay incubation should be avoided and discouraged. The incubated businesses should aim to grow, but this should exclude survivalists (DTI, 2014:12).

Incubators have a positive contribution to economic development in China (Torch programme), Missouri, the USA and Pakistan (Sanyal & Hisamic, 2018:13). A related study conducted in Kenya aimed at establishing the impact of incubators on the GDP of Kenya found a strong positive correlation between the number of incubators and the growing GDP (Kihonge & Ogutu, 2016:240). By minimising the likelihood of SMME failure, incubation becomes an essential driver of entrepreneurship, which leads to economic progress and employment creation; as such, the NDP of South Africa 2030 identified incubation as one of the levers for achieving its goals (SA Government, 2012).

TBI should advance the economic progress of its population by increasing the survival rate of start-ups and technology-focused companies and empowering them to operate successful enterprises. Incubators may further impact well-positioned communities by magnetising externally sourced manufacturing investments that will result in competitive jobs (Sanyal & Hisamic, 2018:12). The desirable impact of the TBIs is presented in Figure 4.6

Figure 4. 6: TBI Impact



Source: Researcher's creation

4.11 THE ROLE OF TBI IN AN ENTREPRENEURSHIP ECOSYSTEM

According to Boucher, Cullen and Calitz (2024:1185), an entrepreneurial ecosystem is a structured set of mutually dependent elements, such as government, universities and service providers, that facilitate productive entrepreneurship within a given location. It also incorporates entrepreneurship structures and processes that collectively contribute to the establishment and growth of small businesses (Hruskova, 2024:39). To foster collaboration among various entities, knowledge and funding organisations such as higher education institutions, small business incubators, and technology transfer entities are vital for a thriving entrepreneurial ecosystem (Correia, Marques, Silva & Ramadani, 2024:1749). Hence, incubators have generally become a vital component of the

vocabulary of small business development and an essential part of any progressive entrepreneurial ecosystem, promoting the growth of an innovative economy (Mian, Klofsten, & Lamine, 2021:1). South Africa is experiencing a similar incubator growth patterns as those observed in the US, where only 12 incubators were recorded in 1980 and by 2018, over 1 250 incubators were operating (Sanyal & Hisamic, 2018:13). By 2013, in SA, public sector accounted for 82% of the national incubators, and the majority of these (84%) were sector-specific, with the significant clusters of these entities b located in Gauteng and, KwaZulu-Natal trailed by the Eastern Cape, Western Cape, and Mpumalanga (Masutha & Rogerson, 2014:149). TBIs impact people's cultural beliefs, technology divergence, economic advancement, employment creation, the establishment of viable enterprises and revenues from profitable products (Al-Mubarak *et al.,* 2013:897). This trend is also evident in the adoption of development policies that target stimulating regional innovation co, competencies, particularly in the models for incubation of new technology-based enterprises (NTBFs) in science/technoparks that are being rapidly adopted in many countries (Kim & Jung, 2010:273)TBIs also promote linkages among universities, research establishments, business groups, industry band development, and the evaluation of a business's risk profile (Sanyal & Hisamic, 2018:10).

According to Baraldi and Havenvid (2016:54), incubation and its components should not be viewed merely as an arrangement to which the incubators are expected to fit but rather as specific players with whom businesses interact. The incubation ecosystem consists of the intricate, interconnected work of associations and exchanges of players that aid in bridging macro and microsystems in the regional innovation systems and the involvement of institutions defined by the strategy, culture, skills, and knowledge base (Kansheba & Wald, 2020) (Mcadam et al., 2016:70). Hence, there is a need to develop a viable entrepreneurial ecosystem comprising public and private entities to boost regional and national economic enhancement. Correspondingly, industrial incubators that enhance

manufacturing are also essential, as most current start-ups have service-based businesses (Sanyal & Hisam, 2018:16).

Incubation has portrayed an essential position in economic development theory as these collaborations ensure that the communities enjoy the benefits of increased employment, additional revenue (industrial development) and prosperity (Al-Mubarak *et al.,* 2013:896). Following the literature on networks, geographic closeness assists the interchange of knowledge amongst enterprises and between them and other establishments, in particular, implicit information which cannot be shared easily (Díez-vial and Montoro-sánchez, 2016:43). University stakeholders, academic entrepreneurs, employees of the Technology Transfer Office (TTO) and incubators, industry financiers, policymakers, and users of innovation are all part of the small business incubation system as they assist in promoting technology transfer and diffusion into the economy (Mcadam *et al.*, 2016:70).

Incubation programmes are designed to achieve a variety of objectives, and these tend to be specific to the national and regional business environment where the incubator is located (Dee *et al.*, 2012:4). It is therefore essential to consider contextual factors when exploring incubation processes in a regional setting as there is likely to be variances in incubation models and performance across regions (Mcadam *et al.*, 2016:69). This assertion is also noted by Rungani and Potgieter (2018:11), further stating that the SMME support approach of a one-size-fits-all is incorrect, as the unique characteristics and specifics of the environment need to be considered. The geographic focus of this research study is on the province of KwaZulu-Natal to capture its uniqueness and investigate the most effective approach to incubating small businesses. Therefore, there is a need to identify specific regional and local factors that will affect the incubation process.

4.12 SUMMARY

Small business TBI can positively impact an economically developing country's societal and economic development goals. Growing and developing the economy, as in the case of South Africa, unavoidably requires that some resources be channelled towards the SMME sector, which, in turn, will generate many benefits for the whole country and economy. The KZN provincial government must ensure its strategies are attractive enough to keep companies within the provincial borders. TBIs provide uniquely significant linkages in the entrepreneurship value chain at a local level. They should encourage the graduated incubatees to stay within the same land authority to improve regional economic expansion and to kindle an unceasingly growing regional innovation system. This accumulation of SMMEs will assist KZN in improving its socio-economic status and provide for its growing population through diverse and technology-based companies that can attract national and foreign investments into the province. However, the TBI process itself is a complex, multifaceted process that requires a broader and deeper understanding and sustenance to safeguard the triumph and sustainability of the programmes and their graduated SMMEs.

CHAPTER 5: CONCEPTUAL FRAMEWORK, RESEARCH DESIGN AND METHODOLOGY

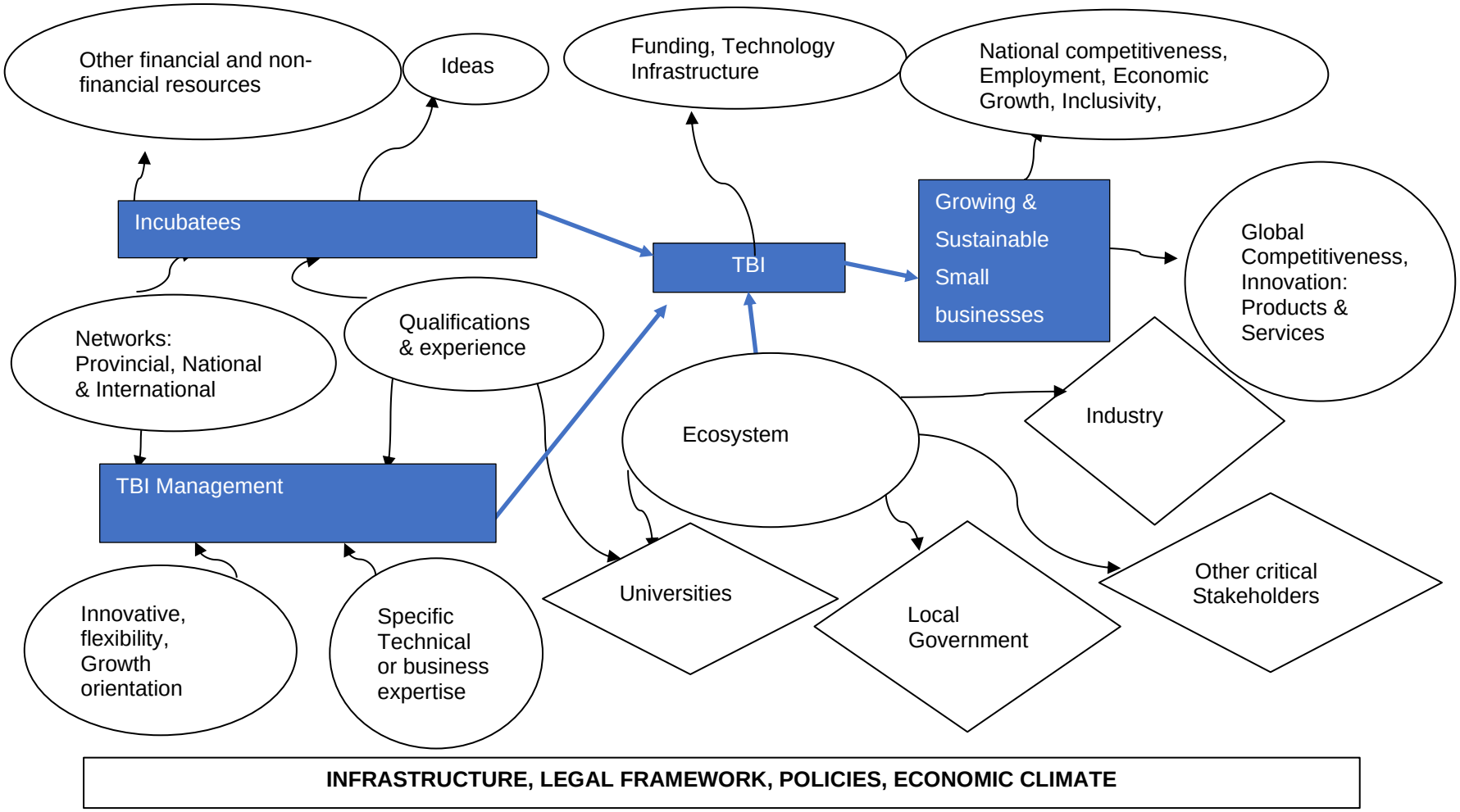
5.1 INTRODUCTION

Chapters 2, 3 and 4 delivered the literature overview on the nature and role of technology business incubation of small businesses. The concept of technology business incubation of small businesses was also expounded upon by scrutinising the various processes of technology incubation and business incubation. Based on the antecedent literature overview, Chapter 5 commences with a discussion on the framework for the technology business incubation of small enterprises as conceptualised for this study. The conceptual framework discussion precedes the summary of the research design and paradigms embraced in this study, the approaches to theory development, and the description and justification of the methodological approaches. This chapter also presents the research strategy (methodologies) embraced in the current study, a comprehensive plan that instils confidence in the validity and reliability of our findings. This chapter responds to the following methodological objectives:

5.2 MO4: To develop a conceptual framework to guide and define the study'CONCEPTUAL FRAMEWORK

Following the primary objective of this research study, Figure 5.1 offers a conceptual framework that specifies a logical structure for describing how technology business incubation of small businesses occurs. Collins and Stockton (2018:2) define it as a map of how the consulted literature works to get the connections and interactions in each study. The conceptual framework also provides the theoretical basis for the adopted research design (Varpio *et al.*, 2020), as presented in the discussion that follows.

Figure 5. 1 A conceptual framework for technology business incubation of small businesses



Source: Researcher's creation

The conceptual framework presented in Figure 5.1 amalgamates existing views in the literature about technology business incubation (Imenda, 2014: 189). This qualitative study seeks to develop or add to theory by linking a well-defined literature set to a definite conceptual framework (Rocco & Plakhotnik, 2009:122).

Trafford and Leshem (2012:86) further assert that it provides the foundational theoretical elaboration the researcher intends to scrutinise. Based on Bickman *et al*. (2014:222), the conceptual framework indicates "concepts, assumptions, expectations, beliefs, and theories that inform and support" the research study. These will be discussed:

5.2.1 Assumptions

The study is based on the following assumptions:

- Incubatees are small businesses with functional, technology-based ideas that have the potential for development and successful market entry.
- Incubatees have the functional knowledge and experience necessary for technology-focused small businesses.
- TBI have the necessary expertise, knowledge and infrastructure to support incubatees.
- The province of KwaZulu-Natal is supportive of the technology-focused small businesses.
- The small business ecosystem in the province of KwaZulu-Natal is vibrant and supportive of technology-focused small businesses and technology business incubation. These will include industry, local universities, local government and other critical stakeholders.

5.2.2 Concepts

The key concept in the study is technology business incubation, which incorporates both technology incubation and business incubation.

5.2.3 Expectations and beliefs

The key expectations for the study are that:

- The TBI graduates are equipped to become sustainable, growing small businesses that will contribute to provincial challenges of poverty, stunted economic growth, inequality and unemployment

5.2.4 Theory that informs and supports the research study

Resource-Based Entrepreneurship Theory is the adopted theory that informs and supports this study. The Resource-Based theory is premised on enterprises being potential creators of value-added capabilities superior to competitors, which are developed as core competencies, knowledge, and skills by the enterprise itself (Caldeira & Ward, 2003:128). Hence, enterprise-level factors shape the enterprise's profitability more than industry-level aspects. According to Barney (1991:105), “strategic” resources are valuable, rare, inimitable, and not substitutable, and they become key differentiators between enterprises that have advantages vis-à-vis those that do not. The resource-based theory is founded on the need to understand how enterprises gain sustainable competitive advantages (Caldeira & Ward, 2003:133). It further argues that finance and time are not the only resources essential in building a prosperous business. Enterprise resources include assets, capabilities, organisational processes, information, and knowledge controlled by the business that enable it to perceive and implement strategies that improve its efficiencies (Tutuba & Tundui, 2022:13; Kellermanns, Walter, Crook, Kemmerer & Narayanan, 2016:36; Barney, 1991:101). The organisation’s resources also include all tangible and intangible inputs accessible to the business owner, including physical assets, know-how and human capital (Amit & Schoemaker, 2016:1).

This study aims to develop a framework for growing sustainable small businesses in KwaZulu-Natal. This theory was adopted as the theory of choice for this study,

arguing that entrepreneurs need resources to launch and operate their businesses. It, therefore, suggests that access to resources relating to financial capital, human talent, or proprietary technology is essential in giving the enterprise the necessary competitive advantage. TBIs provide small businesses with resources they will otherwise not have access to outside of the TBI. The TBI interventions revealed that the support provided by these entities ranges from technological support to access to finance and experts in various fields of technology and facilities. These are key resources for the growth and expansion of the technology-focused small businesses. The Resource-Based Theory appeared to offer possible explanations for technology business incubation, given that the determining factors for incubatees joining the TBIs are associated with their internal contexts of lack of technological and business resources that will assist in growing a sustainable business. This theory emphasises the role of entrepreneurs in driving economic growth and development. It states that entrepreneurs introduce new products, processes, and business models that create new opportunities.

The resource-based theory argues that resources are necessary for an enterprise's competitive advantage (Kellermanns, Walter, Crook, Kemmerer & Narayanan, 2016:27). Barney (1991: 102) described competitive advantage as a value-creating strategy that current or potential competitors are not simultaneously implementing, and sustained competitive advantage is created when other enterprises cannot duplicate this strategy. Hence, an enterprise's competitive performance is related to its tangible and intangible resources and capabilities, as these input factors are critical for value creation (Tutuba & Tundui, 2022:13).Hence, the development, growth, and sustainability of technology-focused small businesses depend on efficient access to the necessary resources and capabilities.

The resource-based theory further argues that sustained advantage results from an enterprise's unique attributes (Caldeira & Ward, 2003:139). Competitive advantages can also be reached through factors such as social capital derived

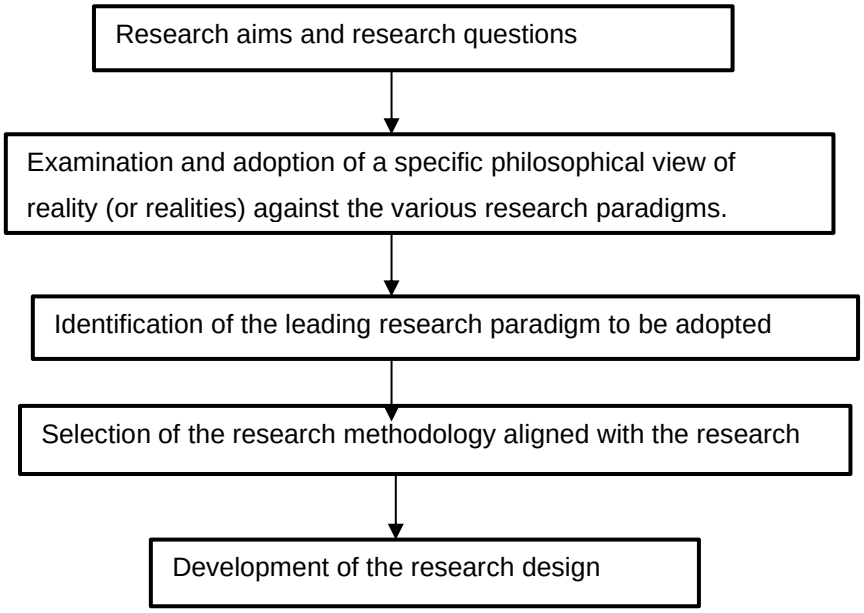
from social networks, organisational process innovation through products and processes (entrepreneurial) for cost efficiency, and intellectual capital expanded from employees, among others, to remain sustainable (Campbell & Park, 2017:303).

This theory also applies to this study as it relates to high-technology enterprises requiring scientific and technical resources and capabilities to strengthen their development, survival and growth (Kellermanns *et al.*, 2016:27). This phenomenon applies to large enterprises but is also true for small businesses. The impact of technological progress, deregulations and innovation has resulted in organisations increasingly relying on their resources and those of their partners as an integral part of their ecosystem (Amit & Schoemaker, 2016:4). This is aligned with the concept of TBIs, where small businesses are allowed to grow from within the TBI. Consequently, RBV provides a framework for the number of resources essential, but businesses' competitive performance is linked to how such resources are orchestrated. The orchestration requires a more robust institutional framework that can organise resources, fungible and complementary assets, necessary for the value system to create value. Emerging technology-focused small businesses can only survive if they can acquire the necessary resources and capabilities, that is, skills and assets, and that is what TBIs are designed to achieve.

5.3 RESEARCH DESIGN

A research design presents rationalised techniques and procedures employed in collecting and analysing the data to respond to research questions and objectives (Saunders, Lewis, & Thornhill, 2019:163; Alavi *et al.*, 2018;529;Kalu & Bwalya, 2017:46). Figure 5.2 schematically presents the methodological approach, which consists of sequential steps that address the philosophical, theoretical, and practical requirements for conducting research.

Figure 5. 2: Schematic representation of the methodology process



Source: Adapted from Wahyuni (2012: 78)

The research methodology provides the theoretical and ideological foundation when a researcher chooses a particular research method (Wahyuni, 2012:72). By definition, a methodology discusses the model/strategy or plan of action to perform the research within the context of a specific paradigm; informed by the underlying set of beliefs that dictate the appropriate research method; while a research method comprises of a suit of particular procedures, instruments, and techniques to collate and analyse the data (Scotland, 2012:9; Wahyuni, 2012:72). This analysis, therefore, differentiates between the research methodology and research methods.

Table 5. 1: General research design descriptors and adopted descriptors for this research study

Descriptors	Possibilities	Adopted Descriptor and Reasoning
Research category	**Exploratory:** Initial research into an idea or observation and when a greater understanding is desirable.	The exploratory research category was adopted to direct the stricture of this study as it assists in formulating challenges, clarifying concepts, and sponsoring hypotheses (Sue & Ritter, 2012:2).This study commenced with a critical literature review, followed by engagement with individuals who are considered experts and, as such, knowledgeable in technology business incubation. It followed a qualitative research approach, which is typical of such studies.
	Descriptive: This kind of research is guided by the desire to describe circumstances, people, and products based on one or several research questions (Sue & Ritter, 2012:2). Hence, it relies on established groundwork to enhance understanding and further explore and explain a given concept.	
	Explanatory: According to Sue and Ritter (2012:2), the fundamental intention of explanatory research is to explain why the specified phenomena occur and further predict their occurrences. It involves creating links and causal effects and building exploratory and descriptive stages.	
Purpose of the Study	**Phenomenology** Grounded theory Ethnography Descriptive	A phenomenology study seeks to understand and describe a phenomenon's universal essence by investigating participants' everyday experiences (Doyle, McCabe, Keogh, Brady, & McCann, 2020:444). This research study sought to understand the process of technology business incubation as experienced by managers of these programmes and their incubatees.
Research Approach	**Qualitative** Quantitative	A qualitative research approach was adopted because, according to Creswell (2009:4), it is ideal for understanding the meanings participants attach to their experiences of the phenomenon. The choice of qualitative over quantitative approach, which seeks to test objective theories by examining relationships among variables (Creswell, 2009:4), aligns with the researcher's ontological belief that participants have a role in shaping reality.

Theory Development (Logic of the Research Study)	**Inductive Reasoning** Deductive Reasoning Abductive Reasoning Research needs to align itself within the inductive/deductive binary continuum by indicating the choice of theory development from the hypothesis formulated by the researcher or from data presented in the findings; however, it may consider the middle ground of abductive reasoning, which harnesses both views(Collins & Stockton, 2018:2)	Theory development aligns research strategies and methodology to suit a particular research study and helps to identify and eliminate possible constraints, such as limitations on data or information; thus, it further dictates the questions, the kind of evidence to be collected, its context, and subsequent interpretation (Saunders *et al*., 2019:157). This study adopted inductive reasoning.
The method of data collection	**Participant Interviews** Qualitative studies use non-quantitative methods to contribute new knowledge and provide new perspectives on issues (Tong *et al*., 2007: 350). These non-quantitative methods explore meanings of social phenomena experienced by individuals in their natural context (Alhazmi & Kaufmann, 2022:2; Malterud, 2001:483).	The most common method for collecting empirical data in qualitative research is interviews followed by focus groups (Chenail, 2011:15); (Tong *et al*., 2007:350). Interviews can be ‘‘structured’’ thus allowing only predetermined questions as outlined in the guide, or "semi-structured" where follow-up on predetermined questions is possible (Grossoehme, 2014:104). This research will adopt semi-structured interviews as the method of collecting data.
The researcher’s control of variables	**Exploratory research** Natural experiment (Ex post facto) Experimental or quasi-experimental	Qualitative research addresses the need to understand human experiences and situations, which may incorporate the individuals’ cultures, beliefs, and value systems (Kalu & Bwalya, 2017:43). It is beneficial for exploring complex phenomena that are challenging to measure with quantitative studies. This study adopted an exploratory research approach, where participants' experiences emerged through face-to-face and online interviews.
The research environment	**Field research setting** Laboratory research Simulated research	The essence of most qualitative research is to study a phenomenon in its natural setting (Kalu & Bwalya, 2017:47) This study was conducted in a natural setting through interviews with participants.
The time dimension	**Cross-sectional** Longitudinal	Any research study's time horizon can be longitudinal or cross-sectional (Saunders, Mark N.K.; Lewis, Philip, & Thornhill, 2019:130). This study's time horizon is cross-sectional, as data was collected at a single point in time.

The outcomes of the research	**Basic or pure research** Applied research	Pure research is focused on creating and expanding new knowledge, while applied research seeks to find real-life applications of a particular phenomenon (Guthrie, 2010:5). This study was premised on pure research as it sought to generate and expand knowledge on technology business incubation in KwaZulu-Natal province, South Africa.

Source: Researcher's creation

As evident from Table 5.1, researchers can utilise several descriptors to fully account for the research design implemented in a particular study.

The qualitative research approach was embraced to augment the interpretation of persons' cultures, belief systems and values, personal experiences, and situations and correspondingly to introduce theories that illustrate these experiences (Kalu and Bwalya, 2017:44). Qualitative research is ''the systematic collection, organisation, and interpretation of textual material derived from talk or conversation, used to explore meanings of social phenomena as experienced by individuals in their natural context'' (Malterud, 2001:483). The approach to theory development is mainly inductive. At the same time, the study itself was driven by the phenomenological purpose of understanding the experiences of managers and incubatees of technology business incubators, therefore adopting an exploratory approach to research. It is a cross-sectional study where participants were engaged in their natural setting through semi-structured interview schedules. However, it is essential to note that these descriptors link to decisions on matters of the adopted research paradigms, methodology, and methods engaged in data gathering and analysis. The following sections discuss these issues individually, starting with the research paradigms.

5.4 RESEARCH PARADIGMS

For this study, the adopted definition of research philosophy is that which presented it as the advancement of research assumption, its knowledge, and nature, thus leading to a method which, when engaged, permits the researchers to produce ideas into knowledge within the context of investigation (Žukauskas, Pranas; Vveinhardt, Jolita; & Andriukaitienė, 2018:122). According to Saunders *et al*. (2019:159), there are at least three major types of philosophical assumption in all research studies: the ontological, epistemological, and axiological dimensions. The following sections will discuss these three philosophical assumptions underpinning the research.

Table 5. 2: Key research paradigms

Fundamental Beliefs	**Positivisms**	**Post-positivism**	**Critical theory**	**Pragmatism**	**Postmodernism**	**Interpretivism**
Other descriptive names	Naïve realism Direct realism Empirical realism	Critical realism Scientific method Quantitative research Empirical science	Historical realism Advocacy Emancipatory Transformative	Mixed method	Post-structural Postcolonial Indigenous	Relativism Constructivism Social constructivism Naturalism Humanism
Ontology *(Nature of reality)*	Reality is independent of external actors and, therefore, objective and external.	Reality is objective, with an independent existence unaffected by human thoughts, beliefs, or even knowledge of its existence, and can only be interpreted through social conditioning.	Social, political, cultural, economic, ethnic and gender values shape the reality.	The reality is external and allows multiple views towards responding to the research question.	Relativism and multiplicity define reality, and therefore, different environments shape it.	Multiplicity of socially constructed realities and local and specific realities
Epistemology *(What determines acceptable knowledge)*	• Facts and credible data are possible as knowledge is an observable phenomenon. • The phenomenon is reduced to simple elements governed by law-like generalisation and causalities.	• Facts and credible data only come from observable phenomena. • Reality can be known. • Knowledge is flawed. • Focuses on expounding within context or contexts.	• Transactional knowledge and, therefore, subjectivist with value-embedded findings • Subjectivity is a human trait • Introducing change in understanding situations and phenomena is key	• Knowledge may or may not be observable • Subjective meanings can contribute to credible knowledge based on the research question. • It is focused on applied research; therefore, the	• Knowledge is relationist • Dominant ideologies decide what is truth and knowledge • Seeks to expose power relations and challenges	• Knowledge is subjective • The focus is on subjective meanings and motivating actions.

	• Science relates to understanding these laws of the natural organisation of reality. • Researcher observes data without imposing personal influence			multiplicity of perspectives assists data interpretation.		
Axiology *(Role of values)*	• Research is value-free • The researcher is objective and does not influence the data	• Research is value-laden • Cultural experiences, worldviews, and social upbringing influence the researcher.	• Research is a moral and political activity that demands the researcher align with and commit to a particular value position.	• The interpretation of results depends strongly on the values, and the researcher adopts objective and subjective viewpoints.	• The researcher and the researched cannot be separated • The inquiry is both value-bound and value-laden.	
Methodology choices *(Model to conduct the research)*	• Experimental or manipulative • Deductive • Theory testing • Quantitative research methods	• Modified experimental or manipulative, critical multiplicism, falsification of hypothesis • Deductive or inductive • Both quantitative and qualitative methods	• Dialogic and dialectical • Mainly qualitative methods	• Deductive and inductive • Mixed method approaches • Both quantitative and qualitative research	• Abductive • Reflexivity • Mainly qualitative research methods	• Inductive • Constructing theory • Hermeneutical or dialectical • Qualitative research methods

Investigation aim	• Explanation, prediction and control	• Seeks to critique, transform, forward restitution and emancipate	• Seeks enhanced understanding of a social phenomenon	• Expose shortcomings in the previously colonised minds • Reconstruct the accepted knowledge • Bring transformation and social changes among the previously disadvantaged	• Entrench understanding of a phenomenon. • Reconstruction of a body of knowledge.
Knowledge expansion or growth	• The gradual accumulation of knowledge, law-like generalisations, and cause-and-effect linkages., (accretion),	• Revisioning histories with similar guiding generalisations	• Informed better and contributing to the repository of knowledge complexity	• Informed better and generating reconstructions with a high degree of complexity.	
Quality criteria	• Traditional benchmarks of displaying rigour, internal and external validity, reliability and objectivity	• Appropriate situatedness in history, elimination of ignorance	• Combining the traditional benchmarks of objectivity, authenticity and trustworthiness	• Trustworthiness and authenticity and eliminating misapprehensions	
Voice	• The researcher is a dissociated reporter of research outcomes to various audiences.	• Advocates for transformation	• A fair balance of passionate and distant approach	• Display passion, intellect and transformative	• Display passion in advocating for multi-voice reconstruction

Sources: (Phillips *et al.*, 2023:2) Doyle et al., (2020:445); (Saunders et.al. (2019:)**;** Collins & Stockton (2018:2)**;** Ngozwana, (2018:21)**;** Wahyuni, (2012:70); Guthrie, (2010:5)

5.4.1 Ontological, epistemological and assumptions of the researcher

Table 5.2 presents three assumptions segregating the different research paradigms: ontology, epistemology, and axiology. The remaining set of assumptions, which relate to methodological decisions, will be discussed in Sections 5.5 to 5.7. In this study, the researcher assumes that the managers and incubatees of technology business incubators in KwaZulu-Natal, South Africa, possess numerous societal interpretations and experiences different from those in other provinces. It is worth noting that despite its popularity among developed countries, technology business incubation is not well-researched in emerging economies of the world (Tang *et al.* 2013:34). This fact also results in inadequate research on factors that will promote growth and establishment of new technology-based enterprises which are the essential enablers for economic growth enterprises from inception to fully-fledged enterprises are limited (Nkosinathi & Robert, 2014:642). Masutha and Rogerson (2014:153) also argued that while policymakers and local economic development managers have adopted small business incubation to aid the country's development, researchers have yet to consider their operations fully. Furthermore, there is a need for focused scholarly attention to the impact of local and provincial background factors on small business incubation, which results in deficiencies in coherence and substantial theoretical foundation (Mcadam, Miller & Mcadam, (2016:69). Thus, it entrenches the idea that provincial differences might necessitate distinctions in small business incubation models and performance.

Epistemology presents the assumption about knowledge, as it is concerned with the beliefs about how the knowledge that is considered acceptable and valid is generated, understood, and used (Phillip *et al.*, 2023:2; Saunders *et al.*, 2019:130; Wahyuni, 2012:69). Therefore, epistemology is concerned with the researcher's view on how people know what they claim to know and determines the basis for what is acceptable, valid, and legitimate knowledge. To differentiate between objectivist and subjectivist opinions, Saunders *et al.* (2019:137) argue that the objectivist researcher pursues to unearth universal truths and laws shaping societal behaviour, and in contrast, the subjectivist researcher is absorbed in the diversity of viewpoints and narratives that can assist in accounting for varied social realities of miscellaneous social actors.

This study adopted a subjectivist view in understanding the experiences of managers and incubatees of technology business incubators. It emanates from the understanding that different groups experience the complex issue of technology business incubation differently; hence, it requires facts, narratives, and opinions to offer a comprehensive perspective. The researcher believes that the participants' portrayals are a product of their interactions with the TBI environments, and they are working towards understanding the system based on how they interpret events and attach meanings from these connections.

Axiology relates to the researcher's values and how those values impact the research progression (Saunders *et al.*, 2019:130). Phillips *et al.* (2023:2) argue that qualitative research aligns with the reality that researchers will unavoidably bring personal bias into the study, which must be acknowledged and accounted for within the context and setting of the research. In this research study, the researcher believes that both the participants and the researcher impact the views expressed in the study. Saunders *et al.* (2019: 136) support this viewpoint, pointing out that values determine the resultant human behaviour and form the foundation for judgment. As participants narrate their experiences in the interview process, their responses are shaped by their values, and the same applies to the researcher regarding how information is received and processed. Therefore, the researcher presents this study as value-laden and subjective, as both the participants and the researcher influence it.

5.4.2 Research paradigms adopted

This section will first present interpretivism as the research paradigm of choice for studying the managers' experiences of TBIs.

5.4.2.1 The research philosophy of choice: Interpretivism

This research study focuses on the phenomenologist's understanding of the participants' lived experiences and how these are interpreted (Phillips *et al.*, 2023). This understanding comes from examining TBI from the perspectives of the managers

and incubatees to offer a richer interpretation and understanding of the societal domain of the TBI and its contexts. The researcher acknowledges TBI's complex and unique context, whose circumstances and interactions involve a person gathering at a specific time with specific needs. The interpretivist views an organisation as a social site hosting a unique kind of society which is similar in some qualities; hence, the focus is on social as opposed to economic aspects of institutional activities, and the research seeks to reveal how particular realities are socially constructed and upheld (Karataş-Özkan & Murphy, 2010:454).

Phenomenological research examines the living experiences of persons concerning a specific phenomenon. It delivers an enhanced understanding and awareness of the meaning such individuals assign to their experiences (Kalu & Bwalya, 2017:47). It also permits tracking empathy and acknowledgement of researcher's subjectivity about the phenomenon being investigated as well as that of the participants themselves (Alhazmi & Kaufmann, 2022:3). The differences in people, culture, backgrounds, circumstances, times breed different social realities, which cannot be presented in a single universal law; hence different perspectives are essential in capturing these realities (Saunders *et al.*, 2019: 149). The researcher believes this assertion includes participants from different ethnic/cultural backgrounds, which is characteristic of the province of KwaZulu-Natal; hence, generalisations are reduced but still offer the complexity of rich insights into humanity.

Interpretivism is formed of several strands, as presented in Table 6:

Table 5. 3: Strands of interpretivism

Strand	Approach to Understanding Organisational Realities
Phenomenology	Phenomenology is the dominant strand of interpretivism. It tends to focus on participants' lived experiences and seeks to understand how they recollect and interpret those experiences.
Hermeneutics	The researcher's interest is in researching cultural artefacts, including texts, symbols, stories, and images.
Symbolic interactionism	Concentrate on scrutinising and analysing social interactions, including conversations, meetings, and teamwork.

Source: Bonache & Festing, (2020:106); Saunders *et al.*, (2019: 149); Yilmaz, (2013:312)

Interpretivism is about viewing the world through the eyes of the study participants, where they are allowed to have a multitude of perspectives on reality rather than the "one reality" of positivism (Chowdhury, 2014:433). One of the major criticisms against interpretivism is the acceptance of the generalisation limitation in favour of exposing the localised content and relevance, a feature which some researchers view as a strength of this paradigm and qualitative research in general (Ngozwana, 2018:20).

5.4.3 Justification for research paradigms adopted

Adopting the interpretivism research paradigm allowed the researcher to understand the lens through which people experience the social world (Žukauskas *et al.*, 2018:123). Central to this philosophy is the acknowledgement that differences amongst people, which relate to cultural backgrounds and circumstances, result in experiencing diverse realities and therefore, definite universal laws and overt generalisation for everybody are not possible (Saunders *et al.*, 2019:149); hence, perspectives from different groups are therefore essential for interpretivists to discover what is meaningful to research participants. Interpretivists focus on meanings; therefore, research studies unequivocally deliberate on contextual variables rather than attempting to decontextualise (Bonache & Festing, 2020:101). These features of interpretivism immersed the researcher in the richness of the meanings managers and incubatees attach to their experiences of TBIs. This level of immersion also assisted the researcher in questioning the prominent role that government and policymakers have created for the technology business incubation of small businesses and the development of high technology-based enterprises in South Africa, specifically in the province of KwaZulu-Natal.

5.5 APPROACH TO THEORY DEVELOPMENT

The importance of theory development lies in its ability to direct research design, techniques for data collection and procedures for analysis that will ensure the realisation of the research goals (Saunders *et al.*, 2019:157). The research will always involve the theory either as “theory-building” (inductive), “theory-testing” (deductive) or

a combination of both in the abductive (Saunders *et al.*, 2019:155; Collins & Stockton, 2018:2). According to Imenda (2014:186), the term theory refers to interconnected concepts that construct a systematic view of a phenomenon to explain or predict. Therefore, the choice between deductive, inductive, or abductive depends on the research philosophy, the area of emphasis of the study and the nature of the topic under investigation. For this study, the researcher followed a phenomenological approach, and induction is the theory development angle of choice to explore a phenomenon followed by theory building towards a framework for improving the effectiveness of technology business incubators in the province of KwaZulu-Natal. Table 5.4 presents the summary of the three approaches to theory development.

Table 5. 4: Approaches to theory development

Approach	Explanation
Inductive	Abduction, also known as retroduction, is the process of studying facts and devising a theory to explain them. It starts with gathering data to examine a phenomenon, followed by theory building and a conceptual framework; hence, it works readily with new research topics where excitement and debate are high and little existing literature exists.
Deductive	The conclusion logically emanates from a suit of theory-determined premises, with the conclusion only considered valid once all premises (or hypotheses) are true. A highly structured methodology that allows for replication and reliability explains causal relations between concepts and variables. An appropriate sample selection of sufficient size ensures generalisation. The positivist research philosophy generally underpins the deductive approach. Deduction readily works with research topics wherein there is a rich literature against which the researcher can define a theoretical framework and a hypothesis.
Abductive	The abductive approach combines induction and deduction; while deduction moves from theory to data and induction from data to theory, abduction moves to and from data and theory.

Source: Saunders *et al.* (2019:152-4); Aliyu et al. (2015:10); Richardson and Kramer (2006:499); Svennevig (2001:3)

Inductive reasoning, as adopted in this study, corresponds to a logical process of generating an overarching theory from a given set of facts(Zikmund, Quinlan, Griffin & Babin, 2019:79). Together with this approach, the researcher examines the existing literature to develop an understanding of what prior research studies have revealed about the phenomenon of interest (Picardi & Masick, 2014). Inductive reasoning is also characterised by a conscientious iterative back-and-forth exercise of theme

development and data analysis until comprehensive logical and overarching themes emerge (Bryman & Bell, 2014:11; Creswell, 2014:186).

Inductive reasoning is generally associated with qualitative research and interpretivism as researchers approach their participants without predetermined ideas to test or confirm (Brinkmann & Kvale, 2018:118; Brunt, Horner & Semley, 2017:23). This process can also be viewed as a bottom-up approach (Brunt *et al*., 2017:23) or a sequence of reasoning that moves from a precise point of departure presented by data towards a more general setting (Venter & Van Zyl, 2017:9). While the empirical process is vital in identifying critical questions to be answered (Brinkmann & Kvale, 2018:118), the inductive approach is not averse to investigating the specific phenomenon of interest by starting with research questions (Picardi & Masick, 2014:7). It is through the analysis of data that themes and patterns emerge thus leading the researcher to the multitude of realities concerning the phenomenon of interest (Saunders *et al*., 2019:145). Through this process, the data reveals meanings that participants attach to their experiences of the phenomenon (Yilmaz, 2013:312). Section 5.4.2 revealed that this study adopted interpretivism as a research paradigm of choice, also aligned with inductive reasoning.

Inductive reasoning: The theory development approach adopted for this study

The researcher opted for a qualitative approach in the current study as this allows for the findings to be grounded in the data and support open-mindedness about the possibilities that will emerge from data and perspectives of the topic, as opposed to initiating an inquiry armed with a theory, that influences the data (Hyde, 2000:83). One of the negative connotations associated with deductive reasoning emanates from its tendency to construct a rigid methodology that discourages, to the point of preventing, the consideration of alternative explanations of the phenomenon under investigation (Saunders *et al.,* 2019:147).

In this research study, an initial conceptual framework originated from the existing literature (Casula *et al*., 2021:1708), thus allowing the researcher to engage with established and known concepts in technology business incubation of small businesses (Venter & van Zyl, 2017:9). Inductive thinking begins with an observation

of events or specific processes from which broader and more universal statements are possible, and based on these research findings, the theory emerges (Aliyu et al., 2015:10; Hyde, 2000:83). The contexts within which the events occur are of interest to the induction approach hence sample sizes tend to be smaller compared to the deduction approach and a variety of methods are likely to be used to collect data, thereby ensuring the inclusion of different views on the subject (Saunders *et al.*, 2019:155).

This aspect of inductive reasoning appealed to the researcher as the study seeks to determine a framework for the TBI for small businesses in a specific context of KwaZulu-Natal Province. The part of the smaller sample also fits the study as there is a limited number of TBIs in the Province of KwaZulu-Natal. This study focuses on the richness and depth of the data. Consequently, the findings pertain to the KZN province of South Africa and seek to avoid prioritising generalisations as there are vast economic differences between the various provinces. This assertion fits with qualitative inductive reasoning (Hyde, 2000:84). The subjective interpretations and the connection to humanities render the induction approach favourable to interpretivists (Saunders *et al.*, 2019:155), a research paradigm of choice for this study.

The previous sections described the research paradigm (philosophy) and approach to theory development underpinning this research, which influence the methodological choices that will be elaborated upon in the following section (Saunders *et al*., 2016:162).

5.6 Methodological approach

This section focuses on the methodological approach chosen to develop the framework for the technology business incubation of small businesses in KZN. Methodology enhances the broad understanding of the inquiry process without focusing on the outcomes (Casula et al., 2021:1710). Qualitative and quantitative methodological approaches are the two options available to research, with a third option being a combination of these methods (Phillips, 2023:2; Yilmaz, 2013:311). Theoretical orientations and frameworks have the potential to guide researchers towards pertinent methodological (theory of method) and design considerations and

assist researchers in positioning their studies theoretically (Alavi *et al*., 2018:528; Collins & Stockton, 2018:2). Yilmaz (2013:311) defines quantitative research as the empirical study that describes the social phenomenon in terms of numerical data derived from mathematically founded methods, in particular statistics. Epistemological, theoretical, and methodological variations have already been presented and summarised in Table 5.4.

The researcher developed Table 5.5 to present features of these two methodological approaches, which are decision points in choosing an appropriate methodology for a particular research study.

Table 5. 5: Differences between quantitative and qualitative research

Feature	Quantitative	Qualitative
Theory	Stipulates the theory to test and the set of variables that require manipulation.	Multifaceted and underpinned by different paradigms, multiple variables
Sample	Randomise to allow for generalisation. Large sample sizes	Purposeful based on the topic of the research study, fewer participants.
Tools/instruments	Preconstructed standardised, close-ended questionnaires, predetermined answers or categories under which participants' responses should fit	Unstructured or semi-structured tools direct the engagement.
Data	Focus on numbers, numerical data, Responses to predetermined categories,	Descriptive terms and meanings that people attach to a social phenomenon, case, situation, or process in their natural state
Environment	Controlled	Naturalistic
Analysis	Numerical (or mathematical), in particular statistics	It does not require statistical procedures
Outcome	Prove or disprove the theory Predictions, Cause-effect relationship Generalisation.	The findings are lengthy, rich in detail, and variable in content. They reveal meanings, interpretations, views, perspectives, beliefs, and experiences about a particular social phenomenon. They are localised.
Researcher's role	Neutral	Active social actor

Sources: Adapted from Yilmaz (2013:311-2)

The following section presents the methodology chosen for this study and the corresponding justification for its selection.

5.6.1 Qualitative methodological approach adopted

The qualitative methodology appealed to the researcher given its ability to describe and understand the phenomenon being researched by acquiring and communicating the experiences of participants based on their utterances through interviews or observations (Yilmaz, 2013:313; Collis & Hussey, 2009:46). Bazeley, (2013:4) described the qualitative research process as an attempt to observe, interpret and analyse how individuals experience, act and think about themselves and their environment. This viewpoint leads to understanding the meanings participants attach to their experiences and how these shape their behaviour (Bickman et al., 2014:221). Through this study, the researcher wants to understand and communicate the experiences of managers and incubatees of technology business incubators in KwaZulu-Natal. Bickman *et al.* (2014:221) further argue that this focus on meaning is central to the interpretive approach, the adopted paradigm for this research study.

Yilmaz (2013:311) also mentions that defining qualitative research is difficult due to complexities resulting from the multifaceted nature of this approach, which is based on several research paradigms. Bazeley (2013:3) The term "qualitative research" is an overarching term for several methodological approaches to research that focus more on the quality rather than quantity of matter. Hence, various researchers have sponsored multiple definitions.

5.6.2 Justification for the methodological approach adopted

The qualitative approach allows the researcher to reach the thoughts and feelings of the participants (Sutton & Austin, 2015:230) while fully involved and immersed in the research study (McCusker & Gunaydin, 2015:541). In qualitative research, the researcher is an essential and integral part of the study through their experiences and personal presence (Sale & Thielke, 2018:129;Choy, 2014:99). Hence, for qualitative researchers, objectivity is neither significant nor truly feasible (House, 2018:7)thus

making the subjectivity of both the researcher and participants form part of the research process (Flick, 2014:116). Neutrality is impossible in qualitative research as the researcher's values and beliefs influence the study. This aspect of qualitative research requires the researcher to demonstrate integrity and acceptable personality, as these determine the quality of research findings (McCusker & Gunaydin, 2015; McLeod, 2015). Given these attributes, qualitative research methodologies have numerous advantages and disadvantages.

This aspect of qualitative research was considered desirable for this study by the researcher, as it allowed open-ended questions to extract the experiences, views, and meanings the managers and incubatees attach to the TBI programmes. Hence, a qualitative approach to research appeals to those who are keen on new insights and a deep understanding of the experiences, manner of interactions and documents in their natural context (Flick, 2018:5; Bazeley, 2013:3). This predominantly bottom-up, grounded, and descriptive approach to research accords privilege to the voice of the participants more than that of the researcher (Jamshed, 2014; McLeod, 2015) The bottom-up approach associated with qualitative research renders it suitable for investigations in a new field of study to establish and theorise novel concepts (Jamshed, 2014:87).

The number of TBIs in KwaZulu-Natal is limited; hence, the choice of qualitative interpretivism study is ideal as it allows for a smaller number of participants and maintains the individuality of these in the analysis, allowing for specificity of context and leads to meanings shaped by the unique circumstances (Bickman *et al*., 2014: 221). TBIs are a relatively new phenomenon in the entrepreneurship support space; hence, qualitative research was deemed essential in understanding the TBI processes by which small business support happens and the corresponding intended and unintended outcomes (Bickman *et al*., 2014: 221).

The ability of qualitative research to reveal unanticipated phenomena is an added advantage over the quantitative approach, especially considering the relative newness of these programmes for both South Africa and the province of KwaZulu-Natal (Bickman *et al*., 2014: 221). The qualitative approach is also ideal for identifying

causality explanations and inferences concerning processes and mechanisms of TBIs in the province of KwaZulu-Natal, South Africa (Bickman *et al*., 2014: 221).

5.7 RESEARCH METHODOLOGY

Aligned to qualitative research are qualitative methodologies that seek to generate interpretations of phenomena based on the understanding that meanings are attached to processes (Gaudet & Robert, 2018:7). Some qualitative studies use known theories to 'frame' their studies, thus providing boundaries or parameters that guide all research stages (Ryan *et al.*, 2007, 740). The theory relates to scientifically accepted general principles used to explain phenomena, underpin research design decisions, and position the study's research framework (Alavi *et al.*, 2018:529). Given that the current study is concerned with developing a framework for TBI of small businesses in KwaZulu-Natal by exploring the experiences of the managers and incubatees of these programmes, the phenomenology methodology was adopted. The following sections describe the details of phenomenology as a methodology and justify its selection for the current study.

5.7.1 Phenomenology methodology (strategy)

This section presents phenomenology as a methodology or strategy for undertaking qualitative research and as a multidimensional concept that can be an epistemology, a protosociological grounds to the social sciences methodology, a sociological paradigm, and an empirical research procedure (Flick, 2014:184). Gaudet and Robert (2018:43) describe four pillars of phenomenology as a methodology in qualitative research: the emphasis on the lived experiences, the necessity of bracketing personal world perspective, the analytical process of reduction and the intention of describing as opposed to explaining. The researcher aligned the current study with hermeneutical phenomenology, as interpreting the lived world is the focus (Gaudet & Robert, 2018:45). At the heart of phenomenology is refining what occurs when establishing empirical data through gathering, analysis, and interpretation (Flick, 2014:190). One of the critical essentials for phenomenologists is always being conscious of the fact that interpretations ride on their own subjective experiences, as the linguistic representation can never fully present the actual experiences but can be processed

systematically to understand the experiences of others through our own experiences (Flick, 2014:189). Phenomenology, like other ethnographic approaches, requires data collection through participant observation, interviews in the field, and analysis of artefacts and documents, accompanied by hermeneutical interpretations, with a unique further provision being the subjective experience of the investigator in the field being recognised explicitly and reflexively as an 'instrument' of data production and gathering. The researchers, therefore, rely not only on observing participants to collect data but also on observing participation in a field-specific position and analysing their experiences phenomenologically (Flick, 2014:195).

5.7.2 Justification for phenomenology methodology adopted

Phenomenology was adopted as the methodological analysis of choice as it is applicable not only to establish the universal, constant formal structures of the lifeworld but also in researching specific socio-cultural life worlds like the technology business incubation programmes that small businesses go through to get support (Flick, 2014:195). Gaudet & Robert (2018:45) present transcendental (description of the lived experiences), existential (the researcher is co-situated with participants) and hermeneutical (interpretation of lived experiences) schools of phenomenology. Phenomenology is a philosophy and methodology customarily used to understand complex situations that cannot be understood easily at first glance (Goulding, 2004:301). The primary goal of phenomenology is to broaden and intensify the understanding of experiences without necessarily pondering the origin of the experience, thus critically reflecting on conscious experience that seeks to unearth the essential constant features of that experience without scrutinising subconscious motivation (Goulding, 2004:302). This understanding requires engaging in an inceptual process, where deep questioning occurs, reminiscing and reflective wondering occur, and interpretation of the primal meanings of human experience takes place (van Manen, 2017:819). Whilst the method is rich in context and deepens the researcher's understanding of the participant's experiences, it does not allow for generalizability as the emergent themes are incepted and not concepts (van Manen, 2017:819-820), and a concept generalises whilst an incept singularities.

In the current study, the researcher adopted interpretivism and hermeneutical phenomenology as suitable approaches for understanding and describing the lived experiences of managers and incubatees of TBIs. Phenomenology, like other ethnographic approaches, requires data collection through participant observation, interviews in the field, and analysis of artefacts and documents, accompanied by hermeneutical interpretations, with a unique further provision being the subjective experience of the researcher in the field being recognised explicitly and reflexively as an 'instrument' of data generation and collection. In the current study, the researcher did not only depend on participant experiences as interpreted from interviews of managers/CEOs/directors of TBIs for data collection, but also participated in the interviewing process from a field-specific role of being a manager of similar programmes and, therefore, analysing participants' experiences phenomenologically (Flick, 2014:195).

5.8 CONCLUSION

Chapter 5 responded to the fourth methodological objective by presenting a conceptual framework and how it guided and defined the study's adopted research design and methodology. The conceptual framework synthesised current literature and the researcher's views on the amplification of technology business incubation of small businesses in KwaZulu-Natal. Through the conceptual framework, the researcher clarified what the study sought to investigate and the basis for the adopted research design, which subsequently outlined and justified using the set descriptors. This chapter also presented the adopted research paradigms based on the researcher's ontological, epistemological, and axiological assumptions. An explanation of the approaches to theory development and the corresponding methodological approach followed this discussion. Finally, this chapter presented the research methodology (strategy) adopted in this study.

CHAPTER 6: RESEARCH METHODS AND RIGOUR

6.1 INTRODUCTION

This chapter presents and justifies the research methods implemented in the study and introduces the methods employed for data collection. It further elaborates on the sampling procedures, the data collection methods, and the data analysis techniques used in this research study. This chapter also presents the measures that were followed to ensure the trustworthiness and quality of the research design and concludes with a discussion of the researcher's ethical considerations. Chapter 6 responds to the following methodological objectives:

MO1: To conduct a literature review on technology business incubation in KwaZulu-Natal
MO2: To conduct a literature review on the experiences of managers/CEOs/Directors of technology business incubators.
MO3: To conduct a literature review on the government interventions that promote and support technology business incubation in South Africa, particularly KwaZulu-Natal.
MO5: To identify and select the most appropriate research methods to address the primary and secondary research objectives.
MO6: To undertake an empirical investigation that will provide insight into the technology business incubation of small businesses in KwaZulu-Natal.

6.2 RESEARCH METHODS

This section comprehensively describes the data collection process, a pivotal aspect of the research methods. It encompasses a set of procedures, tools, and techniques for collecting and analysing data, as outlined by researchers such as Saunders *et al.* (2019:124) and Wahyuni (2012:72). The section delves into the specific processes followed by the researcher in collecting secondary and primary data, providing insights into the reliability and validity of the study's findings. Furthermore, it elaborates on this study's qualitative data analysis techniques.

6.2.1 Secondary data collection (literature review)

Secondary data was collected by critically reviewing the existing literature, a process that is foundational to creating substantial and usable research. The literature review enables a more precise delineation of the research problem and objectives, preventing researchers from unnecessary study replication to make a unique contribution to knowledge (Alavi *et al*., 2018: 531). Quinlan, Babin, Carr, Griffin and Zikmund (2015:27) describe the secondary data as literature published in journal articles, books, government papers and reports, theses, and conference proceedings. According to Rocco and Plakhotnik (2009:122), the literature review and conceptual and theoretical frameworks perform five functions in the research study, these being building of the study foundation, demonstration of how the study adds to knowledge, whom it was conceptualised for, evaluation of the research design and providing a point of reference for interpretation of findings. Furthermore, the literature review provides an objective account of what has been researched and published on a given subject of interest, reflects prominent themes and informs the conceptual framework as well as provides context to interpret the findings (Bickman *et al*., 2014:227; Rocco & Plakhotnik, 2009:125; Ryan *et al*., 2007:738).

In this research study, the literature review commenced before data collection and continued through data analysis to assist in interpreting the findings and the study's conclusion. However, Bickman *et al*. (2014:227) further argue that overreliance on literature and its embedded assumptions should also be treated with caution as it tends to cloud the researcher's frame and approach to the study, resulting in overlooking features that were considered vital, in the conceptualisation of the study. Hence, the researcher consulted the critical literature and aligned it with the study's assumptions and frame. The critical literature review was undertaken and presented in Chapters 2, 3 and 4. Chapter 2 elaborated on the SMME landscape in the province of KwaZulu-Natal in South Africa. This chapter sought to create an understanding of the nature of small businesses in KwaZulu-Natal and their environment as a baseline for understanding the technology business incubation in this province. Chapter 3 presented government interventions geared towards supporting and promoting the incubation of SMMEs, including the technology-based or technology-focused small

businesses that require technology and business support. Chapter 4 discusses the technology business incubation of small businesses.

6.2.2 Primary data collection (empirical research)

This section presents the proposed empirical investigation, further accentuating the populations under investigation, the sampling processes, and the data collection methods and processes.

6.2.2.1 Population studied

According to Bryman (2012:714), a population can represent the complete set of participants sharing similar characteristics from which a sample is drawn. For the primary investigation, the identified population constitutes the TBIs' managers, CEOs, and directors. The section provides greater clarity on the concept of technology business incubation within the context of this study.

6.2.2.2 Sampling process

Sampling in qualitative research plays a vital role as the essence of most qualitative research is to study a phenomenon in its natural setting, assisting the researcher in identifying persons or localities rich in information and can be studied in much depth (Kalu & Bwalya, 2017:47). According to Collis and Hussey (2014:197), a sample is the portion of the subset that represents the entire population. The readers or recipients of the study findings need detailed information and explanations about sample selection, its appropriateness for the research, as well as what type of sample technique was employed (Kalu & Bwalya, 2017:47). The importance of sampling is also closely related to validity, where internal validity, ensures that the study investigates what it was designed for, and; external validity which seeks to understand the contexts that are relevant to the findings (Malterud, 2001:484).

The sampling process involves defining the sample units, describing the criteria for these units, identifying the sampling technique, and establishing the sample size.

6.2.2.2.1 Sampling units

Brunt *et al.* (2017:77) describe a sampling unit as a "single element or member that is subject to selection in the sample." Given that the population of this study consisted of incubators that provide business management and technological or technical support to small businesses in the province of KwaZulu-Natal, the participants were managers/CEOs/directors of these programmes. To qualify for participation in the current study, the individual had to meet the following stipulated criteria:

- The entity should be recognised by the managers/directors/CEOs as the incubator for technology-focused small businesses,
- The entity must have its operations in the Province of KwaZulu-Natal in South Africa,
- The individual who is to be considered as a participant should be a manager/director/CEO of the TBI in KwaZulu-Natal.

Interviewing participants allowed the researcher to generate new insights and findings related to the primary aim of the current study.

6.2.2.2.2 Sampling technique adopted

A representative sample resembles the population from which it was drawn in all the ways that are important for the research being conducted (DeCarlo, 2019:2). These desirable characteristics of the chosen sample participants can emanate from exposure and experience in the phenomenon of interest (Ryan *et al.*, 2007:741). Therefore, it is essential to ensure that participants in the sample are knowledgeable about the issue being researched and willing to share their experiences or information. Here, the reflexive attention should focus on sampling, seeking different information with a view to a detailed description of what is under study (De la Cuesta Benjumea, 2015:887).Non-probability sampling was adopted as it aligns with the study's research design. Two sampling approaches, probability and non-probability, were interrogated, and the decision was made.

Non-probability sampling

This section presents the different approaches to sampling that the researcher may adopt in line with the research design. These approaches are convenience sampling, purposive sampling, snowballing and theoretical sampling. These are all different formats of non-probability sampling. Convenience sampling, also known as haphazard or accidental sampling, is relatively cheap and quick and is based on the ease of participation or high probability of access; it is less optimal as it may fail to capture essential perspectives from difficult-to-reach people (Wurtz, 2016:22; Tong *et al.,* 2007:352). The uncontrolled quota sampling resembles convenient sampling as it requires the researcher first to categorise the population and take a sample from each, thus fixing the number of participants (Wurtz, 2016:22). Purposive (purposeful) or judgmental sampling, on the other hand, is where units are selected for a particular purpose or from a unique situation or in instances where the population is not easily reachable (Wurtz, 2016:22). This sampling method involves recruiting participants who share characteristics and have the potential to provide rich, relevant, and diverse data pertinent to the research question (Tong *et al.*, 2007:352, Ryan *et al.*, 2007:741). The other form of non-probability sampling is snowballing, also called network, chain referral, or reputational sampling, which involves identifying and sampling the cases in a network, beginning with one or a few units and spreading out based on links to the initial cases (Wurtz, 2016:22). There is an inherent possibility of not reflecting the truth about the population, as it may not be representative enough and generalisations, therefore becomes difficult. Lastly, theoretical sampling is a non-probability sampling procedure frequently used in grounded theory and involves selecting participants based on themes that emerge from data analysis (Ryan *et al.*, 2007:741; Malterud, 2001:485).

6.2.2.2.3 Sampling in this study

This study used purposive sampling, aligned to the phenomenological approach typical of research that aims to describe, interpret, and attach meaning to the experience of SMMEs in an incubator programme (Ryan *et al.,* 2007: 741). Theoretical or purposeful sampling approaches are essential in interpretive qualitative research, but there is no sanctified sampling routine; instead, it is about defining substantial

criteria to identify participants (Bonache & Festing, 2020:108). A purposive sampling is a type of nonprobability sampling method used to select the participants to produce a sample that can be logically assumed to be representative of the population (Alhazmi & Kaufmann, 2022:8). Purposeful sampling achieves representativeness or typicality of the settings, persons, or activities selected while encapsulating population heterogeneity to cover the full range and homogeneity to improve confidence and thoroughness of the examination(Bickman, Rog & Maxwell, 2014:235). Purposeful sampling is not concerned about obtaining a random sample that is representative of a large and diverse population, as this applies to statistical sampling; instead, it seeks to identify and select an information-rich case that is closely linked to the phenomenon of interest and thus capable of providing rich information about an issue that is being researched (Bonache & Festing, 2020:108). Purposive sampling further requires that the identified participants be knowledgeable and experienced in the phenomenon under investigation (Doyle *et al*., 2020:446). The study's results will include a discussion of the sample's characteristics and context, as this information is critical to external validation in qualitative research (Malterud, 2001:485).

6.2.2.2.3 Sample size

Sample size should ensure that the researcher can collect sufficient and rich data and guard against predetermined sample sizes that may stifle the analytical processes, resulting in too much or too little data (Doyle *et al*., 2020:446). Furthermore, the researcher needs to indicate whether the conclusion of data collection was achieved through saturation or through exhausting the predetermined sample size (Doyle *et al*., 2020:447). Saturation is reached through concurrent data collection and analysis processes, and the sample size is essential to measure diversity in responses; hence, this needs to be reported (Tong *et al.,* 2007:356). Sample size depends on the intended data analysis approach, that is, descriptive or multiple regression, as well as on the allowed or acceptable sampling error (Wurtz, 2016:25). Qualitative samples are often small to allow for a more profound and focused engagement between the researcher and the participants (Ryan *et al*., 2007:741). Participants in a qualitative study do not constitute a sample in the positivist sense as the goal is not to represent a population or universe; the subjects in qualitative research are called informants as they share an experience that provides specific information (De la Cuesta Benjumea,

2015:887). Other participant characteristics, such as primary demographic data, should be reported so readers can consider the relevance of the findings and interpretations to their situation (Tong *et al.*, 2007:356). This information also allows readers to assess whether perspectives from different groups were explored and compared, thereby influencing the transferability of the findings. According to Wurtz (2016:22), there are two sampling techniques: nonprobability and probability sampling, which are discussed.

According to Malterud *et al*. (2015:3), larger samples are also necessary if the established theory is inadequate in the area under investigation, as these will provide sufficient information power. However, they further add that new information is also possible in smaller samples. Furthermore, Malterud *et al*. (2016) argue for caution in rigidly sticking to either sample size or saturation and move in favour of considering the quality of the information. The researcher utilised the principle of information power to guide the judgements on sample size adequacy. Table 6.1 presents the judgements on information power dimensions.

Table 6. 1: Dimensions for evaluating the information power

Dimension	Impact of dimension on information power	Dimension in the current study
Research objective	According to Malterud *et al*. (2015:2), a comprehensive study objective demands a larger sample than one with a narrow objective to deliver sufficient information power.	The current study's primary objective is narrow: It seeks to develop a framework for technology business incubation for the sustainable growth of SMMEs in KwaZulu-Natal, one of South Africa's provinces.
Sample specificity	Concerning the sample specificity to be researched (Malterud *et al*., 2015:3), they indicated that if the study participants possess particular characteristics, the study's sample size is anticipated to be limited.	As presented in Section 6.2.2.2.1, the researcher focused on particular participants in this study, requiring a small sample size.
The use of established theory	According to Malterud *et al*. (2015:3), a study with narrow theoretical perspectives generally needs a larger sample to ensure sufficient information power than a study relying on well-defined planning and analysis theories. Furthermore, sufficiently novel knowledge can be extracted from a smaller sample by exploiting appropriate strategies.	For this study, the researcher has designed data extraction from the managers/directors/CEOs of the TBIs to understand the experiences of the TBI. These participants are regarded as expected in the field of technology business incubation based on their functions and job titles.

Quality of dialogue,	The quality of the interview dialogue, characterised by focus and lack of ambiguity, is another determinant of information power. Succinct and robust interactions between the researcher and participants require fewer participants to achieve information power (Malterud *et al*., 2015:3).	In this study, the interview schedule provided a framework that guided the interview between the researcher and the participants, resulting in precise, concise interactions.
Analysis strategy	The analysis strategy is another determinant of information power, as a study that seeks to provide an in-depth analysis of participants' experiences may require a smaller sample size than one that focuses on comparisons. (Malterud *et al*., 2015:4).	The current study is not designed to provide comparisons but focuses on understanding TBI participants' experiences with similar and specific characteristics, as presented in Section 6.2.2.2.1 of this chapter. Phenomenological studies generally require small sample sizes to extract individuals' rich and detailed experience of a particular phenomenon (Grossoehme, 2014:117). Using two groups of participants also allows for the triangulation of two datasets, thus ensuring rich, robust, comprehensive data and practical conclusions.

Source: Researcher's creation

Based on the primary objective, the specificity of the sample, the use of established theory, the quality of the interview dialogue, and the analysis strategy adopted in this study, a smaller sample size was deemed sufficient to deliver adequately high levels of information power. This assertion allowed the researcher to use a small sample size of 13 managers/directors/CEOs. Section 6.2.2.3.5 presents the participants' profiles.

6.2.2.3 Data collection methods and processes

According to Grossoehme (2014:109), data collection in qualitative research can be regarded as collecting stories expressed in almost any medium like in conversations (interviews or focus groups), written texts (journals, prayers, or letters), or visual forms (drawings, photographs). Furthermore, Bonache and Festing (2020:108) suggested that qualitative research data collection techniques include archival data analysis, participant observation and ethnography, often with grounded theory development goals. These data sources can be described as primary or secondary depending on the adopted research design. Primary data is that which is collected directly from research participants, while secondary data constitutes relevant information contained in publications, internal or external, provided by participants to the researchers or publicly available (Wahyuni, 2012:73). Several strategies can be adopted when

collecting qualitative data, including non-numerical questionnaires with open-ended questions, interviews (semi-structured and unstructured) participant observation, written texts such as diaries or emails, and historical or contemporary documents (Ryan *et al.*, 2007: 742). The most common tools used for primary data collection are interviews and participant observation; interviews are by far the most common data collection method, mainly semi-structured or unstructured (Bonache & Festing, 2020:108; Ryan *et al.*, 2007:742). Numerous methods of data collection are available for phenomenological qualitative studies. Bickman *et al. (2014:236) further stress* that qualitative research requires concurrent data collection and analysis. This practice forces the researcher to progressively focus the interviews or observation and decide on the best route to handle emerging outcomes. Simultaneous data collection and analysis is one technique followed by the researcher in this study. Qualitative data analysis is based on an interpretative philosophy that seeks to examine meaningful and representative content of qualitative data extracted from the managers/directors/CEOs of technology business incubators in KwaZulu-Natal (Maree, 2016:109). This study collected primary data through interviews with the participants for the qualitative research, following a semi-structured interview schedule. For a semi-structured interview format, there should be a clear explanation of how themes were derived (Ryan *et al.*, 2007:742). The interviews were accompanied by observations and document analysis, as well as field notes to substantiate the collected data, and these will be described:

6.2.2.3.1 Interviews

The main feature of an interview is to encourage the participants to share their perspectives, stories and experiences regarding particular social phenomena observed by the interviewer (Wahyuni, 2012:73; Tong *et al.*, 2007:351). The participants, the practitioners in their field, pass on their knowledge to the researcher through the conversations held during the interview process (Wahyuni, 2012:73). Researchers intend to unearth what is known about a specific phenomenon or setting from the insiders' perspectives. Therefore, they will structure interviews with open-ended questions that commence with words like who, what, where, when, why, and how (Chenail, 2011:15). Research questions do not only emanate from the literature. Still, they can also be informed by the surprises, puzzles, and tensions emerging from

the field, often including issues that could not have been fully anticipated before engaging with the research (Bonache & Festing, 2020:109).

In-depth and semi-structured interviews are used to explore the experiences of participants and the meanings they attribute to them. A structured interview lists predetermined themes and questions to be discussed in an interview. In contrast, an in-depth interview requires greater detail on the issues of interest (Wahyuni, 2012:73). A semi-structured interview, also known as the non-standardized or qualitative interview (Wahyuni, 2012:74), is a hybrid of structured and in-depth interviews. It offers the merit of following a structure while maintaining flexibility for a free-flowing discussion (Wahyuni, 2012:73). Semi-structured interviews are conducted with the experts in the area or the organisations that are being investigated (Wahyuni, 2012:73). In this research study, these will be incubator managers. When semi-structured discussions are held with groups of 4–12 people to explore a specific set of issues, this method is referred to as a focus group (Tong *et al.*, 2007:351). Although semi-structured interviews were generally face-to-face, focus groups, telephone interviews and online approaches are gaining popularity (Doyle *et al*., 2020:447). Based on the research question, open-ended questions extract information from the interviewee, usually one-to-one (Tong *et al.*, 2007:351). The interviewer might facilitate the process by re-wording, re-ordering, or clarifying the questions to investigate further topics introduced by the respondent (Tong *et al.*, 2007:351).

The methodology adopted in this study is phenomenology, which focuses explicitly on hermeneutical analysis of another person's perspectives (Flick, 2014:199) to describe these experiences (Gaudet & Robert, 2018:45). Hence, interviews were adopted as the data collection technique of choice for the study. This choice also aligns with the interpretivism paradigm embedded in the research design. The role of the researcher in interpretivism involves allowing oneself to be challenged by the data with constant questioning of prior understanding about the phenomenon being investigated. (Bonache & Festing, 2020:109).

A pilot study refers to the small-scale version or trial run undertaken before the actual study or the exercise of pre-testing the selected research instrument to reveal potential biases and fatal flaws, including failing to follow the research protocol or fitness for

purpose, appropriateness and complexity (Roberts, 2020:3197; Bickman *et al*., 2014:227; Chenail, 2011:16). For this research study, a pilot study was conducted to test the tools designed to collect data: the semi-structured interview schedules for the managers/directors/CEO of the TBIs. This study became necessary as a way of fine-tuning the research instrument. This milestone was achieved through mock interviews with colleagues who then provided criticism, thus empowering the researcher to manage the flow of the discussion during the interview.

The current study used audio recording and transcription to accurately present the participants' views. At the same time, contemporaneous researcher notes and the duration of interviews were monitored in each case as this relates to the amount of data collected (Tong *et al.*, 2007:356). The interviewing processes adopted also sought to ensure that procedural rigour is maintained. Procedural rigour refers to the appropriateness and precision of data collection techniques and incorporates a reflective/critical component to reduce bias and misinterpretations (Ryan *et al.*, 2007:743). In line with these efforts, the questions and prompts used in data collection should be provided to enhance the readers' understanding of the researcher's focus and to give readers the ability to assess whether participants were encouraged to convey their viewpoints openly (Tong *et al.*, 2007:356). Researchers should also report whether repeat interviews were conducted as this can influence the rapport developed between the researcher and participants and affect the richness of the data obtained (Tong *et al.*, 2007:356). Researchers should also clarify whether participants were recruited until no new relevant knowledge was obtained from new participants (data saturation) (Tong *et al.*, 2007:356). The researcher should advise on the chosen approach, which should be linked to the study's theoretical assumptions (Ryan *et al.*, 2007: 742).

6.2.2.3.2 Observations and Document Analysis

Observations and document analysis are part of the methods of data collection that the researcher may use to corroborate the interview findings (Venter & Van Zyl, 2017:119). Saunders *et al.* (2019:354) describe observations as a systematic viewing, recording, description, analysis, and interpretation of participants' behaviour and further argue that by participating in the activities of those being observed, the

researcher explores participants' experiences and becomes a member of the workgroup or community. Qualitative researchers can use observations in both focus groups and interviews to align verbal and non-verbal data from the participants (Sutton & Austin, 2015:227).

In the current study, interviews were held online through MS Teams and Zoom Platforms or face-to-face, depending on participants' preferences. No document analysis was undertaken as part of the study.

6.2.2.3.3 Field notes

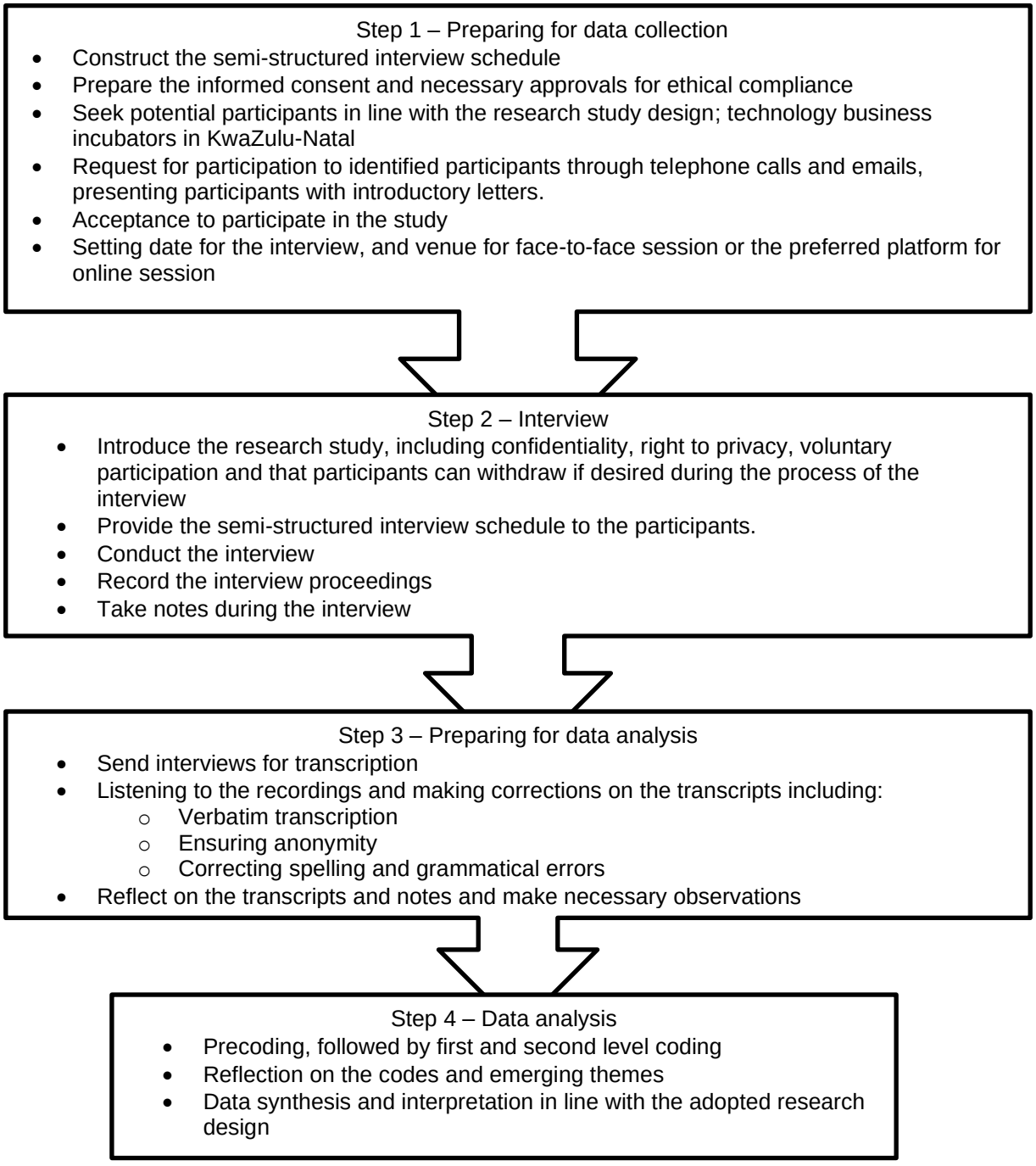
Field notes are essential in qualitative studies to document critical contextual information that will enhance data and further enrich subsequent analysis (Phillippi & Lauderdale, 2018:381). They also help maintain contextual details and nonverbal expressions for data analysis and interpretation (Sutton & Austin, 2015:226; Tong *et al.*, 2007:356). The researcher may also use such data to extend the study or can be helpful to other researchers (Phillippi & Lauderdale, 2018:381).

The field notes assisted the researcher in reflecting upon the actual interviews, the participants' responses to the research questions, and, in some instances, the interactions between the researcher and the participants. They proved helpful reflection points on how comments and observations improved the understanding of technology business incubation of small businesses in KwaZulu-Natal. The interaction points included telephone calls and emails to request participation, confirmation of appointments and during the actual interviews.

6.2.2.3.4 Primary data collection process

This study's primary data collection process is presented schematically in Figure 6.1.

Figure 6. 1: Primary Data Collection Process



Source: Researcher's creation

As depicted in Figure 6.1, the initial step of the data collection process was the preparation phase. The interview schedule consisted of self-designed semi-structured questions founded on the literature review and formulated against this study's conceptual framework. The interview schedule (see Annexure A) comprised five (5) sections. Section 1 was designed to capture information on the TBI's mission and vision, operations, and success measurement. It also sought to understand the TBI's planned achievements and scope of operations. Section 2 was designed to capture the experiences of SMMEs from the perspective of the programme managers, mainly how SMMEs experienced these incubation programmes. Section 3 examined the entrepreneurial ecosystem within the KwaZulu-Natal province to identify interrelationships that participants consider essential for the practical technology business incubation of SMMEs. It further sought to understand and describe how these interrelationships affect perspectives about how and why the incubator functions as it does. Section 4 focused on programme monitoring and evaluation, including continuous improvement measures and internal monitoring systems, as these apply to the TBI. Furthermore, it sought to understand how the incubator utilised these, including planning and frequency, identify who is responsible for them, and explain how monitoring and evaluation feedback is used for continuous improvement. Section 5 focused on what these participants consider essential in improving the effectiveness of the incubation programme. These included the strategies that can be adopted to strengthen incubators' effectiveness and what incubators can do to enhance their effectiveness continuously. Lastly, the researcher was interested in the areas or aspects of the TBI programme that managers would like to change within their incubators, given the chance, opportunity, and resources. As presented, interview schedules were accompanied by the consent form, demonstrating that individuals willingly participated in the study. Section 6.4 of this chapter provides full details on the contents of the consent form.

As indicated in Step 1 of Figure 6.1, the researcher identified potential technology business incubators that may be willing to participate in the study. This exercise was achieved by engaging local, provincial and national SMME support agencies, including the Small Enterprise Development Agency (SEDA), the Small Enterprise Finance Agency (SEFA), the Technology Innovation Agency and local economic development

offices. This process saw the researcher visiting the provincial offices of these national organisations. The search was also extended to network events that sought to bring together actors in the technology and innovation space organised and sponsored by the eThekwini Municipalities, KZN Department of Economic Development Tourism and Environmental Affairs (KZN-EDTEA), Department of Science and Innovation (DSI) and the Department of Small Business Development (DSBD). This recruitment exercise commenced in August 2020 and continued until May 2023. The engagement with the potential participant was always followed by a telephone call or an email to confirm participation and the preferred delivery mode of the introductory letter, which was presented on the official letterhead of the Business School of the North West to enhance the perceived credibility of the study. The informed consent form was designed to present the study's nature, scope, and purpose and get participants' permission to be interviewed (see Annexure B). The researcher and the identified participant had to agree on the interview date and the preferred mode, which could be a face-to-face engagement or one of the online platforms.

As reflected in Figure 6.1, the second step of the data collection process involved conducting the interviews. The language used in the interviews was English; each was recorded and transcribed individually. The researcher shared the interview schedule with the participants to acquaint them with the study's fundamentals. The interview schedule was followed as a guide for all interviews. The researcher profile, Table 6.2, indicates the information provided to potential participants as an introduction to the person behind the research study.

Table 6. 2: Profile of the researcher

Characteristic	Details of the Researcher	
Surname	Ngubane	
Name	Xolile Veronica	
Citizenship	South African (birth)	
Ethnicity	Zulu	
Language competencies	English	
	isiZulu	
Areas in which the researcher knows:	Entrepreneurship Technology transfer Chemistry SMME Support	
Technology Transfer experience	22 years	

Source: Researcher's creation

To extract as much information as necessary, the researcher, as the interviewer, encouraged participants to reflect, elaborate, and engage extensively instead of providing brief and direct responses. Deep reflections are essential for the researcher to formulate new insights and findings that are critical for developing a framework for the technology business incubation of small businesses in KwaZulu-Natal. The researcher remained attentive throughout the interview to ensure that the necessary notes on observations and comments were well documented.

The third step in the data collection process followed the interviewing process, which is the pre-data analysis. The researcher acquired independent services to transcribe the interviews verbatim using Microsoft Office Word. The researcher followed up by editing the transcriptions against the recording. This two-step process assisted in ensuring that the transcripts were captured verbatim, that the anonymity of participants was maintained, and that any spelling-related errors were corrected. Sutton and Austin (2015:228) emphasised the importance of ensuring verbatim transcription of audio recording irrespective of the intelligibility level of the final transcript and further require the researcher to ensure accuracy of transcription, edit to correct spelling and grammatic errors, ensure anonymity, accounting for pauses and incorporating other contextual factors that might have affected the participant. As the fourth and final step of the data collection process, the researcher initiated a coding process, which

involved reflecting on the data as it was collected and identifying codes and themes. This process aligns with the reiterative qualitative data collection process (Van Zyl, 2017:108). A detailed account of the data analysis process is presented in Section 6.2.3.

6.2.2.3.5 Profile of the participants

Thirteen (13) Managers/CEO/Directors of the TBIS in KwaZulu-Natal were interviewed. The participants demonstrated interest in participating in the study, its outcome, and its possible impact on how TBIs in KZN operate. This process was aligned with the study's philosophical position and prescribed methodology, as it supported a flexible approach without restrictive structures that would threaten the fullness of the engagement. The interviews were conducted for approximately 90 minutes, and the sessions commenced with introductions and further confirmation of free participation and consent to the recording of the proceedings. There is only one case where the participant indicated limited experience and newness in the field; hence, the interview was recorded as the shortest of the whole set. Table 6.3 gives the duration of interviews as recorded.

Table 6. 3: Demographic profile of participants

	Participant	Date of the interview	Portfolio	Gender	TBI Location
1	Mr. Sibusiso	12 May 2022	Director	Male	Durban
2	Mr. Happy	18 May 2022	Manager	Male	Durban
3	Mr. Paballo	28 July 2022	Manager	Male	Durban
4	Mr. Sibongiseni	4 August 2022	Manager	Male	Durban
5	Ms Kerishnee	16 August 2022	Manager	Female	Durban
6	Mr. Bongani	11 August 2022	Manager	Male	Durban
7	Ms. Janice	9 September 2022	Manager	Female	Durban/South Coast
8	Ms. Shubnam	22 September 2022	Manager	Female	Port Sheptone/Durban
9	Mr. Martin	7 September 2022	CEO	Male	Durban
10	Mr. Tshepo	22 August 2022	Manager	Male	Durban
11	Mr. Ngwenya	29 September 2022	Manager	Male	Durban
12	Mr. Bulelani	25 August 2022	Manager	Male	Durban
13	Mr. Sibindi	9 September 2022 /12 September 2022	Manager	Male	Durban

Source: Researcher's creation

Table 6.3 shows that 13 managers/Directors/CEOs of technology business incubators in KwaZulu-Natal were interviewed. The following section, 6.2.3. presents the data analytical techniques used in this research study.

6.2.3 Data analysis

According to Bazeley (2013:4), data analysis is an extension of our everyday life where, through critical thinking, we interpret what people say and do and attach meanings that influence our behaviour and response. The purpose of data analysis in a research study is to allow a robust and rich interpretation of the phenomenon that is being studied under investigation (Quinlan *et al*., 2015:331). What differentiates a scientific study from a superficial inference is the properly documented systematic procedure followed in the data analysis process (Malterud, 2001:486). Empirical research is an intentional endeavour oriented towards theoretical and scientific knowledge development (Alavi *et al.*, 2018:529). It should be based on empirical evidence, data collected through observation and experience (Aliyu *et al*., 2015:529). Each research method comprises specific procedures, tools, and techniques for gathering and analysing data (Wahyuni, 2012:72). According to Bazeley (2013:4), analysing qualitative data is a thoughtful and scientifically sophisticated process of engaging data and meticulously illuminating their meanings and significance. According to Bickman *et al*. (2014:236), there are three main groups of strategies that can be used in analysing qualitative data: categorising strategies (coding and themes), connecting strategies (narratives and individual case studies), and memos and displays.

The two approaches to qualitative data analysis are a top-down approach to theory testing, which is based on previous knowledge and is referred to as deductive, and bottom-up, data-informed inductive analyses (Saunders *et al.,* 2019:570; Venter & Van Zyl, 2017:120). Section 5.5 of Chapter 5 describes that this study adopted the inductive approach to theory development. Thematic analysis was the data analysis technique adopted for this study.

The two approaches to qualitative data analysis are a top-down approach to theory testing, which is based on previous knowledge and is referred to as deductive, and bottom-up, data-informed inductive analyses (Saunders *et al.,* 2019:570; Venter & Van Zyl, 2017:120). Section 5.5 of Chapter 5 described that this study adopted the inductive approach to theory development. Thematic analysis was the data analysis technique adopted for this study.

6.2.3.1 Thematic analysis

The thematic analysis involves extracting meanings and concepts from data detecting, examining, and recording patterns or themes where sources of data may be interview transcripts, field notes, documents, pictures, or videos (Javadi & Zarea, 2016:34). A theme can be described as a portion that depicts something important about the data about the current research study that shows some degree of an observable pattern from the participants' responses and represents some level of patterned response or meaning within the data set (Braun & Clarke, 2012:64). Hence, themes are patterns that present ordinary meaning around the concept of interest to the research study (Braun *et al*., 2019:593). The researcher also noted the emphasis that (Braun & Clarke, 2023:4) attached to the conceptualisation of themes as carrying two distinctions, one being the "shared topic" and the other the "shared meaning". This aspect of theme conceptualisation was considered necessary as the emerging themes are used in addressing the aims and objectives of the research study (Javadi & Zarea, 2016:1). Therefore, conceptualising themes is an iterative process facilitated by the researcher's active engagement (Braun and Clarke, 2021b:15).

Numerous researchers have also confirmed the similarities between thematic analysis and content analysis, and these emanate from the use of codes, coding, and the development of themes in both methods (Neuendorf, 2019:211) Javadi & Zarea, 2016:34; Bryman & Bell, 2014:350; Vaismoradi *et al*., 2013:400). Furthermore, and in response to thematic analysis lacking strong differentiation and distinction, (Braun and Clarke, 2021a) emphasise that thematic analysis presents a unique approach to qualitative data analysis, notwithstanding its similarities with such methods as grounded theory, qualitative content analysis, and interpretative phenomenological analysis. Content analysis assists the researcher in qualitatively analysing the data with instances of quantifying data. In contrast, thematic analysis gives a purely qualitative account of the data that is richer and more detailed (Doyle *et al*., 2020:448). Thematic analysis is regarded as a method rather than a methodology, given its flexibility and the fact that it is not directly linked to a specific philosophical alignment or theoretical standpoint (Maguire & Delahunt, 2017:3352) Crowe, Inder & Porter, 2015:617; Bryman & Bell, 2014:350). Concerning thematic analysis, a theme is a concise, accurate, more straightforward and shorter text extracted from the original

text that is a structural meaningful piece of data that persistently and systematically appears or is developed from codes which are the actual particular parts of the data, thus leading to qualitative findings (Javadi & Zarea, 2016:34). The three variations that are associated with thematic analysis are summarised in Table 6.6.

Table 6. 4 Varying approaches to thematic analysis

Approach	Explanation
Coding reliability thematic analysis	This approach is aligned with a deductive standpoint, where themes are developed before the data analysis is conducted. It is designed to respond to the need for objectivity and the absence of bias.
Reflexive thematic analysis	This approach embraces qualitative research values and acknowledges the researcher's subjective influence, which is intertwined with the process. It caters for both inductive and deductive analysis within the interpretative reflexive process.
Codebook thematic analysis	This approach is linked to the qualitative paradigm. It encompasses all methods following a well-defined, structured coding protocol for developing and documenting the analysis, where themes are typically constructed during the data coding.

Source: Adapted from (Braun & Clarke, 2021:5; Braun, Clarke, Hayfileds & Terry, 2019:852; Bengtsson, 2016:12; du Plooy-Cilliers et al., 2014:234; Vaismoradi et al., 2013:401)

6.2.3.2 Inductive reflexive thematic analysis

Inductive theory-building follows grounded theory and entails repetitive data collection, coding, analysis, writing, design, theoretical categorisation, and more data collection (Bonache & Festing, 2020:109). It is often used when few previous studies deal with a phenomenon under investigation (Vaismoradi *et al.,* 2013:401). Inductive analysis is only concerned with codes derived from the data, also called inductive codes, without using previously determined, conceptual framework-derived codes (du Plooy-Cilliers, Davis & Bezuidenhout, 2014:234). Inductive codes are either based on verbatim terms extracted from participants, also known as in vivo codes, or the researcher may identify words that best describe the data unit being coded (Saunders *et al*. 2019:582). Inductive codes are, therefore, expected to change as more data become available, thus requiring a reiterative coding process to enhance the stability and reliability of the interpretations of the meaning units (Bengtsson, 2016:12). Thematic analysis

empowered the researcher to explore and reflect on overt and covert patterns and themes that are integral to the technology business incubation of small businesses in the KZN context.

Thematic analysis in the current study

The reflexive thematic analysis approach was adopted to achieve the study's purpose, which was to develop a framework for technology business incubation for the sustainable development of small businesses in KwaZulu-Natal. Braun & Clarke (2020:12) argue that thematic analysis can generate a superior interpretation of the data through the analytical process, a factor desirable for this current study. In reflexive thematic analysis, the coding process is considered integral to developing themes and sub-themes, resulting from iterative engagement with data through reading, re-reading, reflection, questioning, and generating memos (Braun & Clarke, 2020:5). A detailed process is provided.

6.2.3.3 Reflexive thematic analysis process

A six-step thematic analysis process, as presented by Braun and Clarke (2020:4), involves the researcher-adopted data engagement, coding, and theme development. Qualitative data analysis is based on an interpretative philosophy that examines meaningful and representative content of qualitative data extracted from the managers/directors/CEOs of TBIs in KwaZulu-Natal (Maree, 2016:109). These steps include data familiarisation, systematic data coding, generating themes, developing and reviewing themes, refining and defining themes and writing the report. These steps will be presented and discussed in detail as applicable to this study.

6.2.3.3.1 Step 1 – Data familiarisation

As indicated in Section 6.2.2.3.1, all interview recordings were independently transcribed using Microsoft Office Word documents. These transcriptions were recorded verbatim, and given that the English language was not the first language for some participants, part of the editing done by the researcher was to ensure the accuracy of the transcripts. The editing was not concerned with language errors but

with context, for instance, using acronyms regarded as standard in technology transfer, entrepreneurship support, and small business incubation. Square brackets, [AAAA] were used when an expression was made in any of the other languages, and the researcher translated it into English to ensure that the record remained intact. Ellipsis […] were used to designate cut sentences, and laughs, sighs, and phews were indicated by the respective word in square brackets, for instance, [laughs] or [sigh]. All these interventions and corrections were done before conducting the first step of thematic analysis. The transcription of interviews was then followed by the researcher's first step of data familiarisation by re-listening the interviews and systematising and re-reading the raw data gathered from the participants (Braun *et al*., 2019:852). This first step assisted the researcher in establishing a sense of the data collected. (Bengtsson, 2016:11).

6.2.3.3.2 Step 2 – Systematic data coding

The second step is characterised by the researcher defining the coding units for analysis in the data coding processes. The researcher should provide sufficient information explaining how and why patterns were observed (Tong *et al.*, 2007:356; Malterud, 2001: 486). Identification of patterns can be achieved by accurately describing the coding process and record-keeping (notes and memos), as it will also enhance the understanding of how data were perceived, examined, and developed (Tong *et al.*, 2007:356). Coding identifies topics, issues, similarities, and differences that participants expose through their narratives and as interpreted by the researcher (Sutton& Austin, 2015:228). According to Saunders *et al.* (2019:580), a coding unit is an element of data comprising several words, a line of a transcript, a sentence or a paragraph presenting the meaning of the code. Coding units allow the researcher to present data in practicable information sets (du Plooy-Cilliers *et al*., 2014:234) or smaller and meaningful units or parts that can be examined closely (Bengtsson, 2016:11). The sources of these codes range from current theories to inductively mined from data or codes associated with categories of participants, with a common aim of helping the researcher with understanding, generation of themes and theoretical concepts (Bickman *et al*., 2014:236). Table 6.5 gives a summarised explanation of the three sets of coding categories.

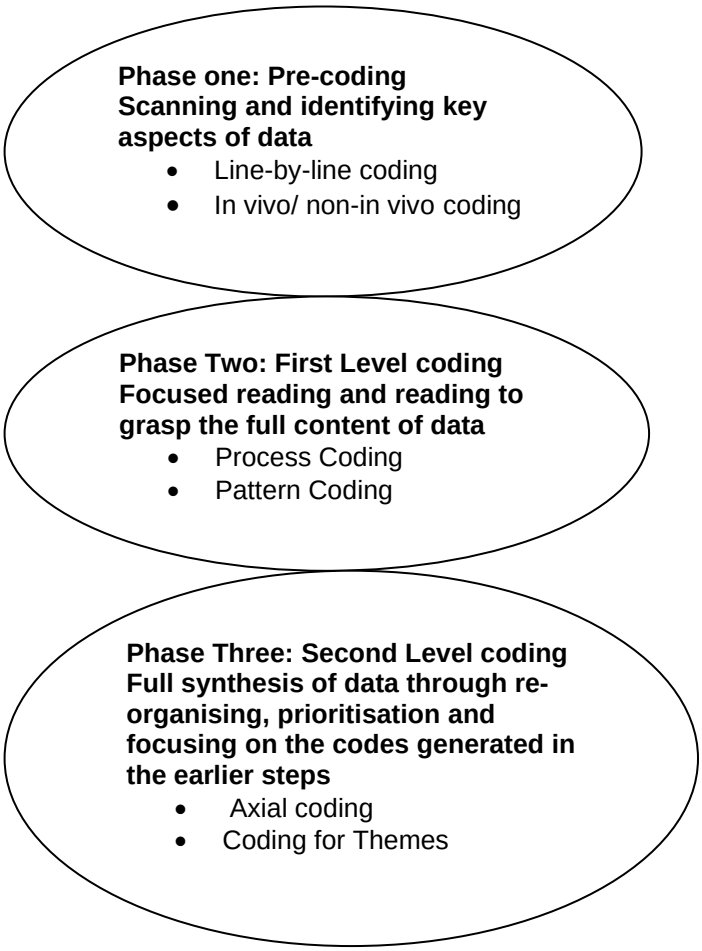
Table 6. 5: Categorizing analysis in qualitative research: Coding and Themes

Category	Explanation
Organisational	These broad subjects or issues emerged before the interviews or the topics the researcher had anticipated. These categories assist in sorting data for further analysis.
Substantive	These categories provide a more profound understanding of the subject matter. They may be sub-categories of organisational categories, with the condition that the researcher could only have anticipated these if there is embedded familiarity with the subject matter, participants, or the research setting. These categories of data are more descriptive about participants' beliefs as they are inductively developed from data. These can assist in generating the overarching theory even though they do not depend on the developed theory.
Theoretical	These categories position data into a more general or abstract framework, and they can be derived from existing theory or inductively realised theory, generated through concurrent concept and theory development, representing the concepts from the researcher (etic) as opposed to those forwarded by participants (emic)

Source: Bickman *et al.* (2014:236-8)

The researcher then used the coding units to code the data extracted from each participant. (Maree, 2016:116) describes the coding process as "reading carefully through the transcribed data, line by line, and dividing it into meaningful analytical units." This coding process results in condensed data that can be simpler and more focused (Bryman & Bell, 2014:336). In vivo (use of direct participant words) and non-in vivo codes (researcher-modified participants' responses) were both used in the study. The in vivo and non-in vivo analysis allowed the researcher to address the explicit (directly observable content) and the implicit (unobservable content) meaning of data as part of the systematic coding process (du Plooy-Cilliers *et al*., 2014:240). As indicated by Cho and Lee (2014:4), the visible surface content and the underlying meanings of the presented text are essential in reaching beyond the apparent data content. The coding process from the transcriptions is illustrated in the Interview extract (See Annexure D). The different types of coding are presented in Figure 6.2:

Figure 6. 2: Systematic coding process - three-phase approach



Source: Researcher's creation

As indicated in Figure 6.2, the first phase of pre-coding relates to the researcher scanning the transcripts to identify important aspects of data based on the research study and its aims and objectives before the whole interpretation. This line-by-line coding included in vivo and non-in vivo generation of codes. Du Plooy-Cilliers *et al*. (2014:240) describe this exercise as a form of microanalysis where the researcher factually reads through parts of the transcript line by line and notes certain words and phrases that seem relevant to the study. As attested by du Plooy-Cilliers *et al*. (2014:240), in vivo coding relates to instances when the researcher codes using the exact words uttered by participants, whereas different wording applies in non-in vivo coding. The first-level coding, comprised of the second phase of the systematic coding process, involved reading the transcript to extract the text's overarching impression and understanding (du Plooy-Cilliers *et al*., 2014:241). Coding experiences revealed the participants' experiences through their articulations, attitudes, and beliefs that reflected their perspectives or worldviews on technology business incubation in KZN.

The third phase of the coding process is about comparing, reorganising, focusing and prioritising codes developed in the second phase, hence the corresponding titles of pattern coding, focused coding, and axial coding. In Pattern coding, the researcher identifies meta-codes, giving category labels that indicate similarly coded data (Saldaña, 2009). This pattern coding was then used to classify other potential patterns in the data, including categories of codes created. Focused coding is concerned with classifying coded data from thematic or conceptual similarity; in this study, the researcher looked for high-frequency codes to develop the most prominent categories from the presented data (Saldaña, 2009:155). It involved selecting important and frequent sections from the interviewee responses (Tong *et al.*, 2007:356), aiming to break data and then develop categories that facilitate comparisons within and between different categories (Bickman *et al.,* 2014:236). It is also possible to use multiple coders to give a broader and more complex understanding of the phenomenon and to further enhance the credibility and validity of the findings through triangulation (Tong *et al.*, 2007:356; Malterud, 2001: 483). Hence, focused coding assisted the researcher in ensuring that the frequent codes developed from the data were well-defined. It also eliminated the possibility of multiple belonging of codes, thus improving the specificity of categories (Theron, 2015:5). Axial coding addresses the need to compare categories of codes and identify the connections and relationships across categories

(du Plooy-Cilliers *et al.,* 2014:241). Through axial coding, the researcher could reduce the codes in this current study that emerged from all previous coding phases (Onwuegbuzie, Frels & Hwang, 2016:). The code reduction was achieved by identifying connections and relationships across the resulting categories of codes. Connecting strategies are concerned with contextual understanding of the data through engaging various methods that seek to identify relationships within the different elements of the text in a coherent fashion. Bickman *et al.* (2014:239) stress the importance of categorising and connecting strategies in analysing qualitative data. Annexure F presents an example of focused and axial coding applied in this study. The familiarisation and coding steps allowed the researcher to conceptualise preliminary themes, which will be discussed in the following section.

6.2.3.3.3 Step 3 – Generating themes

A theme-generating stage follows the coding process, and this stage involves identifying relevant and consistent patterns and meanings within codes (Willig & Rogers, 2017:23). Therefore, provisional or preliminary themes were developed from codes that captured the topic and meaning as generated from the coding phases, with the researcher making decisions on whether these are related codes or categories of codes (Willig and Rogers, 2017). During this engaging process, as more data became available, some preliminary codes were later rejected, and new ones were developed. This typical qualitative research practice employs coding in data analysis (Willig & Rogers, 2017:24). This process is further elaborated in the following section.

6.2.3.3.4 Step 4 – Developing and reviewing themes

Willig and Rogers (2017:26) present the development and review of themes as an essential step in the sequence of thematic analysis, as it is responsible for shaping and clarifying the study's findings. (Vaismoradi and Snelgrove, 2019”11) (further emphasise that the themes develop through continuous analytical examination of codes and preliminary themes developed, as well as the social phenomena, thus translating the utterances of participants into the language capable of facilitating decision-making. This process required the researcher to continuously reflect and examine the data by questioning the relationships between the codes generated and

the themes, their distinctive characteristics, assess for any possible duplications of both codes and themes, ironing out all identified ambiguities in the meanings associated with themes and making decisions on whether the resulting themes will be able to relate the experiences of the participants.

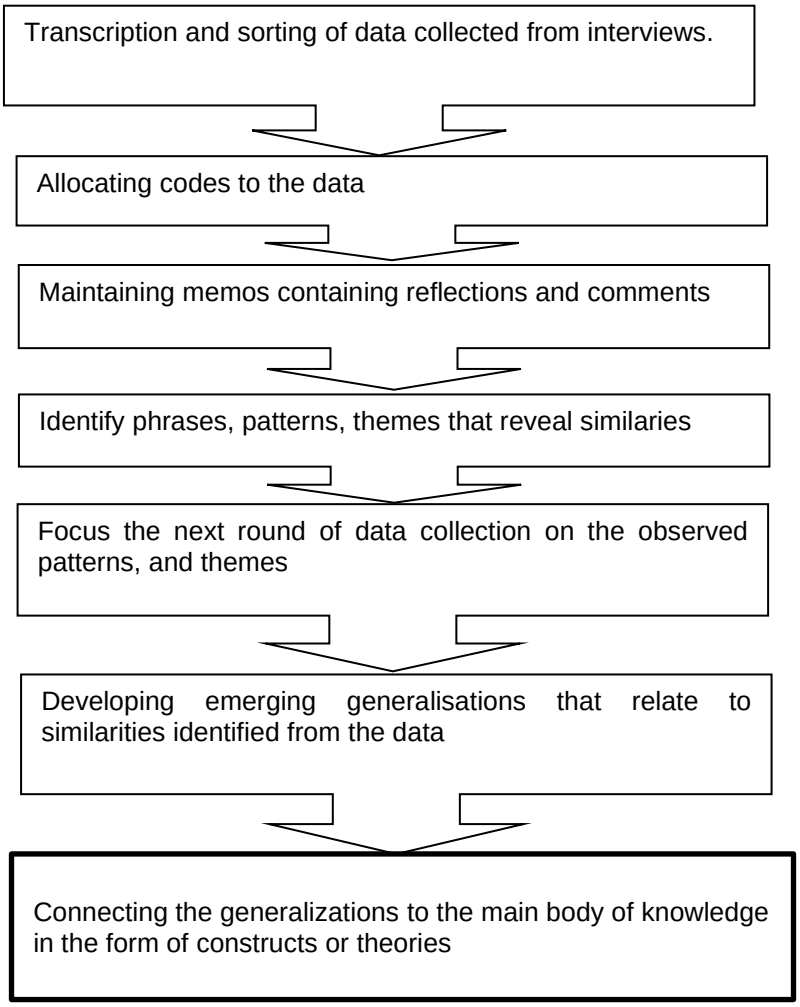
6.2.3.3.5 Step 5 – Refining and defining themes

Step five involved the researcher's efforts in continual review of themes through refinement and focused definitions of the generated themes (Willig & Rogers, (2017:29). For each theme and sub-themes (categories), the researcher provided numerous descriptors or short summaries of the central ideas and diversity of meanings generated for each theme and sub-theme or categories. (see Annexure F) presents the refined and defined themes for the current study.

6.2.3.3.6 Step 6 – Writing the report

The researcher then presented the report of the empirical study's findings and interpretation in Chapter 7. For this research, the researcher used memos and displays that included tables, networks, and matrices, which assisted in data reduction and presentation analysis in a form that permeates the study. Hence, Figure 6. 3 presents a schematic representation of the steps taken by the researcher in analysing data for the current research study.

Figure 6. 3 Summary of the steps taken by the researcher in analysing data



Source: Adapted from Doyle *et al*. (2020:448)

The following section presents how trustworthiness and rigour were ensured in the current study.

6.3 TRUSTWORTHINESS AND RIGOUR

Amongst the responsibilities of a researcher is demonstrating that quality is maintained throughout the research study, thus rendering the outcome or research findings credible amongst recipients (Saunders *et al*. 2019:204; Grossoehme, 2014:111). Some readers and quantitative researchers often question the trustworthiness of qualitative research because the traditional concepts of validity and reliability are addressed differently between these two research approaches (Kalu & Bwalya, 2017:44). Bryman and Bell (2014:43) cautioned against the direct transfer of quantitative research concepts like reliability and validity into qualitative research. Saunders *et al.* (2019:205) even considered assessing reliability and validity as philosophically and technically inappropriate for qualitative research, especially when considering the interpretive assumptions associated with qualitative research, which are not only socially constructed but also multifaceted (Bryman & Bell, 2014:44; Wahyuni, 2012:77). To address this challenge, qualitative researchers have introduced alternative concepts that the researcher may engage in to ensure that the outcomes are reliable and valid (Wahyuni, 2012:77). Bonache and Festing (2020:101) argued that alternative quality standards in qualitative research measure the study's rigour. Rigour refers to establishing the qualitative research process's plausibility, credibility, and integrity (Ryan *et al.*, 2007: 742). The researcher developed Table 6.6 to demonstrate the contrast between trustworthiness concepts used in qualitative research and those utilised in quantitative research.

Table 6. 6: Quantitative vs Qualitative research quality concepts

Quantitative Concept	Corresponding Qualitative Concept	Concerns
Internal validity	Credibility	Confidence in the truth of the research findings as a truthful representation of participants' views as accurately interpreted by the researcher
External validity	Transferability	The extent to which findings of a qualitative study can be transferred or applicable to other contexts or settings with different participants.
Reliability	Dependability	The stability or resilience of findings over time, thus
Objectivity	Confirmability	Demonstrating that another researcher will arrive at the same interpretation of the findings

Sources: Adapted from Korstjens and Moser (2018:121; Kalu and Bwalya (2017:49) and Wahyuni (2012:77)

To improve the rigour and systematic process of the interpretation of the results in qualitative research, Bonache and Festing (2020:113) introduced communicative validity (i.e. what the researchers understand and interpret is consistent with what is meant by the individuals being studied), pragmatic validity (i.e. there is no discrepancy between what the subjects being studied say they do and what they do) and interpretative awareness (i.e. the interpretation reached relating to the lived experiences of the individuals being studied and does not just reflect the beliefs, values and biases of the researcher). Furthermore, the researcher employed the five verification strategies that are suggested as measures of enhancing reliability and validity of qualitative research, these being methodological coherence, sampling sufficiency, developing a dynamic relationship between sampling, data collection and analysis, thinking theoretically, and theory development, and are tabulated in Table 6.7.

Table 6. 7: Strategies for verification of rigour (reliability and validity) in qualitative research

Methodological coherence	Aligning the research question to the method components thereby links data and the analytical procedures. Each step in the research process should verify the previous elements and assumptions. This implies that the process cannot be linear and may require modifications in the questions, methods, and sampling plans to ensure coherence.
Appropriateness of the sample and Triangulation This aspect relates to both the quality of the sample and its diversity.	Identifying participants who best represent or have knowledge of the research topic. Several triangulation methods can be employed to enhance the quality of data further.
Saturation and replication, which refer to the point in data collection where all aspects of the phenomenon have been obtained, are evidence of sampling adequacy.	Saturating data ensures replication in categories; replication verifies and ensures comprehension and completeness.
Collecting and analysing data concurrently forms a conjoint interface between what is known and what one needs to know.	This back-and-forth movement between data collection and analysis is essential to attaining reliability and validity. To ensure the completeness of the data, this exercise should be linked with long-term involvement.
Thinking theoretically requires macro-micro perspectives, inching forward without making cognitive leaps, constantly checking and rechecking, and building a solid foundation.	Ideas emerging from data are reconfirmed in new data, which gives rise to new ideas that, in turn, must be verified in data already collected. Rich data can be achieved through verbatim transcribing of interviews instead of the researcher taking notes.

Respondent validation involves engaging participants for feedback, which plays a vital role in eliminating misrepresentations in the findings.	It is worth noting that the validity of participants' feedback is equivalent to that associated with interviews.
Identifying discrepant evidence and negative cases involves diligently looking for information that emerging concepts or theories cannot explain.	This is one of the critical components of ensuring validity in qualitative research, and it supports the need to actively seek opposing views that may need to be more easily identifiable from the data.
Quasi Statistics refer to simple numerical results that can easily be obtained from data.	Quasi-statistics assist the researcher in challenging and supporting fundamentally quantitative claims.

Sources: Braun and Clarke (2021b:202); Bickman *et al.* (2014:245); Grossoehme (2014:111); Tong *et al.* (2007:356); Morse *et al.* (2002:12); Malterud (2001:486).

To address the question of trustworthiness, the researcher considered the four generally accepted criteria for qualitative research trustworthiness: credibility, transferability, dependability, and confirmability (Wahyuni, 2012:77; Ryan *et al*., 2007:743; Malterud, 2001:483). The four criteria will be discussed extensively in the sub-sections.

6.3.1 Credibility

Credibility is concerned with the accuracy of data in revealing the social phenomena that are being studied (Kalu & Bwalya, 2017:49; Wahyuni, 2012:77). It measures the consistency between the participants' views and their representation by the researcher(Ryan *et al.*, 2007:743). It further assesses the researcher's faithfulness in describing the phenomenon (Korstjens & Moser, 2018:121). Furthermore, credibility should address the congruency between the research findings and the reality, thus enhancing the study's ability to convince the reader of the truth being presented (Maree, 2016:123).

6.3.1.1 Techniques to enhance credibility

A clear and systematic description of the research path, including the research design, the collection of data, and the steps taken to manage, analyse and report data to enhance further the credibility of the study, needed to be clarified at the onset of the

qualitative research (Kalu & Bwalya, 2017:50; Grossoehme, 2014:111). The careful selection of the study sample is one measure that enhances the credibility of the study findings (Wahyuni, 2012:77; Tong, 2007:356). The researcher may also enhance credibility by fully describing and interpreting their experiences as a researcher (Kalu & Bwalya, 2017:50; Ryan *et al.*, 2007:743). Prolonged engagement, observation and audit trails are other means of improving credibility (Korstjens & Moser, 2018:121; Ryan *et al.*, 2007:743). However, the researcher needs to be as neutral as possible, which could be achieved by the researcher's effort to avoid stating opinions while conducting interviews or focus groups (Kalu & Bwalya, 2017:50). Furthermore, credibility can be enhanced by providing detailed information about the participants expressly indicated what was done with the participants, the duration, location, and numbers of participants (McLeod, 2015:121).

6.3.1.2 Credibility in this study

Credibility in this study was achieved by using purposive sampling with a clear description of the participants' profiles (McLeod, 2015:121). Respondent validation, referred to as inviting participants to comment on the interview transcripts and whether the final themes and concepts created adequately reflect the investigated phenomenon was also adopted to enhance credibility (Noble & Smith, 2015:34).

6.3.2 Transferability

According to Bryman and Bell (2014:392), findings of a qualitative research study are oriented on capturing the uniqueness and significance of a particular aspect of the social world being studied by providing a thick and rich description which serves as a database for recipients to make judgements about the possibility of transferability of findings to other milieux. Transferability relates to the degree to which the research findings can be applied in another setting, context, or situation (Kalu & Bwalya, 2017:50; Wahyuni, 2012:77; Ryan *et al.*, 2007:743). It does not imply that data were reproducible but relates to the ability to apply the study in a different situation, allowing for adjustments (Wahyuni, 2012:77). Hence, transferability is also known as the fittingness of the study and its findings (Ryan *et al.*, 2007:743). Leung (2015:326) emphasised that researchers should be conscious of the fact that qualitative studies

offer individual subjective meanings and, as such, might generate findings that may be challenging to generalise to the broader and widespread population.

6.3.2.1 Techniques to enhance transferability

When critiquing qualitative research, a study can be deemed to have met the criterion of transferability when the findings can 'fit' into other contexts, and readers can apply the findings to their own experiences (Ryan *et al.*, 2007:743). To enhance transferability, the researcher should ensure that a rich and thick explanation and description of participants, research sites and characteristics is provided (McGregor, 2018:247; Maree, 2016:124; Wahyuni, 2012:77). Purposeful sampling technique also assists in ensuring that only those participants that conform to the given criteria are identified and selected for participation in the study (Maree, 2016:124). Transferability is also enhanced when the results are meaningful to individuals not involved in the research study (Ryan *et al.*, 2007:743). A detailed explanation of how a robust cross-reference of the data and the conclusions were conducted enhances the validity of the findings and, as such, improves transferability (Kalu & Bwalya, 2017:50).

6.3.2.2 Transferability in this study

In this study, transferability was ensured through a clear and concise description of the research setting that will allow the recipients of the research to identify fit in a different environment as well as through the option of purposeful sampling (McGregor,2018:247; Maree, 2016:124; Wahyuni, 2012:77). The researcher also enhanced transferability the cross-reference of the secondary and primary data in the conclusions of the study (Chapter 7).

6.3.3 Dependability

Dependability refers to the stability of the research findings and the researcher's attempt to account for any changing conditions in the phenomenon of study, design, or methodology as appropriate (Kalu & Bwalya, 2017:51). It is concerned with replicability or repeatability (Wahyuni, 2012:77). It is also an integral component of rigour and involves the researcher providing the reader with sufficient information to

determine how dependable the study and the researcher are (Ryan *et al.*, 2007:743). A study may be deemed auditable when another researcher can clearly follow the trail used by the investigator and potentially arrive at the same or comparable conclusions (Bryman 2012:392; Ryan, 2007:743). It should be noted that a future researcher's application of the research model is not necessarily targeted at getting a similar result (Wahyuni, 2012:77). Dependability is sometimes referred to as auditability (Ryan *et al.*, 2007:743).

6.3.3.1 Techniques to enhance dependability

A research study may be dependable by producing evidence of a decision trail at each stage of the research process (Korstjens & Moser, 2018:121; Ryan *et al.*, 2007:743). This trail provides the reader with evidence of the decisions and choices made regarding theoretical and methodological issues throughout the study. It entails discussing explicitly the reasons for such decisions and ensuring traceability (Kalu & Bwalya, 2017:51; Ryan *et al.*, 2007:743). Dependability can also be enhanced through an elaborate explanation of the research design, tools and process that was followed in the study to allow future researchers to follow a similar research framework (Wahyuni, 2012:77).

6.3.3.2 Dependability in this research study

Dependability was enhanced in this research by providing a detailed, step-by-step explanation of the research design tools and processes that were followed to ensure consistency and maintain regular checks that the analysis process is well-synced and aligned with the accepted standards for the chosen research design (Korstjens & Moser, 2018:122). Furthermore, an audit trail was presented to ensure adherence to proper protocols Kalu & Bwalya, 2017:51; Wahyuni, (2012:77).

6.3.4 Confirmability

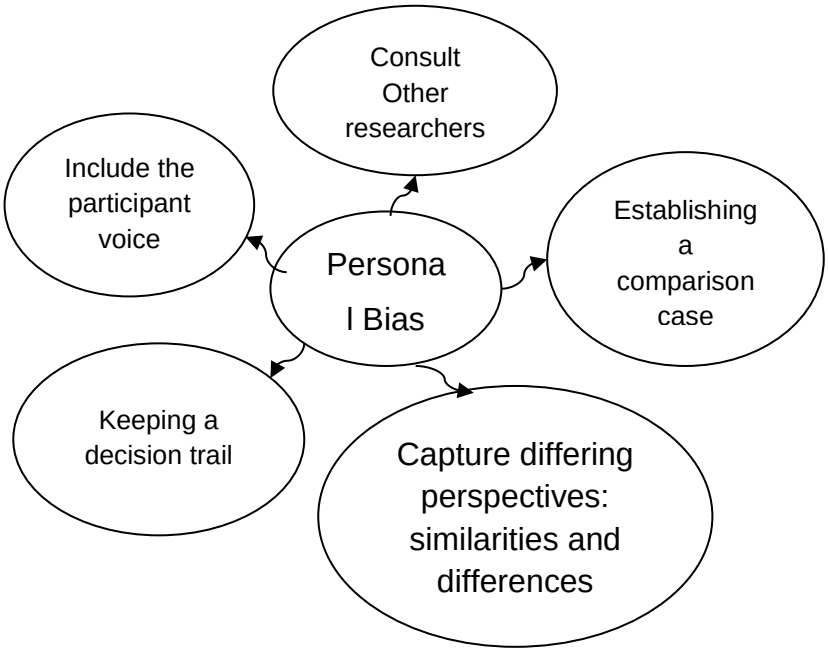
Confirmability is concerned with the notion of neutrality, seeking to secure the inter-subjectivity of the data and ensuring that the interpretations are not based on the researcher's particular preferences and viewpoints but are grounded in the data

(Korstjens & Moser, 2018:122). It is the extent to which the research findings are shaped by the participants themselves rather than the researcher's bias (Connelly, 2016:435) and the extent to which the same findings can be sanctioned by other researchers (Wahyuni, 2012:78). It refers to the steps taken by the researcher to demonstrate that findings emerged from the data and not their predispositions (Kalu & Bwalya, 2017:51). It further ensures that the results are a true reflection of the understandings and experiences of the research participants and not merely a representation of the researcher's views, opinions, and preferences (Ryan *et al.*, 2007:743; Wahyuni, 2012:77). The use of confirmability in qualitative research is comparable with objectivity in quantitative research (Malterud, 2001:483). Confirmability requires the researcher to demonstrate how conclusions and interpretations have been reached by linking findings to data (Ryan *et al.*, 2007:743). Confirmability is usually established when credibility, transferability and dependability are achieved (Kalu & Bwalya, 2017:51; Ryan *et al.*, 2007:743).

6.3.4.1 Techniques to enhance confirmability

A detailed account of the research processes will enable readers to determine whether the data analysis procedures were carried out appropriately, thus enhancing confirmability (Kalu & Bwalya, 2017:51). Confirmability can be improved through source triangulation, peer review of the research process and keeping an audit trail of research records (Wahyuni, 2012:77). Research records allow for an examination of both the research process and research outputs by tracing out the step-by-step course of the research (Wahyuni, 2012:77). A decision trail, mentioned in subsection 6.3.3.1, also serves the purpose of accounting for conformability. Noble and Smith (2015:34) suggested some strategies that can be employed to address personal bias in qualitative research, and these are presented in Figure 6.4.

Figure 6. 4: Strategies for accounting for and eliminating personal bias



Source: Adapted from Noble and Smith (2015:34).

6.3.4.2 Conformability in this study

Conformability was ensured to enhance objectivity in this study by maintaining accurate records of the research journey and all decisions about data analysis (Connelly, 2016:435). An audit trail of the analysis and methodology is reflected in the conceptual framework, research design and methodology (Chapter 5) and the research methods and rigour chapters (Chapter 6). Chapter 7 is dedicated to a detailed presentation of the results and discussions. Neutrality in the interpretation of data was also ensured through the utilisation of direct quotes from the participants in support of the study's findings (Maree, 2016:125). In addition, all the interviews conducted by the researcher were transcribed verbatim to reduce bias.

To improve the trustworthiness of qualitative research, additional aspects of authenticity (McGregor, 2018:247) and reflexivity (Korstjens & Moser, 2018:121) need to be addressed in addition to the four concepts of credibility, dependability, transferability, and conformability, as discussed. The following sections address these concepts of authenticity and reflexivity.

6.3.5 Authenticity

Authenticity refers to the degree to which the participants' voices and agency are maintained (McGregor, 2018:247). It also addresses the need for congruency between the research aims, the population being studied, and the appropriateness of the selected participants who will assist in describing the study in question (Connelly, 2016:436). The five strategies that can be used in addressing authenticity in qualitative research include fairness in representing all views of participants, ensuring ontological authenticity by assisting in raising the awareness of participants of the phenomenon under investigation, educative authenticity by helping participants appreciate the different viewpoints, catalytic authenticity by stimulating some manner of action from participants and tactically authenticity by empowering others (Saunders *et al*.,2019:206).

6.3.5.1 Authenticity in this study

To demonstrate authenticity in this research study, the researcher used the strategies of fairness and ontological authenticity by ensuring that a plethora of the different realities of technology business incubation for sustainable growth of small business in KwaZulu-Natal were identified and recorded (Saunders *et al*., 2019:206). The study's ontological authenticity was also enforced by assisting participants to be aware, understand and appreciate the social phenomenon and context being investigated (Saunders *et al*., 2019:206), which was achieved through an introductory letter explaining the nature and primary objective of the study.

6.3.6 Reflexivity

Reflexivity is the process of systematically attending to the context of knowledge construction, especially to the researcher's effect, at every step of the research process (De la Cuesta Benjumea, 2015; Rambaree, 2013:1; Tong *et al.*, 2007:351; Malterud, 2001:484). Elliott et al. (1999:221) describe reflexivity as "*owning one's perspective"* and further point out that this could happen before or during the research undertaking. Collins and Stockton (2018:3) further add that reflexivity is the researcher's capacity to realise, know and reflect on personal subjectivities. According

to Clarke and Braun (2013:10), reflexivity also involves a reflection on the research as a process and the researcher's roles, including the multiple insiders (instances where the researcher shares some characteristics with the participant's group) and outsiders (where there are no similarities with the researched). Given the intimate involvement of the researcher with the participants, qualitative research possesses the potential for personal bias. This possibility of bias brings forth the need to disclose the researcher's values and assumptions underlying the interpretation and understanding of data (Collins & Stockton, 2018:3; Elliott *et al.*, 1999:221). It is a concept of qualitative research rigour, requiring the researcher's awareness and acknowledgement of personal bias and, therefore, devises strategies to limit its influence on the data and interpretations (Kalu & Bwalya, 2017:51). Chenail (2011:19) further argues that the degree of affinity researchers have with the population under study including researchers being a member of the group themselves can introduce a question of bias in the study, and given this affinity; these "insider" investigators may limit their curiosities so they only discover what they think, rather than opening up their inquiries to encompass also what they do not know. Reflexivity can also be maintained by examining data or its interpretation for competing conclusions (Malterud, 2001:484). It raises the consciousness of how the researcher's presence may have affected the research process and the participants and how the participants may have affected the researcher (Kalu & Bwalya, 2017:51).

6.3.6.1 Techniques to enhance reflexivity

Reflexivity can further enhance the credibility of the study by the researcher describing and interpreting personal experiences as a researcher to control bias, including information on any relationship the researcher may have with the participants (Kalu & Bwalya, 2017:50). This assertion is also aligned to the insider/outside roles as presented by Clarke and Braun (2013:10). Ensuring reflexivity also enhances objectivity in the qualitative study by eliminating the subjectivity associated with suspicion of undesirable or hidden bias (Malterud, 2001:484). Reflexivity allows the reader of the research findings to assess how these factors may have influenced the researcher's observations and interpretations. This reflexivity can be achieved through critical reflection on the research process and understanding how the researcher's values, identity and views may have influenced the findings, which can add credibility

to the research as the researcher tries to manage personal bias (Kalu & Bwalya, 2017:51; Clarke & Braun, 2013:10).

6.3.6.2 Reflexivity in this study

In line with the primary aim of this study, the researcher's identity, characteristics, values, and views were considered and declared to ensure reflexivity in this current study. The researcher first had to acknowledge the role of an insider concerning technology business incubation as a current profession and the province of KwaZulu-Natal as the common place of residence for participants. This insider role is coupled with the outsider role as the researcher worked with program participants with different mandates (founders), goals, and objectives. Several interventions were employed to account for reflexivity; firstly, the transcription of interviews was done independently to facilitate verbatim and objective capturing of the interview proceedings. Secondly, the researcher engaged with the MS Word Documents received as transcripts against the audio recording to ensure that the interview was captured correctly. It was followed by encouraging participants to review the study's preliminary findings, make inputs, and provide clarity wherever necessary. The researcher also took notes during interviews and data analysis processes to record the comments and "surprising facts" that emerged from the data. The reflexive journal is appended to the findings report.

The following paragraphs will discuss measures that address ethical considerations to demonstrate further the study's integrity, trustworthiness, and rigour.

6.4 ETHICAL CONSIDERATIONS

Generally, the purpose of research is to develop additional knowledge and understanding of a phenomenon being investigated; therefore, it is essential to present the ethical considerations relating to the subject matter (Maree, 2016:44) that will guide the reasoning in terms of what is deemed the right thing to do as qualitative research is regarded as a moral enterprise (Brinkmann & Kvale, 2018:28). This aspect is also considered as ethical rigour. It describes how confidentiality issues and the rights of participants are dealt with during the research process (Ryan *et al.*, 2007:743). Research can present risks to participants; therefore, the researcher should ensure

that their well-being is safeguarded throughout the research process (Kalu & Bwalya, 2017:48). Tucker and Govender (2017:1147) argue that the general notion of viewing ethics rigour as a set of rules and principles which must be identified and documented before the commencement of research should be replaced with empathy and moral responsibility. This caution can be ascribed to some definitions of ethical considerations, which regard these as a "set of rules and guidelines that should be considered to avoid possible harm to both the participants and researchers" (Shirmohammadi Kohan, Shamsi-Gooshki & Shahriari, 2018:157). Researchers, therefore, need to ensure that offensive or unacceptable protocols do not emerge from what was judged as harmless questions (Brinkmann & Kvale, 2018:28). This will facilitate the openness and frankness of the discussion. It is, therefore, the responsibility of the researcher to ensure that research focused on human participants is grounded on scientific and generally accepted ethical principles and that relevant permissions from subjects, as well as affiliated committees, have been granted (Shirmohammadi *et al.*, 2018:164), Ethical committees, to which the researcher is affiliated, have the responsibility to protect the rights of the research participants and provide support for those identified as vulnerable (Ryan *et al.*, 2007:741).

This study considered the ethical considerations of ensuring the right to privacy, anonymity and confidentiality, voluntary participation, management of power relations, and the researcher's integrity. The following sections will discuss these ethical considerations and the ethical approval from the affiliated institution.

6.4.1 Right to privacy

It is best practice in any given research, and in particular when dealing with real people, to respect the respondents' right to privacy (Kalu & Bwalya, 2017:48) and ensure that this right to privacy is protected (Collis & Hussey, 2014:4).

Privacy is closely linked to the concept of informed consent, given that the research participants surrender their rights to privacy to the extent that they understand how and what their involvement in the study will be like (Bryman and Bell, 2014). Informed consent should ensure that the participants are fully aware of the purpose of the study, the kind of information desired, how it will be used, and the implications of contributing

to the research study (Ryan *et al.*, 2007:741). In this study, informed consent was solicited from targeted participants before the data collection stage; the researcher ensured their privacy was respected and protected throughout the research process.

6.4.2 Right to anonymity and confidentiality

By the right to privacy, research participants also have the right to remain anonymous (Beckmann, 2017). Furthermore, Brinkmann & Kvale (2018:33) assert that the researcher should also ensure that private data provided by participants is kept and used in strict confidentiality. Given that interviews and observations are the standard methods for data collection in qualitative research, the identity of the participants is known by the researcher, who needs to ensure that their identities will not be revealed and that the raw data collected will be treated with strict confidentiality (Ryan *et al.*, 2007:741).

In the current study, both anonymity and confidentiality were ensured, as the organizations and participants were not mentioned. Pseudonyms were used to protect the identity of participants (Bryman & Bell, 2014:123), thus further warranting that no persecution will be suffered by the study participants (Maree, 2016:44; Bryman & Bell, 2014:123). These measures also ensured that participants could freely express their views without fear of victimisation (Collis & Hussey, 2014:32).

6.4.3 Right to voluntary participation

Safeguarding participants' well-being involves adhering to the standard ethical principles, which include respect for the autonomy of the participants, protecting participants from harm, confidentiality, informed consent, and voluntary participation (Kalu & Bwalya, 2017:48). Collis and Hussey (2014:32), emphasised the point that participants should not be compelled to participate in the study. Informed consent, therefore, becomes one of the significant items under ethical considerations of a research process (Connelly, 2016:454), and it should stipulate that and further advise participants of the voluntary nature of their participation (Manti & Licari, 2018), Furthermore, participants should also be allowed to exit the study if they wish to (Ryan *et al*., 2007:741), so the researcher should request process consent during the study.

Voluntary participation was enforced in the current study through the researcher soliciting informed consent from all participants before engaging the participants through interviews (Bryman & Bell, 2014:124). The informed consent, which the participants had to sign to indicate their willingness to participate, is attached as Annexure B, which was obtained from the study participants. Furthermore, the purpose of the research study was explained individually to all participants in the manner and language they were most comfortable with, which was mainly English and, in some instances, isiZulu, this being an acceptable practice for soliciting voluntary participation (Roulston & Choi, 2018:7; Brunt et al., 2017:10; Bryman & Bell, 2014:124). These sessions also advised participants that they would be research subjects and emphasised their right to decline participation or withdraw at any given stage without fear of repercussions (Besen-Cassino & Cassino, 2017:52).

6.4.4 Managing power relations

Reid, Brown, Smith, Cope & Jamison, (2018:5), suggested that research has a power asymmetry tilted in favour of the researcher and against the participant, as the researcher directs the research process. This feature is often found in qualitative research between the researcher and the participants (Brinkmann & Kvale, 2018:18).Quinlan, Babin, Carr, Griffin and Zikmund (2015:43) further argued that the very title of 'researcher' gives a certain degree of power to the person investigating those regarded as participants, even implying that the researcher is better equipped in terms of skill and knowledge. Lancaster (2017:100) argued that participants can also claim power by declaring what can or cannot be discussed during the interviews. To prevent a power imbalance between the researcher and the participants in a study, a researcher must uphold three core principles of respect for persons, beneficence, and justice to ensure that the power asymmetry between the researcher and the researched is managed (Roulston & Choi, 2018:7; Pillay, 2014:196).

These principles of respect for persons, beneficence, and justice were upheld in the current study by ensuring that participants were free to express their views, which the researcher respected. This attitude implied that the researcher could not impose personal ideas, views, and opinions about the phenomenon under investigation, thus

allowing only the voices of the participants to be heard. Respect and beneficence were also exercised by enabling the participants to decide on the time, date, and venue that best suited their needs for the interview. It also included the options for online or physical interviews and the preferred platform for online interviews, either MS Teams or Zoom. The identities of participants and their organisations were also protected, and so was their right to exit the interview if they wished to do so, despite participants having signed consent forms. These measures collectively worked towards managing power dynamics that prevail in qualitative research. The researcher also ensured that the participants were prevented from any potential harm associated with the study. The researcher's integrity is discussed in the following section.

6.4.5 Researcher's integrity

The subjective nature of qualitative research and the adopted approach for this current study, as presented in Chapter 5, suggest that the personal involvement and core creation of knowledge of the researcher is recognised and acknowledged and, therefore, needs to be accounted for (McCusker & Gunaydin, 2015:541; McLeod, 2015:199). Thus, the researcher's integrity plays a significant role in ensuring that no undue influence is exercised during the investigation through data analysis and reporting of findings (Venter & Van Zyl, 2017:111). The concept of integrity relates to the ability of the researcher to demonstrate honesty and truthfulness in conducting the research study (Lazenby, 2015:73). Van Aardt and Bezuidenhout (2019:204) offered that the researcher can demonstrate this ethical value of integrity by insisting on doing and standing up for what is right. The researcher's integrity should be evident in every aspect of the research to accord trust and ensure the quality of scientific knowledge (Brinkmann & Kvale, 2018:34; Venter & Van Zyl, 2017:111).

Measures taken in the current study ensure that the researcher exercises integrity through honesty and truthfulness from the research design phase and meticulously records all decisions relating to the chosen methodology, data analysis, and reporting of the study findings. These measures incorporated the presentation of the decision trail, which records steps taken to ensure openness and transparency from design to the conclusion of the study (Daniel, 2016:98; Quinlan *et al.,*2015:43). Furthermore, the researcher was responsible for maintaining the integrity of the data collected from the

empirical investigation (du Plooy-Cilliers *et al.*, 2014:269). The researcher also subjected the study to scrutiny by the institutional ethics committee for approval, and this process will be described.

6.4.6 Ethical approval

The researcher subjected this current study to the scrutiny of the Research Ethics Committee of North West University, which then approved the implementation of this investigation. This practice of soliciting approval from the institutional committees is essential in ensuring that the researcher is familiar with the ethics policies and that the proposed study will be conducted by these (Maree, 2016:44). The ethical considerations that have been discussed under Sections 6.4.1 to 6.4.5 of this study were all accounted in the ethics approval application. The ethics approval letter is presented as Annexure C, and the ethical clearance number allocated to this study is NWU-01301-21-A4.

6.5 CONCLUSION

This chapter responded to the methodological objectives that relate to how the literature review was conducted (MO1, 2, and 3). It also responded to MO 4, which required justification of processes followed in identifying and selecting appropriate research methods that addressed the primary and secondary study objectives. Lastly, the chapter responded to MO6 by articulating the processes employed in collecting and analysing primary data and measures taken to address rigour, trustworthiness and quality of the research. All these were premised on the research paradigms, the adopted methods of theory development, and the research methodology. Lastly, this chapter discussed the ethical considerations relevant to this study and how the researcher enforced these during the investigation.

CHAPTER 7: FINDINGS AND DISCUSSION

7.1 INTRODUCTION

Chapter 7 presents the findings from the empirical study and responds to the following secondary objectives of this research study:

SO^4: To explore and describe the mode of operation for technology business incubators.
SO^5: To explore and describe the experiences of technology incubation programme managers/CEO/directors.
These objectives will lead to the development of the framework for the technology business incubation of small businesses in KwaZulu-Natal, as well as the conclusions and subsequent recommendations.
SO^6: To conclude, the strategies that can be utilised to enhance the positive impact of TBIs on technology-focused SMMEs.
SO^7: To recommend the action plans and policy interventions that can be implemented to ensure the success of TBI.
SO^8: Develop a framework for the TBI in the KwaZulu-Natal province in South Africa.

7.2 DATA COLLECTION

The data collection process was discussed in Chapter 6, Section 6.2.

7.2.1 Demographic profile of participants

The participants' profiles and demographics revealed that the gender composition revealed that only three women and ten men participated in the interviews as Managers/CEO/Directors of the TBIs in KZN. Regarding location, all TBIs operate from Durban, KwaZulu-Natal, with only two on the KZN South Coast.

7.3 STRUCTURE AND OVERVIEW OF THEMES

Chapter 6 Section 6.2.3 presented the data analysis process. This process is summarised in Table 7.1.

Table 7. 1: Generation of themes and sub-themes

	Step	Process	Outcome
1	Transcribing	An outsourced process to improve the accuracy and precision of the transcripts, allowing for verbatim comparison between the transcripts and the recording in reporting the study's findings.	Verification of the recordings and transcripts
2	Coding	Re-reading the completed manuscript to identify codes pertinent to the study. Different colours were used to reflect codes that were identical or similar. Coding was done for each transcript as the interviews proceeded. This process is depicted in Annexure D.	Codes generated from transcripts.
3	Categorising	The codes identified in Step 2 were clustered into categories based on identified similarities	87 categories are presented in Annexure E.
4	Second level Categorising: Emerging Themes/Sub-themes	Similar categories and group them under single titles or sub-themes encapsulating similar or identical initial codes.	Persistent patterns emerged as interim themes/sub-themes. An example of this exercise is presented in Annexure G.
5	Establishing relationships between the emerging sub-themes and themes	Refining the emerging themes and sub-themes	New sub-themes and Themes Annexures H and I.

Source: Researcher's creation

7.4.1 Tabulating Codes against the generated sub-themes and themes

Establishing interrelationships between subthemes was followed by tabulating codes under each subtheme. Table 7.2 was generated to assist the researcher in appreciating the importance or value of the subthemes generated from the transcripts. It was also used to identify areas for improvement in refining the subthemes and themes.

Table 7. 2: Table of codes in the sub-themes per participant

		Codes per Participant													
Theme	**Sub-themes**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**TOTAL**
TBI Profile [337]	Ownership	2	1	5	1	3	4	2	2	6	1	5	2	1	**35**
	What the TBI sought to achieve	5	4	5	5	9	16	11	13	8	10	10	2	13	**111**
	Targeted beneficiaries	3	2	4	1	3	4	1	2	1	1	1	1	1	**25**
	Success factors	5	2	4	4	8	4	13	3	3	5	10	3	4	**68**
	Impact	5	2	3	5	15	1	7	2	2	2	4	3	5	**56**
	Ecosystem considerations: Community	2	6	4	4	2	1	5	8	2	1	1	1	3	**40**
TBI Interventions [210]	Business support	9	10	3	8	11	5	14	8	17	3	6	8	2	**100**
	Technological support	6	6	5	2	7	4	4	5	9	1	6	4	5	**63**
	Small Business Support	3	0	1	5	8	4	6	1	3	4	5	5	2	**47**
Uniqueness of TBIs [113]	Benefits of being an incubatee receiving both business and technological support compared to those who are not incubated by TBIs.	2	1	1	1	3	12	9	4	3	6	2	3	4	**51**
	TBI interventions for highly/intensively scientific technologies	3	2	2	2	5	10	9	3	1	7	6	1	11	**62**
Challenges [104]	Incubatee Challenges	3	1	1	1	6	3	8	4	8	3	9	2	8	**57**
	Funding challenges for TBIs	6	2	7	1	9	3	1	3	3	1	6	4	1	**47**
Strategies for improving	Continuous improvement strategies	16	2	5	7	4	5	3	4	4	2	9	2	3	**67**
	Lessons Learnt and Advice for future TBI Managers	9	4	5	4	10	19	9	7	14	5	15	9	10	**120**

the effectiveness of TBIs [183]															
Mode of operation of the TBIs [296]	TBI Networks	6	4	8	5	16	17	7	9	3	7	6	9	6	**103**
	Profile of TBI Managers/CEO/Director	3	2	1	3	8	2	4	4	4	1	6	23	5	**66**
	Importance of Compliance within the SMME sector	3	9	7	3	3	1	2	4	1	2	1	2	3	**41**
	Monitoring & Evaluation	2	2	2	7	6	8	12	5	3	8	7	14	10	**86**
Profile of Incubatees [147]	Characteristics of TBI incubatees	1	7	7	3	5	4	15	12	21	9	2	2	4	**92**
	Essential skills for incubatee success	4	5	1	1	2	2	3	3	22	1	1	8	2	**55**
Government and TBIs [276]	Role of the Provincial Government	2	5	6	9	2	19	17	19	17	4	8	20	3	**131**
	Role of TBIs in KZN	2	6	9	11	3	25	11	20	9	6	7	21	15	**145**

Source: Researcher's creation

The following sections present the findings relating to these eight themes.

7.4 THEME1:TBI PROFILE

The findings revealed that the profile of the TBI influences its ability and how it supports small businesses. A total of 336 codes were identified, with P6 providing the most significant contribution to the code. These codes generated six (6) sub-themes presented as follows:

- Ownership
- What did the TBI seek to achieve?
- Targeted beneficiaries
- Success factors
- Impact
- Ecosystem considerations: Community

The summary of the sub-themes and the categories for Theme 1 are presented in Table 7.3.

Table 7. 3: Theme 1: Sub-themes and categories

Theme	Sub-themes	Categories
TBI Profile	Ownership	None
	What the TBI sought to achieve.	• Small business growth and sustainability • Access to technology and business development support • Promoting Innovation • Addressing the grand challenges of poverty, unemployment and inclusivity • Contribute to the TBI ecosystem in the province
	Targeted Beneficiaries	None
	Success factors	• Market penetration • Entrepreneurship development and support • New, sustainable and growing businesses • Increase the competitiveness of small businesses • Technology-related success factors • Finance-related success factors • Personal development of entrepreneur/innovator • Job creation
	Impact	• TBIs desirable impact
	Ecosystem considerations: Community	• Operating environment • Community Culture

Source: Researcher's creation

These findings align with the political intent of the NDP of South Africa 2030 (SA Government, 2012:144), wherein the government adopts incubation to address the national challenges of poverty, inequality and high unemployment rates, as discussed briefly in Section 1.7.2 of Chapter 1 and extensively in Chapter 3 of this study. This study revealed that the current TBIs in KwaZulu-Natal are aligned with the articulations of the NDP2030.

Theme 1 is presented in Table 7.4.

Table 7. 4: Theme 1 – TBI profile

	Ownership	What the TBI sought to achieve	Targeted category of incubatees	Success factors	Impact	Environment/ community/ Ecosystem considerations	Summary of Findings
1	*"Government funded."*	*"support SMMEs."* *"Poverty alleviation."* *"sustainable SMMEs."* *"Job creation"* *"Bridge the gap between HEI/ industry."*	*"Government seek to alleviate poverty through these programs."* *"to alleviate poverty and create job opportunities";* *"assist SMMEs in the chemical industry sector and related industries."*	*"slice of the market."* *"Is the SMME may be in a better position in terms of market reach and so forth?"* *"support?"* *"How did their product or processes improve?"*	*"Poverty alleviation, sustainable SMMEs, Job creation."* *"How is the SMME operation?:* *"How did their operation improve?"*	*"based within the university environment."* *"The processes of the university."*	Addressing the challenges of poverty, unemployment, developing targeted industries Sustainable small businesses Alignment with university
2	*"After my retirement, we set up this company."* *"Grants that are provided by the governments."*	*"We are striving to ensure that our incubatees develop appropriate technologies for the African market";* *"small businesses that are operating in the chemical sector,"* *"students were having those years, was that there was very difficult*	*"very few employment opportunities for the youth,"* *" sitting at home with qualifications that they have obtained at universities."* *"Initially, our focus was on providing support to SMEs*	*"direct the youth of this country into starting up businesses of their own."* *"key or critical for them to understand their business plans fully."*	*"they must see themselves as employers, business people."* *"assist them to focus on what they have actually identified on the need they have identified."*	*"be aware of the culture."* *"Know the culture of the community."* *"traditions and practices of that community"*	Youth unemployment Graduate Unemployment Inclusion in critical industry sectors Inclusivity in the economy. Relevance to the culture, community

		for them to find employment opportunities";	*and cooperatives that were solely in the chemical sector".*				
3	*"non-profit organisation"* *"As a non-profit organisation, you are now limited in funding."*	*"assisting the small and medium* *businesses that are operating in a chemical sector in the country."* *"growing or stimulating the small businesses."* *"can be the role players in the sector";* *"black previously disadvantaged that are interested, and they are knowledgeable."* *"incubation program is tailor-made per sector to focus solely on the sector."*	*"chemical industry is dominated by white,"* *"SMME as a product of the incubator"* *"they become role players, job creators* *contribute to the country's GDP."*	*"To nurture this SMME to realise his or her dream."* *"operate smoothly and be successful in the future."* *" can be able to fully develop"*	*"After graduating from the program. Then that's where we can say we can be able to measure the impact."* *"see them being self-sustainable."* *"contribute to the country's GDP."*	*"There are rural areas within the province."* *"Those areas are neglected. How do we access them?"* *"water is not up to the same standard."*	Industry development, Sustainable SMMEs Increasing the contribution of SMMEs to the economy of the country (positive impact on the GDP)
4	*"of government"*	*"to support SMMES and cooperatives by providing non-financial business development support."* *"ensure growth"* *"job creation"*	*"contribute more … small businesses that is in the economy."*	*"Our major expected outcomes revolve around two things: turnover increase and job creation."* *"So at the end of it all that's how success is measured."*	"*job creation contribute…in the economy* *the businesses to grow* *"Major expected outcomes turnover increase job creation."*	*"look at which space the SMME* *is operating in, and on that, it* *determines where we can assist."* *"disjuncture's somewhere in terms*	Growing the SMME sector Sustainable enterprises

		"offering business support that is business development support to SMMEs and cooperatives."		*"improvement Assessment which we conduct after a minimum of six months after";* *"How has the business performed in terms of turnover, in terms of creating employment?",*		*of the entrepreneurial ecosystem."*	
5	*"Department of Small Business Development"*	*"to create employment."* *"to support local communities."* *"Agri-Business, in clothing and textiles, which included footwear and leather."* *"focus across all different sectors"* *"community businesses automotive sector"*	*"Students from different businesses"* *"Alumni"* *"programs are very SMME-centric."*	*"how many jobs have we created?* *"How many SMMEs* *"How sustainable are these businesses?"* *"number of SMMEs that we supported."* *youth trained* *"turnover we created for our businesses."* *funds raised for SMMEs business we graduated*	*"need to start focusing on our context. University needs to focus on, look around us, and see the challenges that people are facing locally to grow the country, grow Africa, and grow SMMEs to be able to compete internationally."* *"Been able to grow; and grown quite substantially."*	*"Our context."* *"is not to compare ourselves with Western countries and try to compete with them."*	Industry development, Increasing the participation of local communities in the economy Employment creation (Graduate unemployment challenge) Contextualize programmes
6	*"Government"*	*"focussed on technology incubation"* *"Both technology development and*	*"no such funding instrument that is readily available"*	*"have a commercial appetite or use."*	"*ability of the product or a process that has been developed to either provide a solution to a*	"*incubator would have access to multiple funders or multiple opportunities for resource funding or multiple opportunities*	Innovation in targeted sectors High-tech infrastructure

		business support to entrepreneur." *"biotechnology was going to be one of the key economic drivers."* *“cosmetic or the chemical space.”*	*"science space is rather, you know, is risky."* *"Most investors would rather settle for low-hanging or easy-to-execute projects that are mostly not in the core science space and derail any prospects of getting more science-based enterprises into the market."*		*prevailing problem or to enter a particular market."*	*to engage other stakeholders."*	development and access Commercialisation of technology Technology development and transfer
7	*“government”.* *" Municipality"*	*"to provide world-class incubation training and skills development to our SMMEs."* *“to come in, to operate.”* *"giving them that opportunity to operate in a supportive environment. "* *" they are able to go out and work in the larger environment."*	*“Providing that pipeline for small businesses.”*	*"The number of incubatees whom we bring into the* *Incubation programme"* *"become more able to develop sustainable business models."* *“are able to create jobs.”* *“increase their turnovers year on year.”*	*"Sustainable business models that are able to create jobs, increase their turnovers year on year, and grow their businesses."* *“They also develop sustainable businesses that employ people.”*	*"that culture of positivity within this ecosystem"* *"success of especially a township incubator is based very much on the success of your community engagement."* *"township incubator, that’s how it would work."* *"always to be mindful of the environment and of the economy."*	Growing the SMME sector Sustainable enterprises Contextualisation of programmes

		"springboard into the outside world after the incubation program. "		*" Employ women, youth, women and even people with disabilities."* *“become more able to develop a number of SMMEs or incubatees who attend our mentoring, our coaching, and our training programmes".* *"targets - our criteria are that we have to achieve, and our successes are measured against achieving all."* *"Our clients participate in many events local and sometimes even international events, that for us is also a success because they get chosen."* *“X event in Dubai”* *"how year on year you* can grow a sustainable business, "		*"don’t understand the economy within which you are operating, then you are not going to be able to deliver effectively."*	

				“increase your turnover.” " ability to not only survive but to compete against all other SME's within your scope of work."			
8	*“institution of the higher learning”* *“SEDA”*	*“Agriculture”* *"at a time when technology has crept in, and it finds some of our businesses running with old technology and also using old equipment."* *"old businesses just giving up collapsing* *or failing to cope with them, or overtaken by these events that are taking place or even failing to be productive."* *"some of the technologies that are used in companies are more advanced than the level of academic programs that are delivered in most* institutions."	"*One challenge that I find quite strong is the connection between our education system and the industry."* *"look at what academics or even what the researchers have said and try and implement and combine that information."*	*“they want numbers.”* *“ readiness to meet with companies to "present their new technologies or their new discoveries to the companies."*	*"those who have been through our programs have been able to find the right environment to test their ideas."* *“make businesses successful.”*	"*Based near the institution of higher learning."* *"change from conservative or traditional ways of doing things and using the new avenues that may open up in their thinking."* *"link up with the outside world where we can link up with bigger companies."*	Innovation in targeted sectors High-tech infrastructure development Bridging the technology gap Coordination and synergies between education (HEIs) and industry

		“be clued up with what business. *Requires and what institutions should be providing.”*					
9	*“government-funded incubator”.*	*"IT and creative IT technologies for the farming community and for other industries."* *“agri processing”*	*"to incubate that idea until it gets to a point where it could be put out into a market for competitive purposes."*	*“produce a particular turnover.”* *“scales up for the larger businesses as success on the financial strength* of the business.”	*“sustainable nature of the business.”* *"ability to sustain itself after working through our programme of 18 months."*	*“Understanding the social challenges.”* *"major challenge insofar as the social challenges, cost of living."*	Innovation in targeted sectors High-tech infrastructure development Commercialisation of technology
10	*"University"*	*"look outside of the traditional mode of employment, that is, students going into the public sector,"* *“sow a seed in our students.”* *"expose them to the issue of entrepreneurship.”* *"find employment through entrepreneurship."* *“consulting”* *“technology transfer”*	*"The university’s strategy is to increase the employability of our students.*"	*“Measure the success in terms of the revenue generated.”* *“number of employees that have been created, don’t include the owners.”* *“How many other people are you able to bring on board, on a temporary or permanent basis?”*	*“difficult to monitor the impact.”*	"*Unemployment in South Africa is serious, including the graduates."*	Employment creation (Graduate unemployment challenge) Commercialisation of technology

11	*“a program within X.”* *“local government”*	*"mission and vision is very much to ensure that we have or develop an inclusive innovation ecosystem here in KwaZulu Natal and that we are the leading innovation agency to try and achieve our mandates."* *"to support or provide a platform to support innovators, and innovators can be anyone from individuals, youth, students, businesses, small, medium and large, governments, and other civil society organisations."* *"develop and grow the ecosystem."* *"provide the tools and opportunities to those in need,"*	*“ensure that inclusivity.”*	*“Sustainable jobs of the businesses that we enabled and supported over the years becoming employers.”* *“employed people for a certain period, like a year or longer internships being converted into permanent employment internships being converted into permanent.”* *“We have employed a number of solutions that we have supported, as well as innovative solutions that have been prototyped, iterated, and successfully gone to market and commercialised. The number of people that have been developed in critical skills areas or categories of funding*	*“Market-ready products commercialising.”* *“Sustainable jobs created,employment opportunities created.”*	*“what impact are we making in terms of jobs, sustainable jobs?”*	Inclusivity Innovation in targeted sectors High-tech infrastructure development Commercialisation of technology

				that we bring into the region as a result of our efforts and projects." *"funding that our innovators are attracting by leveraging the support they get."*			
12	"university"; "government"	*"have bona fide entrepreneurs running their businesses."* *"by encouraging academics and students to participate in entrepreneurship, particularly by using ideas drawn from their disciplines."*	*"have X number of businesses in that particular year, run by students or run by academics."* *"concerted effort from the government to try and bring innovation, entrepreneurship there for small businesses, starting up small businesses in these areas."*	"*completed the plan for a functional business."* *"the student or the academic can now run the business by themselves."*	*"getting better and better in articulating their idea."* *"self-confidence",* *"scale it up; it might not actually, it might not be viable."*	*"and also stimulate entrepreneurship within the university system."*	Unemployment (Graduate unemployment) Technology transfer Commercialisation of technology Growing the SMME sector Sustainable enterprises
13	"University"	*"other than identifying and protection on the commercialisation of Intellectual Property."*	*"Unemployment in South Africa is serious as it relates to the*	*"funding that we had raised for the project before the office was established, most of our researchers will be relying on NRF*	*"look at the challenges, especially now we have a crisis in the energy."*	*"addressing existing challenges that we are facing as a country."*	Unemployment (Graduate unemployment) Commercialisation of technology

		"raise awareness in terms of Intellectual Property and commercialisation." *"identify from different colleges and schools if there is any IP that has market potential."*	*youth, including the graduates."*	*funding moving technologies from the basic research into maybe technology readiness level may be above five and the number of persons that have been granted."*	*"This concept is within the energy sector, and I want to work into it."*		

Source: Researcher's creation

The following subsections discuss the findings for each sub-theme, as presented in Table 7.4.

7.4.1 Ownership of the TBIs

Ownership is the first sub-theme for this theme on the profile of TBIs. The findings presented in Table 7.6 reveal that the government generally funds TBIs in KZN (P10: *"government-funded incubator."*) through its departments (P5: *"Department of Small Business Development.*) or agencies (P8: *"SEDA"*) and the municipalities (P11: *"local government."*). Universities are also among the organisations that sustain the TBIs in the province of KwaZulu-Natal (P12: *"university"; "government")*. Table 7.5 demonstrates that the government remains the primary funder for the TBIs in KZN. While most incubators are funded by the national government and the agencies of government departments (SEDA and the TIA), a few do receive financial support from the local government, including municipalities.

Table 7. 5: Ownership of TBIs based on the primary funding

Participant	Government funding, fully or partially	Links with universities
1	X	X
2	X	None
3	X	None
4	X	None
5	X	X
6	X	None
7	X	None
8	X	None
9	X	X
10	X	X
11	X	X
12	X	X
13	X	X

Source: Researcher's creation

Table 7.5 also reveals that six of the thirteen TBIs do not have direct relationships with the universities.

The following sub-theme investigates what the TBIs were designed to achieve.

7.4.2 What the TBIs sought to achieve

The second sub-theme is based on the seven categories as presented:

- Small business growth and sustainability,
- Access to technology and business development support,
- Promoting innovation,
- Addressing the grand challenges of poverty, unemployment, inclusivity, and
- Contribute to the TBI ecosystem in the province.

These categories are discussed in the following sections.

7.4.2.1 Small business growth and sustainability

The TBIs are supporting small businesses by providing a conducive environment for their operations (P7: *"giving them that opportunity to operate in a supportive environment."*) and also affording them access to skills and information on opportunities that will benefit their businesses (P11: *"provide the tools and opportunities to those in need."*). TBIs also seek business growth and sustainability (*P3: "growing or stimulating the small businesses"*); (P8: *"old businesses just giving up collapsing or failing to cope with them, or overtaken by these events that are taking place or even failing to be productive."*; P1: *"sustainable SMMEs"*). TBIs do not only have the responsibility of assisting SMMEs in growing (P4: "ensure growth."), but they should assist them in developing skills that are essential for the business environment (P7 "springboard into the outside world *after the incubation program."*). The key distinguishing factor for the TBIs is their focus on technology, which will be discussed next.

7.4.2.2 Access to technology and business development support

This section reports on how participants described the technological and business interventions. The TBIs also seek to provide small businesses with access to technology (*P6: "technology incubation."*). However, the TBIs also acknowledge that small businesses need business development skills (P6: *"both technology development and business support."*). TBIs support small businesses that need support in developing technologies (P2: "*incubatees develop appropriate technologies."*) and also those that need to upgrade their technologies and equipment (P8: *some of our businesses running with old technology and also using old equipment.")*. The nature of the TBIs' technological and business interventions is further elaborated under Theme 2. Promoting technology-focused ideas and developing these to the stage where they enter new markets also encourages innovation in the province.

7.4.2.3 Promoting Innovation

TBIs promote innovation in the province by supporting innovators (P11: *to support or provide a platform to support innovators."*). The TBIs have systems in place to reach out to innovators through consulting and technology transfer from experts or knowledge holders to small businesses (P10: *"consulting", "technology transfer."*). These TBIs are occasionally a point of engagement between small businesses with unique ideas and experts who assist in bringing these ideas to fruition. This business support generates income, thus benefitting both the university and the innovator (P8: *"Some of the technologies that are used in companies are more advanced than the level of academic programs that are delivered in most of* the institutions.").

TBIs associated with universities afford the institution an extra advantage by providing linkages with industry (P1: "Bridge the gap HEI/ industry."). They also entice university students and staff to use their research to establish new businesses based on novel ideas *(P12: "by encouraging*

academics and students to participate in entrepreneurship, particularly using ideas drawn from their disciplines."; P13: *"Identifying and protection on the commercialisation of Intellectual Property."*).

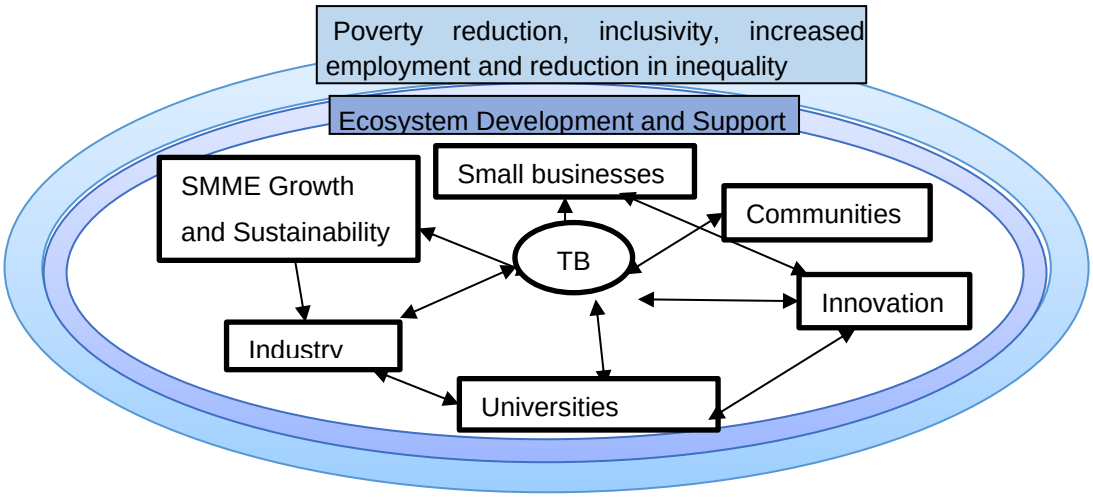
7.4.2.4 Addressing the persistent challenges of poverty, unemployment, and inclusivity

The study's findings revealed that addressing the provincial persistent challenges of poverty, unemployment, and inequality will ultimately impact TBIs. The participants described the ultimate desire for the TBIs as addressing poverty and unemployment by supporting small businesses towards sustainability (P1: "*support SMMEs"; "Poverty alleviation*"; *"Job creation."*). The TBIs also contribute to ensuring inclusivity (P11: *ensure that we have inclusive or develop an inclusive innovation ecosystem here in KwaZulu Natal*) by actively supporting previously disadvantaged individuals (P3: *"black previously disadvantaged that are interested and they are knowledgeable."*). TBIs also play the role of enticing young people to consider the merits of entrepreneurship that addresses unemployment (P10: *look outside of the traditional mode of employment, that is, students going into the public sector" sow a seed in our students expose them to the issue of entrepreneurship"*). (P10: *"Find employment through entrepreneurship."*).

7.4.2.5 Contribute to the ecosystem in the province

TBIs can offer collaborative endeavours with small businesses, innovators, universities, government, and industry, as discussed. Therefore, they are actively contributing to developing a robust and healthy ecosystem in the province of KwaZulu-Natal (P11: *"develop and grow the ecosystem."*). The expected contribution of the TBIs is summarised in Figure 7.1:

Figure 7. 1: Schematic representation of the TBI ecosystem in KZN



Source: Researcher's creation

Figure 7.1 depicts the interrelationships within the TBI operating space, where there are two-way interactions between the TBI and the small businesses that present ideas and requests for support. The interactions with the university involve students, academics, and alumni through ideas generated by entrepreneurs, researchers, and innovators, which are then presented to the TBI for interventions and support.

The following sub-theme reflects reasons for the targeted incubatees for the TBIs in the province.

7.4.3 Targeted beneficiaries

Table 7.7 presents the findings on the targeted incubatees sub-theme.

Table 7. 6: Categories and codes for the sub-theme: Targeted incubatees

Category	Code	Quotations
Poverty alleviation	Poverty	(P1: "*government seek to alleviate poverty through these programs." "to alleviate poverty").*
Job creation	Unemployment	(P1: "*Create job opportunities.*")
	Youth Unemployment	(P2: *"very few employment opportunities for the youth.";*

Reducing the inequality gap	Inequality	(P3: “The *chemical industry is dominated by white."*).
Technology/science-based enterprises	Technology-focused	(P6: *"no such funding instrument is readily available"; "science space is rather, you know, risky."; "most investors would rather settle for low-handling or easy-to-execute projects which are mostly not in the core science space"; "derailing any prospects of getting more science-based enterprises into the market."*)

Source: Researcher’s creation

From the above, it is evident that the government intends to use these programs as vehicles for poverty alleviation and job creation through targeted support in specific sectors (P1: “government seek to alleviate poverty through these programs” “to alleviate poverty and create job opportunities” *“assist SMMEs in the chemical industry sector and related industries”*). Youth unemployment is a critical challenge for the government of South Africa. This challenge now extends to the graduates who can not secure employment upon completion of their studies (P13: *"Unemployment in South Africa is serious as it relates to the youth including the graduates"*), (P2: *“Very few employment opportunities for the youth,”;” sitting at home with qualifications that they have obtained at universities”, “initially our focus was on providing support to SMEs and cooperatives that were solely in the chemical sector*). The university-based TBIs play a role in promoting entrepreneurship amongst students and alumni of the university (P5: *“students from different businesses”; “alumni”; “programs are very SMME-centric”*). Therefore, they increase the employability of the university graduates (P10: "University’s *strategy to increase the employability of our students.*") by promoting entrepreneurship as a viable alternative to formal employment (P12: *"have X number of businesses in that particular year, run by students or run by academics."*).

The SA government is also facing the immense challenge of the widening inequality gap in South Africa, which is also exacerbated by the pre-existing plaque of the apartheid era, which led to the domination of

industries by Whites to the exclusion of black South Africans (P3: *"chemical industry is dominated by white."*). Hence, increasing the participation of Black people in the SA industry and enhancing their contrition to the GDP is a priority for the government (P3: *“They become role players, job creators contribute to the country’s GDP.”*), (P4: *“contribute more small businesses that are in the economy.”*). These TBI programmes, therefore, assist the SA government in increasing the number of active Black people within the technology space (P11: *“Ensure that inclusivity.”*).

At the core of the TBI's existence is the intention to produce an SMME that is appropriately equipped for business (P3: “SMME as a *product of the incubator”*). Therefore, TBIs ensure sufficient numbers of successful SMMEs in the country (P7: “providing that pipeline for small businesses”). However, there is a greater need to promote SMMEs that are focused on some technologies or are informed by the outputs of science, and this area requires support as such projects tend to be expensive, loaded with risk and challenging to finance (*P6: "no such funding instrument is readily available"; "science space is rather, you know, risky"; "most investors would rather settle for low-handling or easy-to-execute projects which are mostly not in the core science space"; "derailing any prospects of getting more science-based enterprises into the market."*).

Promoting technology-based or technology-focused SMMEs strengthens the interlinkages between industry and academia (P8: “challenges that I find quite strong is the connection between our education system and *the industry”).* This intervention will also increase the number of enterprises that utilise high-end technologies. The role of TBIs is that of providing appropriate incubation of ideas and nurturing these to the point where they are converted to market-ready products or services (P9; *"to incubate that idea until it gets to a point where it could be put out into a market for competitive purposes"*). The efforts of the TBIs in developing ideas to a stage where they enter the market is a definite way of promoting innovation in the country (P12: *"concerted effort from the government to*

try and bring innovation, entrepreneurship there for small businesses, starting up small businesses in these areas").

The next sub-theme focuses on what participants considered success factors for the TBIs.

7.4.4 Success factors

Generally, incubation programmes that are externally funded have to comply with a set of contractual agreements, and these include the funding agency's dictated periodical targets that must be met (P7: "targets, our criteria's that we have to achieve, *and our successes are measured against achieving all"*). The findings reflect the following success factors that emanated from the data:

- Market penetration
- Technology-related success factors
- New, Sustainable and growing businesses
- Personal Development of Entrepreneur/Innovator
- Financial Successes
- Job Creation
- Entrepreneurship Development and Support
- Increase the competitiveness of small businesses

7.4.4.1 Market Penetration

To demonstrate success, the incubatee should be able to penetrate the market in the chosen sector through the interventions of the TBI (P1: *"SMME may be in a better position in terms of market reach"*). There is a need for the TBI to assist the incubatee in outlining and understanding the need for the product or service in the market and how it fits within the broader scope of that specific industry in terms of the challenge or problem it is designed to address (P6: *'ability of the product or a process that has*

been developed to either provide a solution to a prevailing problem or to enter a particular market,"). The success factor of market penetration is aligned with supporting growing sustainable small businesses as it marks the final step in the commercialisation journey or the process of introducing a new product or service into the market. The TBI, therefore, balances the role of ensuring that the technology works and, secondly, ensuring that the business concept is refined, thus allowing for successful entry into the market.

7.4.4.2 Technology-related success factors

The incubatees should benefit through technological improvements in their products, processes or services (P1: *"How did their product or processes improve*"). The TBIs are responsible for assessing the targeted technology and the possible commercial appetite it may attract in the industry and, therefore, decide on the feasibility of investing through supporting the incubatee (P6: *have a commercial appetite use of a product or a process to convince us to provide support"*). The TBI should assist incubatees to the point that they can present and defend their ideas (P8: *"present their new technologies or their discoveries to the companies"*). The TBIs are assessed against the number of incubatees they have successfully supported from idea generation to markets (P11: *innovative solutions that have been prototyped and gone to market successfully; gone to market and commercialised").*

7.4.4.3 New, sustainable and growing businesses

The TBIs should increase the number of new businesses created within the province, in particular amongst the most vulnerable sectors of the population, i.e. young people (P2: "*direct the youth of this country into starting up businesses of their own*.") This outcome will assist the province through the self-employment of the young people who are engaging with the TBIs. The sustainability of the business is also desirable. The TBIs

are expected to assist the new business owners in understanding their business plans (P5: *"How many SMMEs "how sustainable are these businesses?";* P2: *"Key or critical for them to understand their business plans fully."*) to ensure that they can operate a successful enterprise that is continuously developing and therefore growing (P3: *"operate smoothly and be successful in the future"*), (P7 "*become more able to develop sustainable business models."*). In instances where the incubatee has not developed a business plan, the TBI need to ensure that an appropriate plan is in place (P12: "*completed the plan functional business either the student or the academic can now run the business by themselves."*)

It is also vital that businesses become sustainable and grow to make a meaningful contribution to government (P7: "How *year on year you can grow a sustainable business."*).

7.4.4.4 Personal development of entrepreneur/Innovator

The TBI interventions are expected to target the development of the individual behind the idea or the small business and assist them in realising their intentions (P3: *"To nurture this SMME to realise his or her dream."*; P7: *"can be able to develop fully."*). The business's success also depends on the incubatees' ability to present and defend their ideas and identify and pursue partnerships and clients (P8: *readiness to meet with companies."*). Developing the individual incubatee also involves ensuring they acquire the critical technological skills essential for business success (P11: "*number of people that have been developed in critical skills areas or categories.").*

7.4.4.5 Financial successes

The TBIs periodically monitor how the small business has performed in terms of turnover, which is expected to increase (P4: *"how has the business performed in terms of the turnover*), (P7: "*increase their*

turnovers year on year."), (P10: *“measure the success in terms of the revenue generated*). The TBIs are also expected to provide incubatees with access to funding agencies; hence the success matrix also considers the turnover of the incubated business acquired through TBI interventions as well as funds accumulated to the incubatee on graduation (P5: *"turnover we create for our businesses; funds raised for SMMEs business we graduated*), (P13: *“number of persons that has been granted*).

This implies that the TBIs are monitored and assessed based on their ability to leverage networks and stakeholder engagements that extend funding to incubatees (P11: *funding that our innovators are attracting by leveraging the support they get*). One of the critical factors for technology-based business is funding that is necessary to conduct research, develop a prototype and develop it to full commercialisation; TBIs need to assist incubatees in accessing such financing from relevant agencies or funders (P13: *most of our researchers will be relying on NRF funding moving technologies from the basic research into maybe technology readiness level may be above five.”).*

A graduated incubatee should be able to increase turnover, as this is necessary to sustain growth (P9: *produce a particular turnover scales up for the larger businesses as success on the financial strength* of the business”).

The TBIs' fundraising efforts also impact the total amount of funds available for technology development or transfer; hence, their contribution to the region is also assessed as a success factor (P11: funding that we bring into the region as a result of our efforts and projects), (P13: *funding that we have raised for the project*).

7.4.4.6 Job creation

TBIs also monitor the employment statistics for the incubatees to assess whether there has been an increase in the number of individuals employed by the incubated business (P4*: "job creation; in terms of creating employment.*"; P5: *How many jobs have we created*?"), (P7: "Are we able to create jobs?"), and (P10: number of employees that have been created).

The enterprise's sustainability goes beyond finances to include the actual positions created and sustained within the small business (P11: *"Sustainable jobs of the businesses that we enabled and supported over the years*). The incubatee, as the owner of the business, is expected to be the first employee of the business; hence, sustainability and growth measures do not consider self-employment, but TBIs monitor that of other employees (P10: *don't include the owners, how many other people are you able to bring on board, temporary basis or permanent."*).

Job creation -youth

TBIs respond to a particular focus on youth and job creation, and Managers/CEO/directors are expected to respond to the number of young incubatees they have supported (P5: *youth trained*"). As generally government-funded entities, the TBIs also assist the government in achieving its priorities, including women, youth, and people living with disabilities (P7 *Employ women, youth, and people with disabilities*). The focus on youth employment is further impressed upon by monitoring the conversion of internships and part-time employment to full-time positions (P11: *becoming employers employed people for a certain period of time like a year or longer internships being converted into permanent employment internships being converted into permanent employment a number of solutions that we have supported*).

7.4.4.7 Entrepreneurship development and support

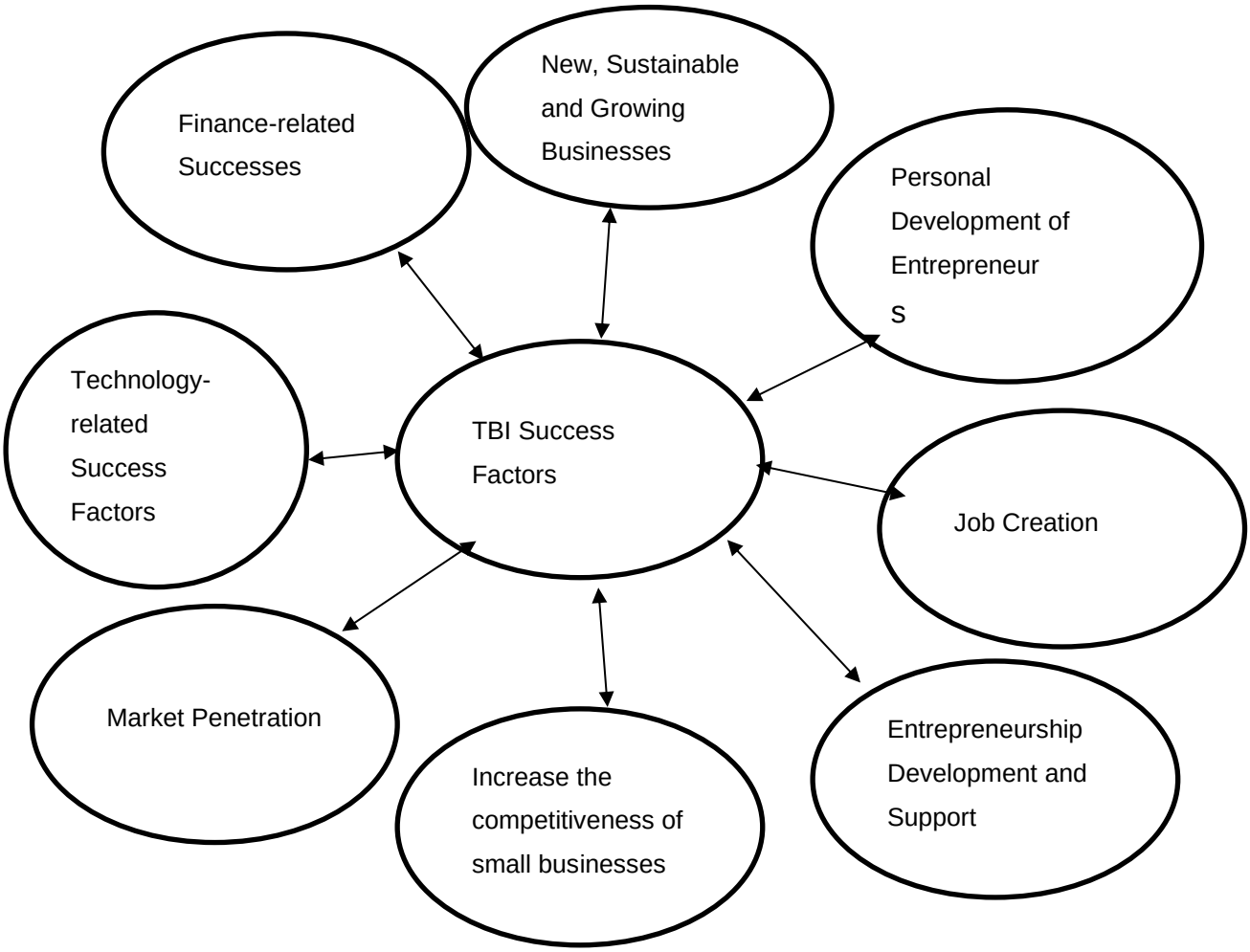
The funding agencies are also interested in the number of people receiving support from the TBI to assess the programme's performance and relevance (P8: *"They want numbers*"). These targets also emanate from an expectation that TBIs will contribute to entrepreneurship development and support in KwaZulu-Natal; hence, participants are expected to report on the number of SMMEs that they have assisted (P5: "*number of SMMEs that we supported"*), (P7: *"the number of incubatees whom we bring into the incubation programme", number of SMMEs or incubatees who attend our mentoring, our coaching and our training programmes*).

7.4.4.8 Increase the competitiveness of small businesses

Small business sustainability is linked to their ability to cope with the marketplace challenges and become competitive; hence, the TBI interventions should nurture their skills and improve their competitive edge (*P7: ability to not only survive but to compete against all other SMMEs within your scope of work."*). One such intervention is creating platforms where they can compete with one another and even nationally (P7: *"our clients participate in many events locally and sometimes even international events, that for us is also a success because they get chosen"*).

The TBI success factors are presented in Figure 7.2:

Figure 7. 2: TBI success factors



Source: Researcher's creation

The sub-themes related to the impact of the TBIs will be discussed in the following section.

7.4.5 Impact of TBIs

7.4.5.1 TBIs desirable impacts

It is vital to accept that the success and impact of TBIs are interdependent and can be challenging to measure (P10: "difficult to monitor the impact"). The achievements, as noted in the previous sub-themes, refer to outcomes as a result of the TBI intervention and may have short to medium-term effects on the beneficiaries or the environment. This study

considers impacts as long-term environmental effects that are contributed by the intervention, in this case, the TBIs. Hence, impacts may be similar to outcomes, with the difference simply being the duration of the effect. It, therefore, implies that some factors described in the previous sub-theme as success indicators are also linked to desirable impacts. These are notably poverty reduction, employment creation, contribution to the economy and GDP, reduction in inequality and sustainable and growing SMMEs (P1: "Poverty alleviation, sustainable SMMEs "Job creation (within), *how is the SMME operation in, how did their operation improve*), (P3: *"After graduating from the program, then that's where we can say we can be able to measure the impact" see them being self-sustainable. contribute to the country's GDP*), (P4: "*job creation contribute…in the economy the businesses to grow "major expected outcomes turnover increase job creation*"; P7: (*"sustainable business models are able to create jobs, "increase their turnovers year on year." to grow their businesses, to develop sustainable businesses to employ people as well*), (P11: *"market-ready products commercialising. sustainable jobs created, employment opportunities created"*). The impact of the TBI should also assist the incubatees in adopting an attitude of being employers and business people to guarantee sustainable employment (P2: "*they must see themselves as employers, business people*"), (P9: *"sustainable nature of the business "ability to sustain itself after working*).

The long-term achievements of the TBIs should also involve impacting the responsiveness of the local entrepreneurship and innovation ecosystem by developing relevant interventions designed to address emerging challenges and allow small businesses to compete globally (P5: "*We need to start focusing on our context. Universities need to focus on, look around us and see the challenges that people face locally: grow the country, grow Africa, grow SMMEs to compete internationally"*). Achieving growth and sustainability will result from graduate incubatees being able to focus on their businesses (P2: "*assist them to focus on what they have identified, on the need they have identified"*) but also capable of scanning the environment for opportunities and developing a problem-solving culture

and innovative attitude towards challenges (P13: *look at the challenges", especially now we have a crisis in the energy"; "this concept within the energy sector and I want to maybe work into"*).

TBI graduates should also assist the province of KwaZulu-Natal in developing capabilities that seek to address provincial, national, and global challenges, with the potential of venturing into or establishing new markets (P6: *"ability of the product or a process that has been developed to either provide a solution to a prevailing problem or to enter a particular market")*. The skills that graduate incubatees collated through the TBI programmes should assist them in sustaining and growing their businesses (P8: *"those who have been through our programs have been able to find the right environment to test their ideas" make businesses successful*).

Personal development and improvements are essential to small business prosperity. Entrepreneurs need to continuously work on sharpening the skills necessary to survive in a harsh business environment (P12: "*getting better and better in articulating their idea"; "self-confidence", "scale it up, it might not actually be viable, right?").* This emphasis on personal growth is a crucial aspect of TBI programmes.

The following section focuses on the considerations of the environment, community, and small business ecosystems.

7.4.6 Ecosystem considerations: community

This section relates to the environment, community, and small business ecosystem under which the TBI operates. These are believed to be impacting its operations and, subsequently, its success and that of its graduates.

7.4.6.1 Operating environment

TBIs should be conscious of the realities of the operating environment and identify measures that will assist them in navigating the processes that may be imposed on them (P1: *"based within the university environment"; "the processes of the university"*). There is also a challenge to the rurality of the province of KwaZulu-Natal, which is characterised by impoverished areas that do not have the essential elements of a successful business, including water and access (P3: *"There are rural areas within the province"; "those areas are neglected"; "How do we access them?"; Water is not up to the same standard."*). TBI operations will therefore require adjustment to ensure that it fits within its operation environment as this aspect is essential for the effective delivery of TBI services (P7: *township incubator, that's how it would work" "always to be mindful of the environment and the economy" "don't understand the economy within which you are operating then you are not going to be able to deliver effectively"*).

The operating environment for the incubatee is also crucial in deciding on the type of support that the TBI should be provided to ensure success (P4: *"look at which the space the SMME is operating in and on that it determines where we can assist"*). This includes a proper assessment of the socio-economic conditions of the operating environment (P9: *"understanding the social challenges."major challenge insofar as the social challenges, cost of living,"*) and the diversity of the potential incubatees as others may have considered entrepreneurship as means to survive and access an income (P10: *"unemployment in South Africa is serious including the graduates*"), and community expectations for sustainable jobs (P11: *"what impact we making in terms of jobs, sustainable jobs"*).

The TBIs should drive the contextualisation of the interventions such that new models that are ideal for the provincial context can be developed and implemented to the benefit of the incubatees and the province (P5: *"our*

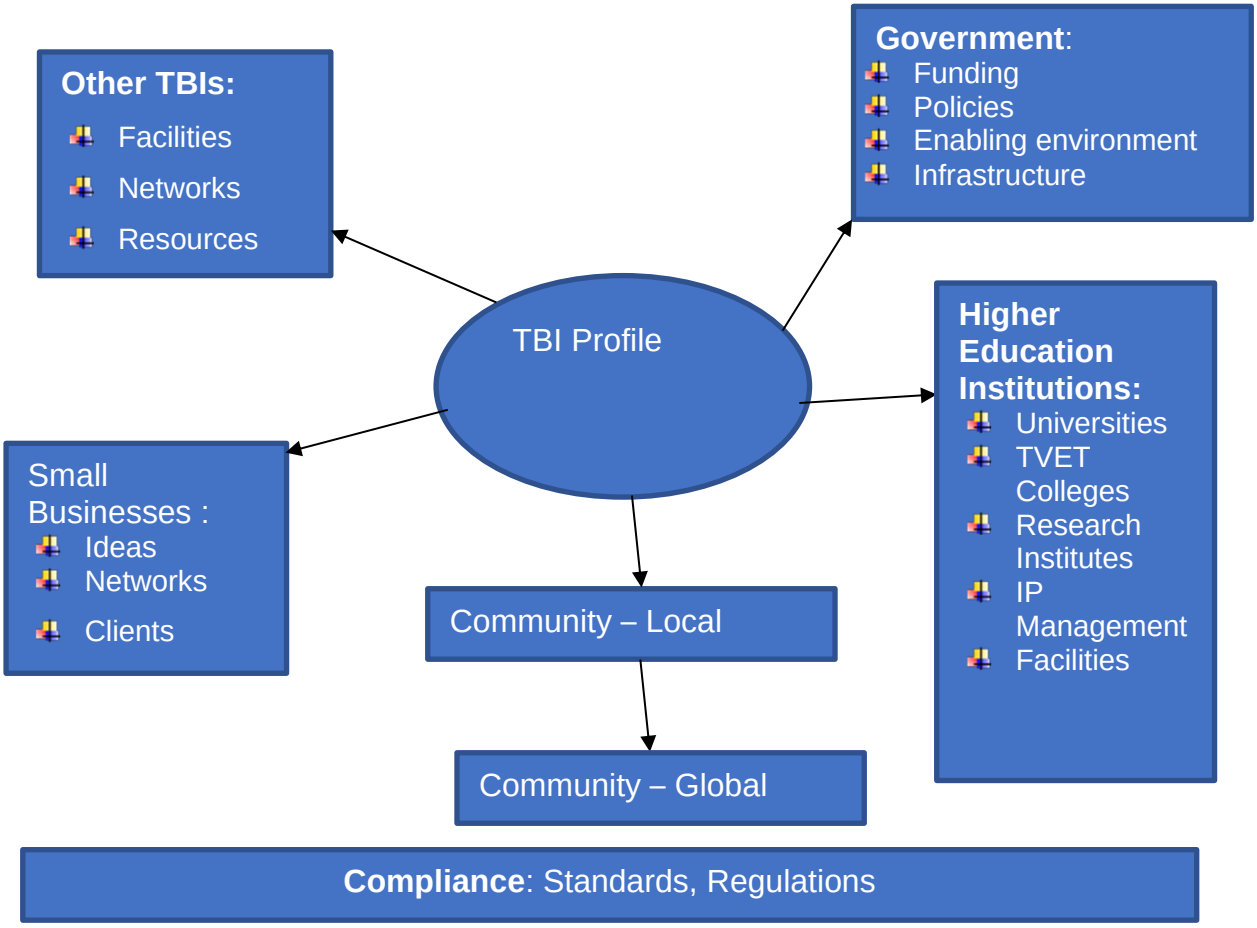
context "not compare ourselves with Western countries and try to compete with them"). Such initiatives can be instrumental in addressing the observed and concerning disconnect in the provincial entrepreneurial ecosystem (P4: *"disjuncture's somewhere in terms of the entrepreneurial ecosystem"*). A healthy ecosystem will improve the resource base for the TBIs, in terms finance and expertise, (P6: *"incubator would have access to multiple funders or multiple opportunities for resource funding or multiple opportunities to engage other stakeholders"*).

7.4.6.2 Community culture

The community is integral to the TBI ecosystem. The prevailing culture significantly impacts the TBIs and their ability to achieve the desired outcomes and impacts. Being aware of the culture and knowing the traditions and practices of the community is crucial for successful engagement (P2: *"be aware of the culture"; "know the culture of the community"; "traditions and practices of that community"*). The positive culture also contributes to the achievement of desirable TBI outcomes and impacts, especially in areas that can be described as challenging, like rural and township environments (P7: *"that culture of positivity within this ecosystem," "success of especially a township incubator is based very much on the success of your community engagement"*). The graduate incubatees should also be able to adapt to new circumstances and adopt different approaches to undertaking businesses that are aligned to global standards (P8: *"change from conservative or traditional ways of doing things and using the new avenues that may open up in their thinking"; "link up with the outside world where we can link up with bigger companies)*. The very presence of TBIs is expected to assist in developing a culture and attitude that embraces entrepreneurship (P12: *"and also stimulate entrepreneurship within the university system"*), which SA has adopted as one of the vehicles to address the national challenges confronting the country (P13: *"addressing existing challenges that we are facing as a country.").*

7.4.7 Theme1: Discussion and Conclusions

Figure 7. 3: Schematic representation of Theme 1 findings



Source: Researcher's creation

7.4.7.1 Discussion

The Ownership sub-theme revealed that the government is the primary funder of TBIs in KwaZulu-Natal, with limited support from municipalities. In addition, some TBIs are linked to the local universities. The local and provincial governments of KZN need to view the TBIs as necessary interventions in reducing risk and failure rates and improving survival and growth of the early stages enterprises (Lose, 2021:2). From the above data analysis, it is evident that the TBIs are instrumental in developing

technology-focused small businesses. SMMEs are a major source of growth, innovation, and jobs and have the potential to impact the achievement of many sustainable development goals, irrespective of their size (Endris & Kassegn, 2022:2). The combined technology and business support interventions increase the probability of growth and sustainability among the small businesses in KZN. The focus on new technological ideas also leads to innovation, and, therefore, TBIs contribute to enhancing innovation production and increasing the province's intellectual property portfolio. The ultimate benefit will be that the TBIs will assist the province in addressing the persistent and interrelated challenges of poverty, unemployment, and inclusiveness. This intervention will also increase the participation of previously disadvantaged individuals in technology development, innovation and the creation of technology-focused small businesses. The government's focus on creating an inclusive economy is spelt out in its policies, and SMME interventions (Aruleba & Jere, 2022:3), and these are also discussed in Chapter 3. Ultimately, the TBIs contribute to establishing the TBI ecosystem within the province.

The presence of TBIs also increases the number of individuals who can successfully venture into entrepreneurship and establish small businesses. Through self-employment and employing others, the inequality gap will be reduced as more individuals will have access to income, further reducing poverty in the province(Lose, 2021:2). . Innovations that emerge from these engagements require the TBI, universities, small businesses, and the industry to ensure full idea development. The outcome of the TBI interventions should be a growing and sustainable business that will play an essential role in the industry (Schutte, 2019:12) This study, therefore, further confirmed that the community benefits from the TBI through the entrepreneurs, innovators, or small businesses that are incubatees. The successful implementation of the support creates employment opportunities, increases the province's GDP, and contributes to a reduction in poverty.

The study revealed eight critical success factors for the TBIs: market penetration, technology-related success, finance-related success, development of an individual entrepreneur or innovator, job creation, new sustainable and growing businesses, entrepreneurship development and support, and increasing the competitiveness of small businesses. There are links between the impact of TBIs and the desirable long-term factors that make these programmes an essential element of the entrepreneurship and innovation ecosystem (Dladla, 2021:61). These are also desirable impacts for the government, thus justifying the financial support provided to the TBIs. This impact is possible as the TBIs promote the growth and sustainability of technology-focused enterprises. The TBIs also have the potential to increase the number of technology-focused small businesses in the province as well as increase the number of previously disadvantaged entrepreneurs and innovators. The operating environment is critical in designing the ideal matrix of interventions that the particular TBI will offer. In designing interventions, the TBI management must consider the prevailing culture in their communities or environment and design measures to address the subsequent challenges. It also partially determines the potential funding partners, key stakeholders, and potential incubatees, as the geographical location determines access. Notably, the point is the challenge of engaging underserved rural populations. The challenges associated with the rurality of the KZN Province were dealt with extensively in Section 2.3 of Chapter 2.

These findings are aligned with the findings in Section 3.12, the conclusion of Chapter 3 of this study. Furthermore, these findings are aligned with the Medium-Term Strategic Framework 2019-2024, which stipulates that the priority for the government is the need to develop "a capable, ethical and developmental state, and further defines "capable" as a state where "human capabilities, institutional capacity, service processes and technological platforms to deliver on the NDP through a social contract with the people; and a developmental state as the one that will provide conditions that grow the economy create jobs and improve society's quality of life” (South African Government, 2019:29). This theme is well

aligned with the conceptualisation of government interventions by the Department of Monitoring and Evaluation, where the outputs, which are results of activities, should yield medium-term outcomes and long-term impacts to be deemed successful (National Evaluation Policy Framework; Ministry of Performance Monitoring Evaluation and Administration, 2011:5).

7.4.7.2 Conclusions

The interventions of the TBIs should prepare the incubatees for survival and prosperity in the hostile and competitive business environment. Hence, TBI services are key to promoting innovation in the province of KwaZulu-Natal, which will diversify the economy and positively impact the provincial GDP. The study confirmed that the government's interest in funding the TBIs in KwaZulu-Natal emanates from the ability of these programmes to contribute to the persistent and interrelated challenges of unemployment, poverty, inequality, and lack of economic inclusivity. Through funding, the government ensures that TBIs have the necessary resources to manage programmes that address these socio-economic challenges. It can be concluded, therefore, that for the government, the long-term desirable impact of the TBIs is a reduction of unemployment, poverty and inequality and an increase in the number of technology-focused SMMEs

These TBIs are an integral part of the technology business incubation in the province of KwaZulu-Natal as they assist the province by contributing to developing the TBI ecosystem (Lukhele & Soumonni, 2021:829). Such a presence of a vibrant ecosystem is essential in determining solutions to the sustained challenges confronting the province. Improving the effectiveness of the TBIs will assist the province in realising the increase in the adoption and creation of technology by small businesses. As evident from the targeted beneficiaries sub-theme, TBIs will also enhance the participation of blacks and other previously disadvantaged individuals in

technology development and the utilisation of technology in establishing and growing sustainable small businesses. The success of the TBIs incorporates areas of reaching markets, technological and financial advancement, skills development for the innovator and the entrepreneur, increasing the competitiveness of the small businesses and creating jobs in the province.

Measuring impact is difficult for the TBIs as these require long-term engagement with the incubatees, which is impossible as the TBI interventions are meant to be short-term and fixed for a particular duration of years. Measuring success factors over the same period is more effective than long-term impacts. However, some success factors of job creation and sustainable businesses are also among the desirable effects of the TBIs. Impact measurement should be explored further in future studies.

The study also revealed the importance of considering environmental factors in TBI's operational plans to ensure that it can meet its target and success measures. These factors lead to the conclusion that TBIs are allocated in different environments, communities, and ecosystems; hence, they can operate in the same manner. The rurality, lack of appropriate infrastructure, low literacy levels, and high unemployment rates are among the factors that need to be managed for the success of the TBIs in the province. These factors will be elaborated upon in Theme 8. Therefore, this study recommends that TBIs should conduct a thorough assessment of the environment and an understanding of the prevailing culture and community that forms part of the TBI ecosystem. This understanding will assist the TBI in designing programmes that are responsive and acceptable and have the potential to enhance the standing of the province nationally and globally.

7.4.7.3 Alignment with the primary aim and secondary objectives of the study

The primary objective of this study is to develop a framework for technology business incubation for sustainable growth of small businesses in KwaZulu-Natal. It is worth noting that the principle of establishment and resourcing of TBI is aligned to benefit the small businesses in KwaZulu-Natal. The driving objectives, mission, vision, and focus converged towards promoting an environment that supports and develops small businesses in KwaZulu-Natal.

The findings displayed in Table 7.8 and through the discussion of sub-themes reveal that the TBIs are designed to address the issues of poverty, unemployment, inclusivity in the economy, development of industries in targeted sectors, youth unemployment (including graduate unemployment), inclusion in critical industry sectors, growing the SMME sector with sustainable enterprises; high-tech infrastructure development and accessibility, technology development and transfer and commercialisation of technology. These are discussed extensively in Chapter 4, Section 4-11.

Table 7.7 presents the links between Theme 1 and the literature review of this study.

Table 7. 7: Theme 1: Links with the literature review of the study

Research objective	Links with the Literature Review of the Study
SO4: To explore and describe the mode of operation for technology business incubators.	The government and its agencies generally fund the TBIs operating in KwaZulu-Natal. Therefore, TBIs' operations align with the government's political intent to develop a capable, ethical, and developmental state. The scope of government intervention was discussed extensively in Chapter 3 of this study.
SO5: To explore and describe the experiences of technology incubation programme managers and those of the entrepreneurs who are incubatees.	Government funding dictates the scope and, by default, the operations and focus of the TBIs. The provincial government can improve the effectiveness of the TBI by actively influencing its direction in line with national government intent and programmes. As noted in Section 4-12 of this research study and Chapter 4's conclusion, the KZN provincial government must ensure its strategies are attractive enough to keep companies within provincial borders. Similarly, the provincial government should create an environment to improve regional economic expansion and to kindle an unceasingly growing regional innovation system, thereby encouraging the graduated incubatees to reside within the province and contribute to the increased productivity of the region (Sections 4-13). The reality of these TBIs being hosted or co-owned with the university complicates the diversity of objectives, which requires an alignment of strategic objectives for both government and hosting/owner institutions. It also highlights the critical role played by the institutions of higher learning in achieving the national goals related to grand societal challenges facing this country: poverty, unemployment, inequality, and stunted economic growth.

Source: Researcher's creation

7.5 THEME 2: TBI INTERVENTIONS

The theme of TBI interventions comprises three sub-themes from 210 codes, with P5, P7, and P9 contributing immensely to the codes (Table 7.2). These codes generated three sub-themes on support, as presented:

- Business support
- Technological support
- Small Business Support

These classifications of the interventions are based on the areas of small businesses targeted for development, support, and improvement. Hence, the business support categories refer to all services related to business development and soft skills that the incubatee requires to conduct successful small businesses. Technological support comprises technology-focused interventions imparted through physical, human and financial resources that seek to enhance the use of technology in small businesses. The third category of small business support incorporates all interventions that cross-cut through business development and technological support; these include compliance, networking, and services that seek to develop and grow sustainable small businesses. The sub-themes and categories for the Theme of TBI interventions are presented in Table 7.8, followed by data collected from participants (Table 7.9).

Table 7. 8: Sub-themes and categories for TBI interventions

Theme	Sub-themes	Categories
TBI Interventions	Business support	• Business assessment and Business planning • Financial Management • Human resources management, • Marketing and sales • Networking • Physical business space • Coaching and mentorship – Personal Development
	Technological support	• Technology transfer • Advanced facilities and equipment • Promotion of Innovation
	Small Business Support	• Compliance • IP Management • Business growth and success

Source: Researcher's creation

Table 7. 9: Theme 2 – TBI interventions- data and individual participant findings

	Business support	Technological support	Small Business Support	Summary of Findings for each participant
1	*"Support them with those skills that are required for a business to be able to succeed."* *"to market their business."* *"How do they go about conducting their business in a manner that will allow them to grow?"* *"be able to reap benefits from their business operations."* *"incubatees to be able to penetrate the market get a slice of the marketing with this product."* *"Marketing sales, penetrate the market."* *"need other skills, supporting skills that will ensure that a business runs in the manner that a business is supposed to run."*	*"We deal mostly with the technical aspect of the SMMEs that we work with"* *"technological support"* *"product that can compete"* *"a competitive edge over their competitors"* *"Access to advanced facilities"* *"latest facilities in terms of their products and their processes."*	*"How do you deal with a specific market, a niche market?"* *"The client can actually explain from the beginning to the end what the product entails."*	Marketing Sales Market penetration Managing the business Technical aspects of the business Technological support Product development Competition (dealing/managing) Access to advanced facilities Dealing with specific market requirements Comprehensive understanding of the product
2	*"Accessing funding for their business operations, business management."* *"source funds, where to source funds"* *"financial management."* *"train them to learn to develop business plans."* *"fail actually to market their services to the communities."* *"knowledge of marketing skills"* *"human resources management"* *"learn time management";*	*"focus is mainly on providing technological support to the youth trained them in the manufacture of detergents."* *"trained them in the manufacture of cosmetics and other chemicals."* *"technological training."* *"transfer of skills"* *"The technology skills in the sector."*	*X*	Where and how to source funds Financial management Developing a business plan Marketing Human resources management Time management Technological support Manufacturing Transfer of skills

	“plan” *“business support."*			Knowledge of technology in the sector
3	*“financial aspect”* *“marketing aspect”* *"audit their accounts come the end of the financial year."*	*“Own infrastructure"* *"right equipment for the right product."* *"where they assist you with product testing."* *"The product testing gives them a competitive edge in the market,"* *"equipment part - there are grants available for the SMMEs, which is good because it is a small business. You want to see this business prosper in the market."*	*"prepare them to meet the requirements to access that grant."*	Financial management Marketing Auditing support Infrastructure Relevant Equipment Product Testing Access to grants for equipment Grant application support
4	*“providing non-financial business development support.”* *“start-up training”* *“basic business skills”* *“generic business development support, kind of training.”* *“registration with CIPC.”* *“access markets, funding.”*	*“skills training”* *“technical skills”*	*“issues of compliance”,* *“grow and expand their business”,* *“what skills does the jockey need?”* *“coaching and mentorship”* *“issues of exports.”*	Business development Start-up training Registration with CIPC
5	*“growth wheel tool, a 360-degree snapshot of how our business operates; identify where are the critical areas that need support; then we develop the programs where we are able to plug in”;* *“enterprise supplier development programs”* *“Marketing”* *“training workshops. generic workshops for finance,”* *“knowledge transfer"*	*"developing their prototype";* *"linking them up with tech stations",* *“IP development”* *“Trademark”* *“brand building”;* *“conformity assessment”;* *“tech transfer*	*“During COVID, when businesses were really struggling, we needed to be in contact on a regular basis, checking them out, seeing how they were doing, helping them, and guiding them.”* *“ full incubation program which is twelve months”* *"developing businesses to support local and for export”* *“localisation program”*	Business assessment Marketing Training workshops - generic for finance Knowledge transfer Networking Market access Linking business to markets Prototype development Digital marketing and e-commerce platforms

	"Networking" *“marketing access”* *“linking businesses to markets”,* *“digital marketing and e-commerce platforms "* *“don’t have a size fit all because we are working across different sectors."*		*“mentoring and coaching”* *“pay for those services, SMMEs have that benefit.”* *“compliance.”* *“pre-incubation, which is six months”*	Trademark Brand building Conformity assessment Tech Transfer Tailor-made support
6	*“supporting ideas or projects, there has to be a market.”* *"to enable an investee or an incubatee to decide quicker that that approach is not going to work."* *“also having to change course.”* *"taken them longer than the time they took had it not been provided with support."*	*"to focus its investments both in supporting projects."* *"skills development towards enabling that biotechnology sector; the emergence of a number of biotech based enterprises; focussed approach; invest in these skills.”* *“skills for the future"* *"emerging enterprises that actually deal with or develop technologies."* *“diagnostics”* *“providing analytical services.”*	*“certification of products.”* *“access to accrediting boards”* *“implementation-based technologies.”* *“customised services, depending on their needs.”*	Idea development and support Skills development Development of specific industries Diagnostics Analytical services Certification of products Access to accreditation bodies Tailor-made support
7	*“business development support”* *"a seed funding place, it’s managed and regulated by the incubators."* *“We provide working spaces,co-shared working spaces.”* *“complete office suite office space or a hot desk that has all the facilities”* *“a miniature office, a reception service; access to internet security, water, lights, all utilities”* *“access to boardrooms meeting rooms media centre, make-a-space as well”*	*“App development”* *“supporting you with an innovation platform.”* *"also do to develop and grow your innovations."* *"Understand and support digitally-enabled processes and equipment."*	*“New and innovative thinking”* *"we’re providing everything that we believe an SMME would need to grow their business."* *“business development services”* *“mentoring, coaching”* *“productivity improvement and support”* *“training”.*	Business development support Seed funding Working spaces (co-shares) App development Innovation support Digitally enabled support and processes Mentoring and Coaching Productivity improvement and support

8	*"helps them also master business skills."* *"how businesses get new business."* *"how much it is marketed,"* *"advice as they go out to meet with companies."*	*"identify some businesses that would come up with something substantial, certain ideas and products."* *"At the time when technology has crept in, it finds some of our businesses running with old technology and also using old equipment."* *"were able to come up with an innovative idea."* *"right environment to test their ideas"* *"he did his research that are more and more avenues where he can open up a new line of businesses."*	*"helping them with the premises."*	Business skills Advice Innovation Premises
9	*"Write proposals."* *"The shared facilities are what makes it easier for the incubatees."* *"Marketing drives the organisation in the market, and financial management is one of the key aspects of developing a business plan. Extracts from that business plan are a sales plan, account management plan, and operations management."* *"identifying the gaps in the individuals."* *"Advertising and marketing people are coming over and spending three hours with our youngsters so that they can see what it entails to get into advertising and marketing."* *"Interpersonal skills"*	*"involved in technology, registering new ideas, IP around those ideas and assisting the organisation in getting to commercialisation through to production."* *" innovation, assisting the organisation in getting to commercialisation through production, development, marketing and, of course, driving the organisation in the market."* *"production development."* *"when you've got the technical facilities, you can use our equipment."*	*"how all these things tie in together to make a business successful"* *"skills training."* *"address the character of the person and whether that person would fit into an entrepreneurial system."*	Proposal writing Shared facilities Marketing Financial management Business plan development Develop Sales plan Commercialisation IP registration Skills training Individual entrepreneur assessment

	"engage, who can talk, who can sell a concept, who can handle rejection." *“soft skills”* *“you have a room that you can use as and receive calls on your behalf.”*			
10	*"exposing our students to the micro-environment that affects every business that operates."* *“training s one of the things that could be used to improve the output and efficiency"* *"basic entrepreneurship training to those who are not yet running businesses."*	“*technology transfer”*	*“consulting”* *have “another programme for those who are now really making a revenue, an advanced programme for them”;* *“mentorship.”* *“Skills”* *“mentorship and coaching”*	Exposure to entrepreneurship Mentorship and coaching Entrepreneurship Training Output and efficiency improvement Technology transfer Consulting Advanced programmes for clients already in business Skills
11	*“business development skills”; “if programs were customised more towards the cohort that’s coming into that particular year or program, then we would definitely achieve much better results.”* *"basics about running a business, setting, creating and running a business."* *“Financial literacy”* *“manage finances within a business”* *“how do you also navigate through the business environment?”.*	*“specialised and technical in nature.”* *"to support or provide a platform to support innovators, and innovators can be anyone from individuals, youth, students, businesses, small, medium and large, governments, and other civil society organisations."* *“From concept to commercialisation, developing their innovative product or service or offering to register their IP.”*	*"provide the tools and opportunities to those in need,"* *“registering that business.”* *"formal business coaching"* *"A mentor and someone that will guide and advise is definitely important to" develop them as an individual.”*	Business development skills Customised services Financial literacy Navigating the business environment Specialised technical support Innovation support Commercialisation IP registration Provide Tools and opportunities for small businesses Mentorship and Coaching Personal/individual development

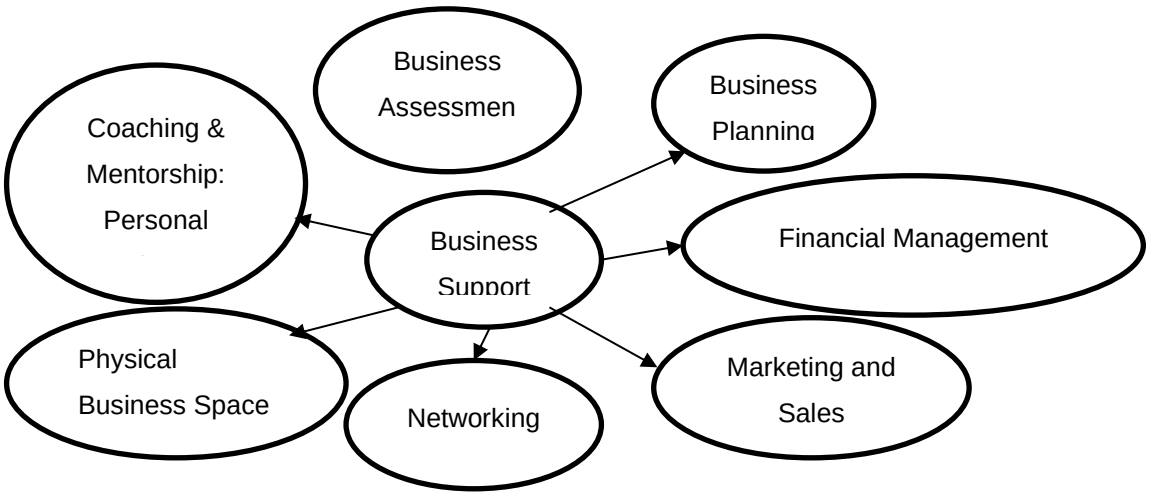
12	*“Registering a business.”* *"taking entrepreneurs through business management.”* *“soft skills”* *“business support is standard training for all entrepreneurs’ innovators."* *"Does the market want this idea? Is there a real need for this idea? Assist in ideating and cleaning off the dirt and the debris, and assist the innovator in seeing the real idea behind the idea."*	*“supposed to buy business equipment, that equipment is there; it’s functional.”* *“provide services like technical, depending on the discipline in terms of where that business comes from, if it’s chemistry or engineering.”* *“producing as per intention.”* *“technical skills”*	*“advice in terms of what entrepreneurship is”* *"advice in terms of starting an entrepreneurial”* *“business, advice in terms of idea”,* *"ideation and processing the idea to a point where it could be accepted, say, for instance, for funding if it goes to a committee that evaluates possible funding for an idea.”* *“seed funding”* *“You have got to have a plan for how you’re going to take an entrepreneur from zero to ten. The backbone of the, so to speak, incubator.”*	Business Registration Business Management Soft skills development Business support Market assessment Buy equipment or ensure that the existing equipment functions optimally Technical services that are discipline-specific Supporting production Technical skills Advice Seed funding Ideation and idea development
13	*“business development”;* *“develop our entrepreneurs within an institution.”*	*“moving technologies from the basic research into maybe technology readiness level may be above five.”* *“licencing of the technology”* *“spin-off creation”* *“tech transfer is quite, not new but is something that we just tapped in as most of the universities in South Africa.”* *"the process of commercialisation basically, we wouldn’t say it happened just overnight,* *“Commercialisation is kind of slow."*	*"run workshops where we equip our academics, in terms of what they can do with their research."* *“element of spin-offs*	Business development Entrepreneur development Technology development (to higher technology readiness levels) Licensing technology Spin-off creation Commercialisation Workshops for researchers to explore possibilities

Source: Researcher’s creation.

7.5.1 Business support

According to the participants, these entities provide comprehensive support to incubatees in developing their small businesses. This support includes training that is vital for starting a business (P4: "*start-up training*") and essentials of business management through generic interventions (P4: *"generic business development support kind of training"; basic business skills;* P5: *"training workshops";* P7: *"training*; P10: *"basic entrepreneurship training to those who are not yet running businesses";* P12: *"business support is standard*). The business support does not necessarily involve injecting funding into the incubatee or the small business (P4: *"providing non-financial business development support"*; P7: *"business development support";* P7: *"business development services*"; *P11: "business development skills";* P12: *"taking entrepreneurs through business management"*; but seeks to develop and nurture the incubatees' business skills; P8: *"helps them also to master the business skills";* P13: *"business development"*). These skills are imparted through various training and skills development initiatives provided by the TBIs in KZN to increase productivity within the small business (P10: "*Training, it's one of the things that could be used to improve the output and efficiency"*). The participants affirmed that the TBI incubatees should also be able to manage people who will provide services and support to the small business (P2 *"human resources management"*). The various forms of business support are summarised in Figure 7.4:

Figure 7. 4: Business support provided by the TBI



Source: Researcher's creation

These categories of business support will be discussed:

7.5.1.1 Business assessment

The TBIs in KZN also use skills, expertise, and tools to conduct a business assessment that offers a complete view of the business (P5: “a *360-degree snapshot of how our business operates”*). The business assessment also assists the TBI in identifying fatal flaws within the business and subsequently designing a tailored intervention to assist the incubatee (P5: *identity where are the critical areas that they need support; then we develop the programs where we are able to plug in”;* P12*"advice in terms of starting an entrepreneurial";*). It is also essential to consider that some TBIs in KZN support incubatees operating in different industry sectors, making it difficult to provide generic solutions for all entities (P5: *don’t have a one-size-fit-all because we are working across different sectors";* P6: *customised services, depending on their needs; P11: “if programs were customised more towards the cohort that’s coming into that particular year or program, then we would definitely achieve much better results”*).

7.5.1.2 Business planning

The TBI incubatees should be involved in developing their business plans (P9: “*develop a business plan”).* The TBI provide the support essential for incubatees to develop their business plans (P2*"train them to learn to develop business plans"*). The business plan is essential in detailing how the business will be developed and managed towards growth and success (*P11: setting, creating and running a business"*). The business plan should, therefore, be a living document that dictates the business's operations, including the sales plan, how the accounts will be managed, and providing a clear operations management plan (P9: *extract from that business plan a sales plan, account management plan, and operations management”*).

7.5.1.3 Financial management

The importance of financial management for small businesses was recognised (P9: *financial management is one of the critical aspects"*). The TBIs responded to this need by designing interventions that provide financial management skills that range from basic financial literacy to advanced programmes based on the level of financial understanding of the incubatee (P11: *financial literacy, manage finances within a company"*). The general financial skills requirements are also addressed through the generic financial management skills (P5: "*generic workshops for finance"*). They generic skills development programmes assist the incubatees with skills to manage their finances (P2: *"financial management;* P3: "*financial aspect").* They also provide information that relates to possible sources of funding and available government grants (P2: *"source funds, where to source funds;* P3*: to access that grant";* P4*: access funding")*. Importantly, TBIs also ensure the financial transparency of these businesses by evaluating the evidence of proper financial management through an auditing function performed periodically as part of the TBI support (P3: "*audit their accounts come the end of the financial year"*). Some TBIs in KZN also provide subsidies to assist incubatees in meeting business development costs (P5: *"pay for those services, SMMEs actually have that benefit";* P6: *"to focus its investments both in supporting projects "*). This intervention provides an ideal platform for seed funding of new technologies (P7: *"a seed funding place, it's managed and regulated by the incubators";* P12 *"seed funding";*).

7.5.1.4 Marketing and sales

Marketing the business is a critical skill in the development of sustainable small businesses in KwaZulu-Natal (P1: *to market their business";* P2: *"knowledge of marketing skills";* P3: *"marketing aspect"*; P5: *"Marketing"*). Given that graduate incubatees will be new entrants in the business environment, they claim a space within the market (P1: *"incubatees to be able to penetrate the market get a slice of the marketing with this product"*). Therefore, incubatees need interventions that will assist them in accessing markets (P4: *"access markets;* P5: *"marketing access"*). They also need to understand the pricing strategy to break into new markets (P8: *"how much it*

is marketed";). Through marketing and sales, incubatees make inroads into the markets (P1: *"Marketing sales, penetrate the market";* P8: *"How business gets new business"*) and avoid potential small business failure (P2: *"fail to actually market their services to the communities*). The emergence of online markets has also necessitated the inclusion of digital marketing avenues and e-commerce platforms (P5: *"digital marketing, e-commerce platforms"*). Through aggressive advertising and marketing (P9: "*advertising and marketing*), incubatees can drive marketing campaigns into new markets (P9: *"marketing driving the organisation in the market*).

7.5.1.5 Networking

Networking is one of the vital skills for incubates in KZN (P5: *"networking"*). The TBIs also assist incubatees in sharpening their networking skills (P8: *"advice as they go out to meet with companies"*). The TBI interventions seek to develop interpersonal skills for the incubatees (P9: *interpersonal skills"*) by closely monitoring how they engage, sell their ideas and manage emotions that come with unsuccessful bids (P9: *"engage, who can talk, who can sell a concept, who can handle rejection"*).

7.5.1.6 Physical business space

TBIs also provide incubatees with physical business management space, including the offices, meeting rooms, networks and other utilities (P7: *"we provide working spaces,co-shared working spaces"; "complete office suite "complete office suite office space or a hot desk that has all the facilities";* P8:*helping them with the premises;* (P9: *you have a room that you can use as and receive calls on your behalf*). These are generally shared facilities that are accessible to all (P9: *"the shared facilities is what makes it easier for the incubatees"*).

7.5.1.7 Coaching and mentorship- incubatee - personal development

The TBIs in KZN also assist the incubatee through the determination of the personal skills requirements for small business owners (P4: *"What skills does the jockey need?";* P9: *"Identifying the gaps in the individuals"*) and other soft skills (P9:" *soft skills";* P12:

“soft skills”). These interventions include assistance that focuses on developing the personal character necessary for business development and sustainability (P9: *"address the character of the person and whether that person would fit into an entrepreneurial system;* (P12: *advice in terms of what entrepreneurship is”;* P13: *“develop our entrepreneurs within an institution”*). The findings of this study also revealed that the ability to manage time is considered critical (P2 *“learn time management*”). The general planning ability is essential for incubatees (P2: "to plan, the skill to write proposals (P9: "*Write proposals”*). The enforcement of these skills is achieved through the coaching and mentorship support that the TBIs provide (P4: *“Coaching and mentorship”*; P5: *“mentoring and coaching”;* P7: *“mentoring, coaching”;* P10: *"mentorship and coaching”*). The mentorship and coaching interventions can also be facilitated by external individuals operating as role models for incubatees (P9: *“people coming over and spending three hours with our youngsters so that they can see what it entails to get into advertising and marketing”*). This intervention is considered essential as mentors play a critical role in guiding and supporting incubatees (P11: *"formal business coaching"; "a mentor and someone that will guide and advise, definitely, that is important" develop them as an individual*). The TBIs vary the level and intensity of their programmes based on the level of growth of the incubatee (P10:*“have “another programme for those who are now really making a revenue, an advanced programme for them”*; P11: *“registering that business”;*). The success of small businesses should also lead to the incubatees benefiting from their companies (P1: *"be able to reap benefits from their business operations"*). The incubatees are also capacitated with innovative thinking capabilities to assist them in surviving the turbulent business environment (P7: *“New and innovative thinking”*).

The following sub-theme presents the technological support that TBIs provide to incubatees.

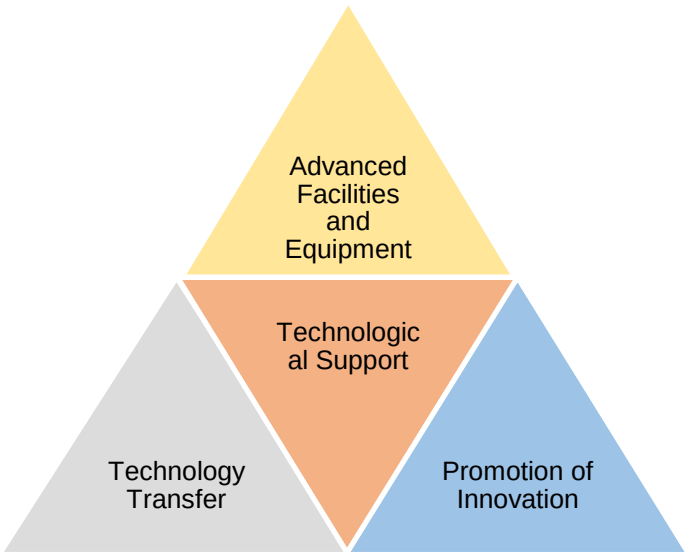
7.5.2 Technological support

The provision of technological support is one of the critical offerings of TBIs in KwaZulu-Natal (P1: *"We deal mostly with the technical aspect of the SMMEs that we work with*; P2: *"focus is mainly on providing technological support to the youth;* P12:

“provide services like technical). TBIs support incubatees to develop their technology-based ideas or projects (P6: *"emerging enterprises that actually deal with or develop technologies"*; *“supporting ideas or projects”).* The TBIs seek to identify and develop small businesses that have the potential of developing new products from ideas (P8: *"identify some businesses that would come up with something substantial, certain ideas and products"*). The ideas or projects which based on technology or scientific knowledge and the TBIs assist incubatees in developing these to fully-fledged small businesses that are growing and sustainable (P9: “*involved in technology”;* P11: *“specialised and technical in nature”*). The ultimate goal for the TBIs is assisting the incubatees to develop products and enter the markets successfully (P6: *there has to be a market”*).

The categories of technological support are presented in Figure 7.5

Figure 7. 5: Technological support of TBIs



Source: Researcher’s creation

7.5.2.1 Advanced facilities and equipment

Infrastructure is a critical factor for the success of incubatees of the TBIs in KZN (P3: *“own infrastructure”;* P12: *"supposed to buy own business equipment, ensure that equipment is there, and it is functional"*). Hence, the incubatees need access to specialised and advanced technological facilities and equipment that is available through TBIs to sustain their growth and development (P1: *"Access to advanced*

facilities"; *"latest facilities in terms of their products and their processes"*). Incubatees are also challenged in terms of harnessing sufficient resources to remain at the cutting edge of technology and are therefore forced to work with outdated technologies and equipment (P8: *"At the time when technology has crept in and it finds some of our businesses running with old technology and also using old equipment*).

Incubatees, therefore, have access to the equipment suitable for their product needs (P3: *"right equipment for the right product*; P9: *"When you've got the technical facilities, you can use our equipment*), which also ensures compliance and improves the probability of acceptance by the market. Access to TBI equipment is also essential to assist incubatees with designing the production lines (P9: *production development";* P12: *"producing as per intention.")*. One of the essential services the TBIs provides is the provision of testing and analysis support for the incubatees (P3: *"where they assist you with product testing"*; P6: *"providing analytical services"; "diagnostics"*). TBIs also assist incubatees with information and support to attract grant funding specifically targeted to alleviate the infrastructure burden for small businesses requiring specialised equipment and facilities (P3: *"equipment part, there are grants available for the SMMEs")*.

7.5.2.2 Technology transfer

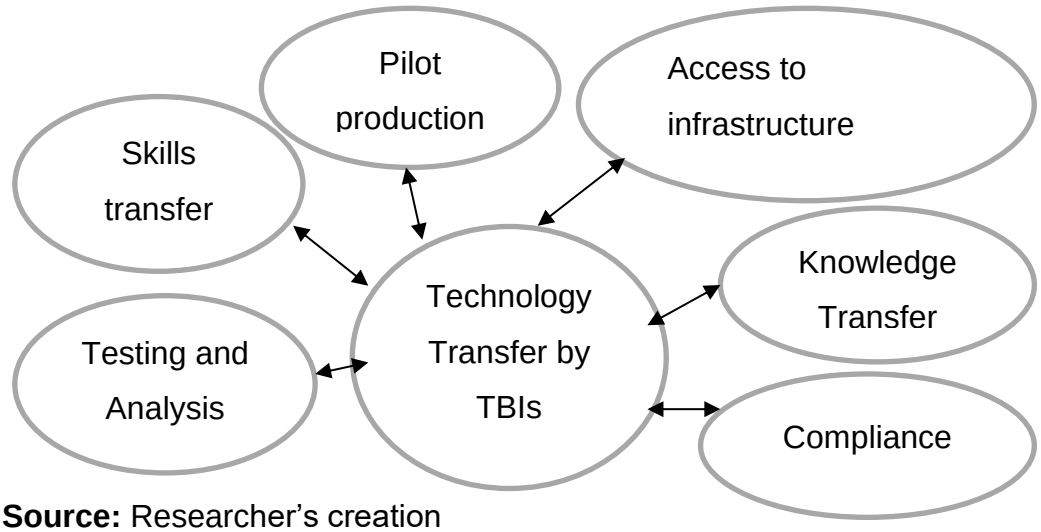
Technology transfer by TBIs to incubatees occurs through knowledge transfer and technological skills transfer (P10: "*technology transfer";* P13: *"tech transfer is quite, not really new but is something that we just tapped in as most of the universities in South Africa"*), thereby providing essential tools and opportunities to the incubatees (P11: *"provide the tools and opportunities to those in need").* The TBIs in KwaZulu-Natal are also responsible for transferring knowledge to incubatees (P5: *"knowledge transfer"*). In instances where in-house expertise is not adequate, TBIs use their networks and stakeholders to provide the necessary support, which can also be achieved through consulting (P10: *"consulting"*). The other advantage of being an incubatee is access to technological information that will advance the course of the incubatees, including referrals to other relevant service providers (P5: *"link them up with tech stations"*). The transfer of technological skills is critical for supporting incubatees so that they can be

able to develop growing sustainable small businesses (P2: *“transfer of skills;* P4: *“skills training”; “technical skills”;* P12: *“technical skills”*). Incubatees require critical skills and support to be competitive in the business environment, as this is essential for their growth and sustainability (P1: "product that can compete"; "a competitive edge over their competitors"). Providing a product or service of proven quality is another factor in gaining a competitive edge in the market (P3: *"The product testing gives them a competitive edge in the market"*).

The TBIs in KZN provide technology-related services to incubatees in technology-focused or technology-based small businesses. Evidence demonstrated that these SMMEs rely extensively on the equipment and facilities available through the TBIs. This factor links to the cost associated with these resources and the limited financial strength linked to small businesses. The ability of the TBIs to promote innovation in the province of KwaZulu-Natal is crucial for the province's economic development and diversity. Technological support is one of the essential services provided by the TBIs. The technological service offerings differentiate the TBIs from other incubation programmes. The TBIs provide the necessary infrastructure for small businesses during their development phase. The incubatees' equipment should match the product or service requirements to enter the market. This support also assists incubated with compliance with the relevant standards and regulations applicable to the industry of interest. The incubatees should operate at the cutting edge of technology so that their products can enter and compete successfully in the markets. The equipment and infrastructure support provided by the TBIs also includes assisting the incubatees with pilot production. Testing and analysis are other critical elements of TBIs' technological support. It helps the incubatees ensure their products comply with the relevant standards and regulations. The TBIs offer training that is not restricted to business training but also technological and industry-specific skills development.

The TBI technology transfer mechanisms are summarised in Figure 7.6.

Figure 7. 6: Technology transfer mechanisms of the TBIs



Source: Researcher's creation

7.5.2.2.1 Industry sector-specific technological skills

The findings also revealed that the TBIs in KwaZulu-Natal focus on different industry sectors, so the technological training provided (P2: "*technological training*") is aligned to a specific sector (P6: *"focused approach; invest in these skills; skills for the future"*). Some TBIs provide chemicals, cosmetics, and related technological skills (P2: *"trained them in the manufacture of detergents; trained them in the manufacture of cosmetics and other chemicals";* P12: "*depending on the discipline in terms of where that business comes from, whether it is chemistry or engineering"*). There is also a focus on emerging technologies like the biotechnology sector (P6: *"skills development towards enabling that biotechnology sector*) with a view to increasing the number of SMMEs in that particular sector (P6: "*an emergence of a number of biotech-based enterprises"*). In a digitalised world, TBIs promote the participation of the KZN population in the booming information technology space through supporting app development (P7: *"App development"*) in an endeavour to develop industrialisation in the province (P7: *"understand and to support digitally-enabled processes and equipment")*.

7.5.2.3 Promotion of innovation

The TBIs in KZN support innovation by providing a platform to develop, nurture, and commercialise innovations (P7: “supporting you with an innovation platform”, "*also to develop and grow your innovations"*; P11: *"to support or provide a platform to support innovators and innovators can be anyone from individuals, youth, students, to businesses, small, medium and large, governments, other civil society organisations";* P12: *"standard training for all entrepreneurs' innovators"*). Incubatees can approach the TBI with new ideas and access support from experts and facilities to nurture innovations (P8: *“were able to come up with an innovative idea”; “right environment to test their ideas”;* P12 *“business, advice in terms of idea "ideation and processing the idea to a point where it could be accepted say for instance for funding if it goes to a committee that evaluates possible funding for an idea”)*. The TBIs first assist through the registration process of the novel ideas and securing the relevant intellectual property rights (P9: “*registering new ideas, IP around those ideas”*). Furthermore, TBIs assist the incubatees through the commercialisation process and entry to markets (P9: *assisting the organisation in getting to commercialisation through production, development, marketing and, of course, driving the organisation in the market”;* P11: *from concept to commercialisation developing their innovative product or service or offering to register their IP”;* P13: *“moving technologies from the basic research into maybe technology readiness level may be above five”;* P13: *"the process of commercialisation*). The TBIs also assist incubatees with the various exit strategies for IP management including licensing and spin-off creation (P13: *“licencing of the technology”; “spin-off creation”*).

7.5.3 Small business support

These services, grouped as small business support, consider all those interventions requiring business management, technological skills, and knowledge(P9: *"how all these things tie in together to make a business successful";* P10: *"exposing our student to the micro-environment that affects every business that operates”; P11: “how do you also navigate through the business environment”;* (P12 *“you've got to have a plan on how you're going to take an entrepreneur from zero to ten. backbone of the so to*

speak, incubator"). This support relates to managing and meeting the requirements for a specific niche market (P1: *"How do you deal with a specific market, niche market"*), which will also require clients to be able to fully understand the entire product value chain including its technological characteristics or capabilities (P1: *"the client can explain from the beginning to the end what the product entails,"*). The small business support also extends to instances when TBIs have to intervene to assist incubatees during the trials beyond their control, like the Covid-19 pandemic, which had a global impact (P5: *"During COVID, when businesses were really struggling, we needed to be in contact on a regular basis, checking them out, seeing how they were doing, helping them, and guiding them."*).

7.5.3.1 Compliance

Compliance is one of the cross-cutting requirements that underscore both business and technological support, which participants consider important for incubatees (P3: *"prepare them to meet the requirements;* P4: *"issues of compliance"*; P5: *"compliance."*). Compliance measures through which TBIs assist SMMEs include ensuring that they are registered with the Companies and Intellectual Property Commission (CIPC) (P4: *registration with CIPC";* P12: *"Registering a business"*). Conformity is also necessary to ensure that incubatees succeed in the open market (P5: *"conformity assessment"*). The products of incubatees also need to meet the relevant specifications and accreditations (P6: *"certification of products"*). The information support provided by the TBIs also allows incubatees access to the accreditation boards (P6: *"access to accrediting boards"*.

7.5.3.2 Intellectual Property (IP) management support

The findings also revealed that these programmes have interventions in place to support incubatees in managing intellectual property, including the development of IP (P5: *"IP development"*) or through prototyping (P5: *"developing their prototype"*). The TBIs also assist the incubatees with the ideation process (P12: *"Does the market actually want this idea? Is there a real need for this idea?";* "*assist in ideate and cleaning off the dirt and debris and assist the innovator in actually seeing the real idea*

behind the idea"). The growth and expansion of small businesses are considered essential; hence, incubatees are expected to develop their brands and protect them (P5: *"brand building"*), which may also necessitate the protection of the associated trademarks (P5: *"Trademark"*). Universities, academics and researchers are critical elements in the development of innovations and intellectual property; hence, their understanding is crucial to promoting innovation for their benefit and the country (P13: *"run workshops where we equip our academics"; "in terms of what they can do with their research element of spin-offs)*.

7.5.3.3 Business growth and subsequent success

The findings revealed that small business success is the critical cross-field outcome for TBIs in KwaZulu-Natal in ensuring their effectiveness (P1: *"support them with those skills that are required for the business to be able to succeed"*; P3: *"Which is good because it is a small business and you want to see this business prosper in the market";* P7: *"we're providing everything that we believe an SMME would need to grow their business"*). The growth and expansion of businesses are considered vital (P4: *"grow and expand their business"*). They should be one of the outcomes that incubatees gain from TBIs (P1: *"how to go about conducting their business in a manner that will allow them to grow"*). The TBIs are, therefore, capacitating incubatees with strategies for improving productivity to ensure growth (P7: *"productivity improvement and support"*).

Export promotion is another avenue explored for growing and expanding small businesses (P5: *"developing businesses to support local and for export";* P4:*" "issues of exports."*). Initiatives to assist business growth include providing supplier development support to incubatees to increase their suitability in the market (P5: *enterprise supplier development programs*). This service is essential in linking the incubatee business to the markets (P5 *"linking businesses to markets"*), thus promoting the growth and expansion of business and adapting the incubatee's product and marketing strategies to diverse cultures, languages and regulations to entice a particular market (P5: *"localisation program"*; P8:*" he did his research that are more and more avenues where he can open up a new line of businesses"*).

7.5.4 TBI programme duration

The TBIs in KZN have varying durations for their incubation programmes. Some programmes provide pre-incubation support (P5: *“pre-incubation which is six months”*) before the incubation programme, which may take twelve (12) to 36 months (P5: *“ full incubation program which is twelve (12) months”;* (P3: “*in that three-year program”*). These pre-incubation interventions or assessments also serve the purpose of early detection of fatal flaws, thus allowing the incubatee to re-evaluate the available options (P6: *"to enable an investee or an incubatee to decide quicker that that approach is not going to work."; “also having to change course”*). The combination of expertise and facilities assists the incubatee by reducing the time to failure (P6: *"taken them longer than the time that they took had it not been provided with support."*).

7.5.5 Discussion and conclusion: Theme 2-TBI Interventions

7.5.5.1 Discussion

The findings of Theme 2 revealed that incubatees in KwaZulu-Natal require knowledge and skills to develop and manage growing, sustainable small businesses. TBIs should ideally be able to diagnose business needs, provide monitoring and evaluation on the targeted services, provide investment capital and link incubatees to their networks and working environment (Hewitt & van Rensburg, 2020:4). The KZN TBIs provide support that enhances the business management skills of the incubatee. These skills are then complemented by technological skills geared towards assisting the incubatee in gaining competency in the technology they are developing and understanding to use the necessary equipment and facilities. The findings also supported the need for compliance, IP management and factors that lead to growing sustainable small businesses (Dladla, 2021:63).

The TBIs in KwaZulu-Natal also support incubatees through interventions that enhance business success and promote growth, thus achieving sustainability. KwaZulu-Natal government can learn from the recent development in Cape Town and Johannesburg, where technology-based start-ups are receiving ample support that

propels growth and prosperity(Anwana & Anwana, 2020:3). These findings also revealed TBIs' core activities and services in KwaZulu-Natal. These are presented in Table 7.10. The TBIs provide both generic and tailored business support for incubatees, designed to assist them with developing and sustaining their enterprises. This support is delivered through a set of skills development interventions. The business support that the incubatees receive excludes funding. Some of the TBI interventions are generic and geared at meeting the general needs of small businesses. However, TBIs do provide tailored interventions that are designed for a specific incubatee based on the assessment conducted by the TBI. Evidently, from the narratives, tailored interventions are more effective than generic interventions.

The findings also revealed that the TBI approach to business planning is that the small business owner should be instrumental in developing their plans to assist them in understanding their businesses. Generic financial management skills programmes support incubatees from financial illiteracy to adequate competency to address business finances. The financial audits provided by the TBIs assist incubatees in adhering to the best financial management principles. The TBIs further provide support through subsidised services, and this is another form of financial relief for incubatees. The TBIs' skills also assist them in adapting to digital platforms for marketing their businesses. Networking is a developing skill and asset that the incubatee needs to advance the interest of the small business. Access to facilities is a support service that benefits It allows them to engage with clients in a formal and safe space. The TBIs suggest that incubatees must develop as individuals and acquire skills that will encourage business success (Endris & Kassegn, 2022:6).

Technological support and the promotion of high-technology industrial development and innovation are what differentiate these programmes from generic incubator programmes (Mcadam, Miller & Mcadam, 2016:70). Their contribution leads to new or novel technological-based products reaching the appropriate markets. Therefore, they contribute towards diversifying products and services from the province. To enter new markets, the products or services that the incubatees are developing should match the available technologies, and the necessary equipment and infrastructure are generally costly and unaffordable in a resource-constrained small business environment. The equipment and support provided by the TBIs also include access to designing

production lines that will ensure that the upcycling process generates identical products to those developed at the laboratory stage. Testing and analysis are essential services TBIs provide to support incubatees and small businesses in ensuring continued compliance and acceptance of the product in the market. The TBIs are vital in ensuring that small businesses have access to technology and are exposed to technological advancement and global trends to bridge identified gaps in skills and assets (Schutte, 2019:11).The training and support on innovation and IP management provided by the TBI assist incubatees in understanding the route to markets through the commercialisation process. It also prepares and equips the incubatees with sufficient knowledge and information to survive the challenges associated with IP management and compliance with the IPR Act (Chapter 3). The TBI programme duration varies among the TBIs; hence, this study recommends reconsidering post-incubation interventions that will assist the incubatee in adapting outside of the TBI.

7.5.5.2 Conclusion

Generic business support interventions are ideal for addressing the general challenges that incubatees confront as small businesses. However, tailored programmes are suitable for meeting the specific needs of the incubatee. Conducting initial assessments on incubatees assists the TBIs in directing their efforts toward addressing the gaps in the business. The TBIs consider financial management to be one of the critical skills for business success. Hence, TBIs provide these skills to incubatees and equip them for business growth and associated success. The TBIs encourage the incubatees to develop strategic networking skills that are essential in developing growing sustainable businesses. The TBIs provide infrastructure and suitable scientific equipment coupled with testing analysis support to assist the incubatees. Access to suitable infrastructure is essential for the success of the technology-focused small business, especially considering that SMMEs are resource-constrained (Malebana, 2017:76).Ultimately, TBIs focus on new or modified technological products that are to be entered into the markets. Their importance also relates to providing technological support to emerging industries like the biotechnology sector and constantly evolving industries such as IT while sustaining competencies and technology improvements in markets like chemical and agriculture.

7.5.6 Alignment of the Theme 2 findings with the primary aim of the study

Theme 2 findings have revealed the services that the TBIs in KwaZulu-Natal provide to small businesses, as presented in Table 7.10. Understanding the TBI offerings is a critical step towards developing the framework for effective TBIs in KwaZulu-Natal. The findings also reveal a desire and intention to provide holistic support to small businesses.

Table 7. 10: TBI Services – Findings: Theme 2 – TBI interventions

Theme 2	TBI interventions			
Research objective	SO4: To explore and describe the mode of operation for technology business incubators.			
Methodology	Empirical research – Qualitative – Interviews			
Marketing Sales Market penetration Managing the business Technical aspects of the business Technological support Product development Competition (dealing/managing) Access to advanced facilities Dealing with specific market requirements Comprehensive understanding of the product Where and how to source funds Financial management Developing a business plan Human resources management Time management Technological support Manufacturing Transfer of skills Knowledge of technology in the sector	Product Testing Access to grants for equipment Grant application support Business development Start-up training Registration with CIPC* Business assessment Marketing Training workshops -generic for finance Knowledge transfer Networking Market access Linking business to markets Prototype development Digital marketing and e-commerce platforms Trademark Brand building Conformity assessment Tailor-made support Technology Transfer Idea development and support Skills development Development of specific industries Diagnostics Analytical services	Seed funding Working spaces (co-shares) App development Innovation support Digitally enabled support and processes Mentoring and Coaching Productivity improvement and support Business skills Advice Innovation Premises Proposal writing Shared facilities Business plan development Develop Sales plan Commercialisation IP registration Skills training Individual entrepreneur assessment Exposure to entrepreneurship Mentorship and coaching Entrepreneurship Training	Consulting Advanced programmes for clients already in business Skills Customised services Financial literacy Navigating the business environment Specialised technical support Innovation support Commercialisation IP registration Provide Tools and opportunities for small businesses Mentorship and Coaching Personal/individual development Business Registration Soft skills development Business support Market assessment Buy equipment or ensure that the existing	Ideation and idea development Entrepreneur development Technology development (to higher technology readiness levels) Licensing technology Spin-off creation Commercialisation Workshops for researchers to explore possibilities

Auditing support Infrastructure Relevant Equipment	Certification of products Access to accreditation bodies	Output and efficiency improvement	equipment functions optimally Technical services that are discipline-specific Supporting production Technical skills	

Source: Researcher's creation

7.6 THEME 3: UNIQUENESS OF TBIS

This theme identifies those factors that can be attributed to the uniqueness of the TBIs compared to other small business support entities. These unique factors are the cornerstones for the effectiveness of TBIs in the province of KwaZulu-Natal. A total of 113 codes were recognised in this theme, with P6 and P7 contributing immensely to the codes. These codes generated two sub-themes presented as follows:

- The benefits of being an incubatee compared to those who are not in the programme.
- TBI interventions for high/intensive scientific technologies

Table 7.11 presents the sub-themes and categories for Theme 3.

Table 7. 11: Theme 3: Sub-themes and categories

Theme	Sub-themes	Categories
Uniqueness of TBIs	The benefits of being an incubatee compared to those who are not in the programme.	• Holistic support for sustainable small business development • Subsidised services • Access to expertise, knowledge and best practices • Access to TBI networks • Access to national and international expertise and markets
	TBI interventions for high/intensive scientific technologies	• Development, refinement and commercialisation of technological solutions • Access to technological infrastructure • Aligning new technologies to industry needs

Source: Researcher's creation

The findings established that the TBI's primary focus is on small businesses operating in technology-focused sectors or relying on technology for daily operations. Therefore, the services provided by the TBIs are characterised by highly scientific equipment and facilities and heavy reliance on the TBI staff's technological expertise and networks. Accessing these services directly benefits from accelerating ideas to markets and cost savings as these services are subsidised. Moreover, the findings also revealed the need for holistic support that promotes small business growth and sustainability. Table 7.23 presents the codes that relate to the uniqueness of the TBIs.

Table 7. 12: Theme 3 – Uniqueness of TBIs

	The benefits of being an incubatee compared to those who are not in the programme.	TBI interventions for high/intensive scientific technologies	Summary of Findings per participant
1	*"We encompass all kinds of support that the business needs into one package, giving holistic support to our incubatees."* *"It does not matter if you have a product that is out of this world; a business cannot only run based on."* *"your technological abilities, but also needs other soft skills."*	*"facility that is also up to the standard."* *"Our role in the entire ecosystem is technological."* *"providing them with a space that they can use to create their manufacturing facilities."*	The TBIs first contribute by delivering technology to the small businesses the programme incubates. This support is coupled with technological support, including expertise, facilities, and equipment through which small businesses can access high-end technologies. The TBI embraces the concept of holistic development for technology-focused or technology-intensive small businesses by ensuring that support covers the new organisation's business and technology-related needs.In line with the holistic development of the business, the TBIs also adhere to developing the individual entrepreneur in all aspects of managing the business, including technical and soft skills.
2	*"SMEs and cooperatives that start operating never finish a year, never go beyond a year. So, with this program, we notice that almost all* *the incubatees and their businesses operate right through and we lay a good foundation for their success."*	*"We realised that there was a greater* *need than the provision of technology or technological skills to these individuals, SMEs, and cooperatives."* *"constantly studying the developments inside the country, as well as outside the country, Africa."*	The failure of SMMEs to survive during the early years is a concern. Hence, holistic support to SMMEs is favoured and believed to lead to business sustainability. It is also instrumental in mitigating the high failure rates amongst SMEs and cooperatives in the province. There is a need to constantly modify support in response to developments within and outside the country.

3	*“Whatever they are doing in that program, engagement should lead to their being self-sustainable.”* .	*“Make sure that when they leave the incubator, they have their own infrastructure because, in that three-year program, they were dependent on the incubator's infrastructure equipment; grants are available for the SMMEs. This is good because it is a small business, and you want to see this business prosper in the market.”*	The TBI should provide holistic support to ensure the enterprise is self-sustainable. It also provides grant funding, especially for acquiring essential infrastructure for operations. Owning the necessary infrastructure is essential to the successful graduation of incubatees, which is necessary for them to operate independently.
4	*"Being able to network with other small businesses.”*	*“Access to that is the expert knowledge, best practices, and industry experience.”* *“needed to reach that in the larger communities for the benefit of all.”*	TBIs also offer support through experts who can advise on best practices related to industry needs and challenges and can engage with the broader community to benefit the incubatee. This support is also extended to networking amongst incubatees, which is made possible by interactions within the TBIs.
5	*“You can have a brilliant idea, but if you have not done the research in the market to see if there is a demand for it.”* *“Then, obviously, this is a product and is going to be sitting on the shelf, or it is an idea that is going to be sitting in a library; it is not going to be commercialised.”* *“student businesses tend to be start-ups and do not generate a large amount of income.”*	*“spin-off companies that we are supporting.”* *“Started by staff within the faculties, and they have come up with creative ideas, and things and products.”* *“Research and development.”* *“Our relationship with EDHE.”* *“links with all the other universities.”* *"a lot of our start-up, a lot of technology orientated business."*	TBIs further assist small businesses with market research, translating ideas into tangible products. These entities also provide valuable support for resource-constrained start-up companies. This factor is considered even more crucial for technologically inclined start-ups based on creative ideas or products of research and development. The relationships with universities and their stakeholders further enrich the TBI environment.
6	*"both technology development and business support to an entrepreneur."* *“enable them to develop their processes using government-funded infrastructure"* *"access to other expertise that ordinarily*	*“Infrastructure”* *“technical know-how.”* *"How to navigate the most complex scientific space"* *"access to not just local but national*	TBIs emphasise the importance of offering technological and business support to small businesses, which is essential for their success. Since most TBIs are government-funded (Theme 1), they can provide infrastructure, expertise, key stakeholders, and resources to

	or in any other set-up would not have been possible," *“assists in fast-tracking the process of* *either confirming a product or a process or changing course, "* *"resources that can guide the journey towards a successful outcome are shortened, hastened because there is guidance."* *"clients either developing products and processes up to a commercial phase."* *“clients who are currently pursuing collaboration with international partners.”* *"support or the product that is being* *developed are aligned toward the industry,"* *industry is evolving* *“Innovators or SMMEs understand or appreciate what the industry appetite could be."* *“industry organisations, understand their needs, introduce SMMEs' suppliers or service providers, and address some of the industry needs.”* *“connect such industry players with SMMEs.”*	*and sometimes an international aspect in certain fields."* *“part of a network of other incubators* *research institutes”* *“allows for access to networks of other incubators.”* *“networks of other funders.”* *“The incubator would have access to multiple funders, multiple opportunities for resource funding, or multiple opportunities to engage other stakeholders.”* *“SMMEs need to actually have access to other high-tech infrastructure or high-tech skills beyond just KZN.”*	support the small business's technology and operations. The other essential service the TBIs provide is assisting the entrepreneur in determining the potential of the technology or product. This support helps small businesses make informed decisions about the idea's potential or research output. It allows small businesses to experience failure within a supportive environment that will assist them in moving forward, thus eliminating wasteful expenditure and utilisation of resources. With such benefits, small businesses would have avoided significant costs and losses. The TBI networks are also essential for leveraging resources, expertise, and information.
7	*"become more able to develop sustainably* *business models."* *"go on overseas missions to participate in* *local and overseas missions."* *“equitable access to internet connectivity.”* *“work from a safe and secure environment.”* *"opportunity to work from a space that is*	*"The challenges of the ICT part are felt keenly because of the lack of training."* *“lack of resources,* *"lack of skills, you know.”* *“skilled mentorship training programmes in the ICT."* *"Bigger challenges than technology-based are access to resources."*	TBI incubatees benefit from exposure to TBI networks, information, and partnerships. The national and international exhibitions are part of the benefits enjoyed by incubatees. The incubatees enjoy working in professional spaces, thus building a good reputation in the business environment. Incubatees also benefit from accessing facilities and consultants at no cost to their accounts,

	conducive and that is recognised as a professional," *“Engage with a consultant; you would be paying lots of money. All of that is free, and these are all free services.”* *"Do not have any other worries or commitments, like, you know, formal working environment.”* *“The service that we charge them is a very tiny rental for the office space.”*	*“access to a laptop, access to data.”* *"KwaZulu-Natal, it’s obvious that there’s a serious lack of digital skills."* *“Everyone is using technology, and technology is using the internet, laptops, and smartphones.”* *“Equipment that can assist SMMEs in growing better software, better equipment, and digitally enabled equipment.”* *“Any sector that you are looking at, whether it be in IT or manufacturing.”*	which is ideal for finance-constrained small businesses. The TBIs can also scan the environment for risks and challenges and develop interventions to mitigate these.
8	*“need funders to produce it cheaper and even at a rate where it would be affordable to any other person.”* *“Utilising the knowledge that one has but linking it up with new technologies.”* *“The impact it has made on the minds of so many has made them realise that more can still be done in the innovative space.”* *“produce similar products and no compromise on that quality.”*	*"It has become so expensive to come up with a new idea in the country where we are,"* *“Where you do not have support from different institutions.”* *"The space that businesses find themselves in has to compete with so many foreign readymade products. "*	TBIs contribute towards innovation in the province. TBIs are assisting small businesses in realising possibilities within the innovative space P8: “*made them realise that more can still be done in the innovative space”*. The support provided by the TBIs creates a safe space for entrepreneurs to link their ideas and knowledge with new technologies. It's a space for exploring possibilities. The added advantage for the incubatees is an opportunity to develop their products to specification without incurring debilitating costs. The technology is generally inaccessible to small businesses due to costs associated with this space, as also evident from P8: *it has become so expensive to come up with a new idea in the country where we are”*. Hence, the TBI services and support make it possible for these entities to enter technology-intensive spaces.

			The technology-focused space is also complicated by the influx of foreign products that are readymade for the SA market and compete with local-produced products.
9	*"on a weekly basis, and then they will share to the rest of the clients what they are planning to do, as a collective, to give them feedback,"* *"Learn how to present to each other, which has a huge impact on capacitating them, giving them a sense of confidence."* *"Go to Joburg to just sit around at the exhibition stand. You must have a report and talk about your client experience."*	*"We are an incubator that does not charge for its services; you can use our facilities free of charge until you make as much money as you like."*	Incubatees benefit from the TBI staff guiding and supporting the business and providing on-time feedback and learning opportunities. Access to expertise allows the incubatees to put the newly acquired skills into practice and receive feedback for continuous improvement. Given that the TBI space is resource-intensive, the ability of the TBIs to fund the services and support provided to small businesses is a benefit for financially constrained enterprises. P9: *"We are an incubator that does not charge for its services. You can use our facilities free of charge until you make as much money as you like*." This support is essential in ensuring the enterprise can establish itself and survive its early formative years, thus increasing its chances of sustainability.
10	*"quite rare that you would find an entity being able to work, an entity working all the relevant day as stakeholders; they get funding, giving funding to our students to run businesses."; "participate in competitions, inter-varsity competition."* *"able to gauge their strength against their peers in other institutions' programmes in Africa, our students became third in Africa and work with different partners."*	*"Reducing or mitigating the risk of them failing increases the probability of our entrepreneurs succeeding."*	The availability of accessible funding is considered a critical factor in supporting a new enterprise, and it is coupled with other support geared towards increasing the chances of success. The provisions of the TBI also assist incubatees, through competitions, in gauging themselves against peers. These competitions also allow incubatees to work towards the best their enterprises can offer as part of preparations.

11	*“funding that our innovators are attracting by leveraging the support .”* *“So we help them with developing their innovative product or service or offering, whatever it may be; we do these two streams or activities concurrently.”*	*"Not all prototypes are going to cost in the region of twenty thousand rands. They are going to cost somehow significantly more"; "can only fund up to a certain amount"; "tech space, some of the prototype development fees are actually coming at substantially more than that."* *"capacity constraints, funding being one,"* *"specifically where the needs are more specialised and technical in nature."* *“No one-size-fits-all solution.”*	TBIs also assist incubatees with resources, including funding for the technology they work with or intend to exploit. The support targets innovative products, services, or offerings that incubatees are engaged in as a business or establishment. The cost issue is also handled through the TBI under the applicable capacity constraints of the TBI, with funding highlighted as a factor for highly specialised or highly technical projects.
12	*"budget for this for the protection of intellectual property on behalf of their incubatees."* *“assist the business towards the logical conclusion, the logical coming of age of the idea.”* *“assist an entrepreneur, be it academic, be it a student, to a point where the idea is good enough.”*	*“supposed to buy business equipment,”*	The participant also noted the benefit of successfully concluding the ideation process and acknowledged that the incubatee would have had to invest in equipment.
13	*"In the spin-off that the university creates according to the policy, they do have a certain percentage."* *"motivate them into business and focus on entrepreneurship rather than only on teaching and learning."* *“researchers or academics, mostly they need to be equipped with the business side of things, focusing on teaching and learning, the mindset of maybe trying to think that we want them to file a patent before they publish.”*	*"quite difficult to enter in that particular stream when you are trying to commercialise your technology."* *“small, medium, and technological-based enterprises, which I would say are privately owned, do show support in terms of having to commercialise and do not want to be associated with a high-risk.”* *“once you file a patent for them, they shift their focus, keep on publishing, and do not participate in commercialising or business*	The university-based TBIs also levy a percentage of the spin-off revenue in accordance with the applicable policies. The participant further notes the challenge of university researchers needing support to sustain the business while engaged in teaching and learning activities. Commercialisation is expensive and requires expertise that the TBI may also outsource.

	“related to the technologies developed by the academics and researchers.”	*development. Have a patent that is costing the university thousands.”* *"costs associated with IP protection and the specialised kind of advice."* *"office goes to the extent of working or outsourcing external expertise."* *“other issues are complicated* *"If the technical aspect of the* *expert is not there, then the patent is kind of useless to the university."* *"novel technology that will have an impact, at least we protect it."* *"participate in assisting the office in commercialising your technology."* *"an invention but in terms of the technical skills required to have a functional prototype, we then need to work with an industry partner who also plays an important role in terms of the materials that are going to be used in that particular production."* *"As a university alone, it will be very difficult for us to be involved in the technology process."*	Universities also face the challenge of hoarding patents that are a financial burden to maintain.

Source: Researcher’s creation

7.6.1 The Benefits of being an incubatee compared to those not in the programme.

7.6.1.1 Holistic support for sustainable small business development

The TBIs are mainly focused on technology-based businesses, as noted in Theme 2; however, the quality of technology alone cannot sustain a small business unless it is coupled with business development support (P1: *"doesn't matter if you have a product that is out of this world, a business cannot only run based on your technological abilities, also need other soft skills "*). The provisions of the TBIs benefit incubatees through its all-inclusive approach to small business development, which involves a holistic services package (P1: *All kinds of support that the business needs are encompassed into one package, giving holistic support to our incubatees";* P6: *both technology development and business support to entrepreneur";* P11: *So we help them with developing their innovative product or service or offering whatever it may be, we do these two streams or activities concurrently*).

The TBIs assist in improving the success rate of early-stage SMMEs, a need that has been highlighted by previous researchers who have reported on high failure rates amongst SMMES, as indicated in Chapter 1 of this study, (P2: *"SMEs and cooperatives that start operating never finish a year, never go beyond a year;* P2: *So with this program, we notice that almost all the incubatees, their businesses operate right through we lay a good foundation for their success."*).

Incubatees in the TBIs, like all other incubators, have the added benefit of possible interactions with other small businesses who are also incubatees of the programme (P4: *"being able to network with other small businesses"*). The TBIs further develop business-inclined individual qualities in an incubatee through promoting engagements with other incubatees so that they can develop plans and commit to a plan of action while benefitting from feedback from their peers (P9: *"on a weekly basis and then they will share to the rest of the clients, what they are planning to do, as a collective to give them feedback"),* which is an advantage from the small business that is working individually. TBI incubatees develop the essential presentation skills that are crucial for

business development and growth (P9: "*learn how to present to each other, "which has a huge impact on capacitating them and giving them a sense of confidence"*).

The interventions of the TBIs in KZN are geared towards ensuring sustainability, thus improving the chances of the survival of small businesses (P3: "Whatever they are doing in that program, *it should be engagement that will lead to them being self-sustainable"*). The TBIs focus on technology-based businesses, and the technology is developed by researchers, students and academics who are not well equipped in terms of business skills, thus necessitating that they require support in managing businesses as well as in the development of technologies (P13: *"relate to the technologies developed by the academics and researchers"; "researchers or academics mostly they are not really equipped with the business side of things, focusing and teaching and learning, mindset of maybe trying to think that we want them to file a patent before they publish"*). There is a need to develop a sustainable business model that will guarantee that the product enters the new markets, grows and leads to a sustainable business (P7: *"become more able to develop sustainable business models"*).

7.6.1.2 Subsidised services

The participants also noted the challenge related to the cost of engaging in technology-based enterprises or businesses that rely heavily on technology for their operations. The incubatees encounter the high cost of introducing novel ideas into the economy (P8: *"It has become so expensive to come up with a new idea in the country where we are"*). Technology-intensive projects require added resources, including finances, and among the TBI networks are potential funders and investors who can assist the incubatee with the necessary financial injection to introduce the project to the markets (P6: *networks of other funders, the incubator would have access to multiple funders or multiple opportunities for resource funding or multiple opportunities to engage other stakeholders"*; P11: "*funding that our innovators are attracting by leveraging the support"*).

Small businesses venturing into the high-tech space need financial injections to develop, grow, and sustain their ideas, products, or projects while ensuring that the

required quality is adhered to and that sufficient quantities will be available at an affordable rate in the market (P8: "*need funders to produce it cheaper and even at a rate where it would be affordable to any other person";* "*produce similar products and no compromise on that quality"*). This aspect of support is critical considering the increase in imports that compete with locally manufactured products (P8:*" "space that businesses find themselves in, it has to compete with so much foreign readymade products"*). Realising a prototype is regarded as one of the most costly activities (P11: *"Not all prototypes are going to cost in the region of twenty thousand rand. They are going to cost somehow significantly more"*).

Small businesses also need access to internet connectivity (P7 *"equitable access to internet connectivity"*) in a safe environment that offers security (P7 *"work from a safe and a secure environment"*) and is ideal for business and professional engagements (P7*"opportunity to work from a space that is conducive and that's recognised as a professional"*). Ordinarily, this kind of environment will cost the small business. However, the TBIs provide this service free of charge or (P7 *"engage with a consultant you'd be paying lots of money for it, all of that is free, these are all free services";* P9: *"we are an incubator that does not charge for its services, can use our facilities free of charge until you make as much money as you like"*). Access to office or workplace resources is another benefit that incubatees enjoy such that their resources are focused on developing businesses (P7 *"don't have any other like, you know, worries as such, commitments"*), and they pay minimal fees for these rentals ;(P7 *"formal working environment, service that we charge them is a very tiny rental for the office space"*). The TBIs in university also assist resource-constrained students with funding to develop and grow their small businesses (P10: *they get funding, giving funding to our students to run businesses"*). The issue of support with the resources necessary for the incubatee is one of the advantages of TBIs, as incubatees have access to financial resources that are included within a package of support services; however, it is worth noting that some incubators do not charge for services (P9: *we are an incubator that does not charge for its services, can use our facilities free of charge until you make as much money as you like*); while others do expect incubatees to contribute (P2: *incubation programs operate; differently, they follow certain different models Others even charge incubatees;* P2: "*by so doing they attract a smaller number of people that they would have possibly been able to incubate."*).

7.6.1.3 Access to expertise, knowledge and best practices

The incubatees in the TBIs in KZN have the benefit of engaging with experts in their fields of interest who can provide knowledge on best practices in the sector; outside of the TBIs, they would have had to pay for these (P4: "*Access to the expert knowledge, best practices, industry experience and need to reach the larger communities in order to benefit all";* P6: *technical know-how"*; P6: *"access to other expertise's that ordinarily or in any other set-up would not have been possible"*). Access to expertise and knowledge producers is also essential to supporting technology-focused start-ups, given that some businesses require specialised interventions that cannot be provided through generic support (P11: *"no one size fits all solution*"). Therefore, the availability of expert knowledge support also enhances the innovation abilities of the incubatees by complementing the knowledge available within the small business as well as knowledge limitations even within the TBIs (P8: "*Utilising the knowledge that one has, but linking it up with the new technologies"*; P13: *"other issues are kind of complicated "if the technical aspect of the expert is not there, then the patent is kind of useless to the university."*). Hence, part of the commercialisation costs is acquiring the necessary expertise to provide advice (P13: *"cost associated with IP protection and the specialised kind of advice, the office goes to the extent of working or outsourcing external expertise"*). This support promotes innovation and entrenches a positive attitude towards innovative advancements (P8: "*The impact it has made me think in the minds of so many it has made them realise that more can still be done in the innovative space*"*).* TBIs further support and promote innovations through policies that allow for compensation of researchers, students and academics for projects that have been successfully commercialised (P13: *"in the spin-off that the university creates according to the policy, they do have a certain percentage "motivate them into business and focus onto entrepreneurship rather that only on teaching and learning."*).

7.6.1.4 Access to TBI networks

The small businesses that work on their own can only rely on their networks; however, the incubatees in the TBIs also have the benefit of accessing the TBI networks, thereby expanding its networks that can be essential post the incubation process (P6: *part of a*

network of other incubators, research institutes"; "allows for access to, also networks of other incubators). These networks assist the incubatees in accessing support from multiple institutions (P8:*" where you don't have support from different institutions".*). The ability to attract these networks is rare amongst small businesses (P10: *"quite rare that you would find an entity being able to work, an entity working with all the relevant stakeholders"*). Networks are also crucial for TBIs as individual institutions can sustain support high-tech alone (P13: "*As a university alone, it will be very difficult for us to kind of be involved in the technology process"*).

7.6.1.5 Access to national and international expertise and markets

The TBI's national and international partnerships also influence the expertise provided by the TBIs, and the collective knowledge and expertise benefit the incubator (P6: *"access to not just local but national and sometimes an international aspect in certain fields"*). The TBIs are also instrumental in affording the incubatees with opportunities to undertake business trips to overseas events where they can market their products and develop new international markets and networks (P7: *"go on overseas missions to participate in local and in overseas missions"*). This support is critical as the success of the technology business cannot be confined within the province, and there is a need to reach national and international markets (P6: *SMMEs to have access to other high-tech infrastructure or skills beyond just KZN"*).

7.6.1.6 Discussion and Conclusions: Benefits of being an incubatee compared to those not in the programme.

The incubatees of the TBIs have access to numerous benefits compared to those that are not participating in any TBI programme. These benefits range from access to expertise, commercialisation support, subsidised services, and access to networks and markets. The small businesses outside the TBI will have to use their finances to access these services. The TBI incubatees can receive holistic support considering their technology and business development needs to develop their innovative products or services. These business and technological support streams are provided concurrently to meet the overall needs of the small business. The experiences of the participants

relate to the fact that technology alone is insufficient to develop technology-focused small businesses. TBIs increase the success rate of early-stage entrepreneurs. The TBI environment also assists the incubatees in developing their skills through engagement with other incubatees and TBI's stakeholders. Through their funding matrices, the TBIs can provide subsidised services to incubatees, thus reducing the financial burden on their small businesses.

The support ranges from product development to samples for marketing the new product. Some university-based TBIs provide access to funding to attract students with high-value technological business ideas. The small businesses incubated by the TBIs need more resources to employ the expert human resources necessary to develop the technology and drive the business to success. Therefore, The TBI staff complement the incubatees' competency and assists them in developing technologies and steering their businesses towards success. The knowledge available to the incubatees also extends to that housed by the TBI. This resource then assists in driving the business to success.

The following sub-theme concerns the benefits designed for small businesses, which are premised on highly scientific and technological ideas.

7.6.2 TBI interventions for highly/intensive scientific technologies

This section focuses on the TBI support that promotes high-tech or highly scientific technologies incubated within these programmes.

7.6.2.1 Development, refinement and commercialisation of technological solutions

The TBIs are instrumental in assisting incubatees in keeping abreast with the latest developments in the technology space as the incubatees of these programmes are generally based on new SMMEs built upon technological ideas, projects or research (P5: *"a lot of our incubatees are start-up technology orientated businesses";* P2: *"constantly studying the developments inside the country as well as outside the country, Africa).* The incubatees further benefit from the TBIs by developing and refining their

ideas based on acquired knowledge or research until the product is fully commercialised (P5: *what you can have a brilliant idea, but if you haven't done the research in the market to see if there is a demand for it. Then obviously, this is a product and is going to be sitting on the shelf, or it is an idea that is going to be sitting in a library it is not going to be commercialised; student businesses tend to be start-ups, not generating a large amount of income;* P12: "*assist an entrepreneur, be it academic, be it a student to a point where the idea is good enough"*).

Developing novel ideas for the commercialisation stage is challenging for small businesses (P13: *"quite difficult to enter in that particular stream when you're trying to commercialise your technology"*). Some of these challenges emanate from the resource intensity of commercialisation, and small businesses rely on the TBIs. The funding support provided by the TBIs begins with ensuring sufficient financial resources for incubatees to protect their intellectual property (P12: *"budget for this for protection of intellectual property on behalf of their incubatees")*. The TBIs assist the incubatees in evaluating the potential impact of the new technologies, and the ability to conduct such assessments is absent among small businesses (P13: *"novel technology that will have an impact, at least we protect it"; "participate in assisting the office to commercialise your technology"*).

The services provided by the TBIs in KwaZulu-Natal include supporting spin-off companies emerging from research conducted by researchers, staff, and students of the universities (P6: *"clients either developing product and processes up to a commercial phase";* P5: *are spin-off companies that we are supporting, they were started by staff within the faculties, and they have come up with creative ideas, things, and products"*). The complexity and financial burden of developing new technologies can also be alleviated by partnering with national and international companies (P6: *"clients who are currently pursuing collaboration with international partners"*; P11: *"can only fund up to a certain amount"; "tech space, some of the prototype development fees are actually coming at substantially more"*).

Through their links with universities, the TBIs also provide for possible interactions with institutions outside of the province of KwaZulu-Natal through their participation in national projects like DHET's Entrepreneurship Development in Higher Education (P5:

research and development of our relationship with EDHE, links with all the other universities). Personal development and confidence enable young entrepreneurs in university-based TBIs to compete with their peers nationally and globally (P10: *"participate in competitions, inter-varsity competition"*, *"able to gauge their strength against their peers in other institutions programme in Africa"*).

The collective efforts of the TBIs promote innovation in KwaZulu-Natal through the products, services, and industries that they support (P11: *funding that our innovators are attracting by leveraging the support. So we help them develop their innovative product or service or offering, whatever it may be*). Hence, TBIs also contribute to the government's drive to convert research outputs to tangible products with commercial value, as they translate research into a desirable product for the market.

7.6.2.2 Access to technological infrastructure

The incubatees who are starting businesses need facilities to initiate their production. The TBIs in KZN provide these specialised services as support to these small businesses (P1: "*facility that is also up to the standard our role in the entire ecosystem is technologically providing them with a space that they can use to create their manufacturing facilities*"; P2: "*we realised that there was a greater need other than the provision of technology, or technological skills to these individuals and SMEs and cooperatives"*). These interventions are especially critical in instances where technology is the key in the small business that is being supported by the TBI (P11: *"capacity constraints, funding being one"; "specifically where the needs are more specialised and technical in nature*). The TBIs are instrumental in providing a business environment that supports high-tech start-up companies.

Small businesses, irrespective of the industrial sector the incubatee is active in, require digitally-enabled equipment to grow their enterprises (P7: *"Equipment that can be, you know, that can assist SMMEs to grow better software, better equipment, equipment that is digitally enabled. Any sector that you are looking at, whether it be in IT, whether it be in manufacturing"; P12: "supposed to buy business equipment"*). These needs are even more prominent for the province of KwaZulu-Natal, where there is a reported lack of

essential digital skills (P7: *"KwaZulu Natal it's obvious that there's a serious lack of digital skills"*; *"Everyone is using technologies and the technology is using the internet, using the laptop, using a smartphone"*). The ICT needs of the incubatees can include essential equipment such as laptops and fundamental services such as access to data (P7: *"access to a laptop, access to data"*).

The incubatees have access to technological infrastructure during incubation (P3: "*in that three-year program, they were dependent on the incubator's infrastructure equipment";* P6: *"enable them to develop their processes using government-funded infrastructure";*). Given those information and communication technologies (ICT) drive business in the current industrial revolution, the incubatees need access to digital infrastructure, technologies and experts to conduct their businesses, and the TBIs provide them with access to these essentials (P7: *"The challenges of the ICT part are felt keenly because of the lack of training"; "lack of resources, "lack of skilled, you know, skilled mentorship training programmes in the ICT"*).

Resource constraints are one of the significant challenges for small businesses in technology-focused enterprises (P7: "bigger challenges then also with technology-based, it's the access to resources"; P11: *not all prototypes are going to cost in the region of twenty thousand rands. They are going to cost somehow significantly more"*). The cost associated with high technology business is considered high risk by small businesses; hence the reluctance to engage in this space, and TBIs make these engagements possible (P13: *"small, medium enterprise, a technological-based enterprise which I would say they are privately owned, they do show support in terms of having to commercialise don't want to be associated with a high risk"*) The incubatees also have the further benefits of exposure to the funding instruments that specifically target technology-focused small businesses, and without this support and possible grant funding, some of these SMMEs would not succeed (P3: "*there are grants available for the SMMEs, which is good because it is a small business, and you want to see this business prosper in the market"*).

7.6.2.3 Aligning new technologies to industry needs

As the industry evolves, as observed through migration within the various industrial revolutions from the first to the fourth, small businesses need to understand and keep pace with these developments (P6: "*Industry is evolving"*). It is, therefore, essential for innovators and SMMEs in the high technology space to understand industry requirements and also be proactive in terms of developing and introducing new products into the market (P6: *"innovators or SMMEs, understand or appreciate what the industry appetite could be."*). The TBIs ' work with industry organisations provides another information avenue for incubatees as they benefit from understanding trending technologies and technology gaps (P6: *"industry organisations, understand their needs"; "address, some of the industry needs.*). These engagements and knowledge acquisition assist the incubatees in ensuring that the resulting product and service are aligned to the needs of the industry (P6: "*support or the product that are being developed are aligned toward the industry")*. The TBI assists incubatees by establishing network development, thus facilitating introductions of small businesses to the industry organisations, suppliers, and other relevant industry stakeholders (P6: *introducing SMMEs' suppliers or some of the service providers, connecting such industry players with SMMEs*"). industry is also a necessary enabler for commercialisation of novel; technologies and inventions, through their facilities, materials, and knowledge base (P13: *"an invention but in terms of the technical skills required to have a functional prototype, we then need to work with an industry partner who also plays an important role in terms of the materials that are going to be used in that particular production."*).

Technology-intensive projects, ideas or research outputs require space resilient enough to take to the markets (P6: *"How to navigate the most complex scientific space"*). The TBIs provide the added value of assisting in identifying possible solutions (P6: *"assists in fast-tracking the process of either confirming a product or a process or changing course";* P12: "*assist the business towards the logical conclusion, logical coming of age of the idea"*). The impact of the TBI support for the incubatee is accelerating the process from an idea to a fully functional product (P6: *"resources that can guide, the journey towards a successful outcome is shortened, hastened because there is guidance"*). This further enhances the probability of small business success (P10: *"reducing or mitigating the risk of them failing, increase the probability of our entrepreneurs succeeding"*).

7.6.3 Discussions and Conclusions: Theme 3-Uniqueness of TBIs

This section presents a discussion and conclusion on Theme 3

7.6.3.1 Discussion

Developing new technologies and commercialisation is costly, and the incubatees benefit from the subsidies provided by the TBI. The financial requirements of innovative and/or high-growth enterprises are, therefore, significantly higher than those of general entrepreneurs (Anwana & Anwana, 2020:6). Incubatees need financial support during the technology development stage to produce sufficient quantities to introduce the products into the markets or test new services. The TBI support commences with IP protection and subsequent milestones towards the market readiness level. The production of the new product should also comply with quality standards, and the TBI facilities ensure that the final product is ready to compete with existing products, including imports.

Some TBIs so provide funding for emerging entities to develop their entities, especially for university students who possess innovative ideas and need a platform to nurture new technologies. These efforts cannot be sustained without active engagements and collaborations with local and provincial governments. The KZN provincial government, as it is essential for governments of developing regions, should enhance its role of facilitating access to finance through policies and regulations that support high-technology enterprises and promote funding for innovation (Lukhele & Soumonni, 2021:).

The TBI networks of partners and stakeholders are also critical in providing the knowledge and skills if there are areas for improvement within the specific TBI. These networks include local and international stakeholders who also assist during the incubatee's commercialisation journey. Local stakeholders incorporate universities whose involvement also assists in further reducing the cost of the undertaking and, through their experts, complement TBI staff. This support may include the TBI hiring

students, academics, researchers, and consultants to refine innovations and facilitate their development into market-ready products (Ngubane & van der Merwe, 2023:102).

7.6.3.2 Conclusion

One key benefit of the TBIs is financial support through subsidised services. The subsidies cover the technology development and pilot production in preparation for market entry. Entering markets requires a novel product to compete in quality and quantity. Access to manufacturing space with formal facilities and internet connectivity also alleviates the financial burden on the incubatee. The TBI networks are critical in their ability to provide overall support at reduced costs, and these stakeholders include local and international partners. Universities are one of the essential stakeholders for the commercialisation of new technologies.

7.6.3.3 Alignment with the Primary Aim and Secondary Objectives of the Study

The findings revealed that TBIs provide holistic support to incubatees. They seek to develop and nurture novel technologies from the ideation stage to a fully-fledged product or service available on the market. The uniqueness of TBI’s processes and operations benefits incubatees, thus supporting the creation of growing and sustainable small businesses in the province. These are the unique benefits of incubatees who are developing small technology-focused businesses.

The following section focuses on the theme that addresses TBIs' challenges in KwaZulu-Natal.

7.7 THEME 4 CHALLENGES

This theme concerns challenges within the TBIs, classified as those related to incubatees and those about the funding of the TBI itself. One hundred and four codes were recognised in this theme, with P5 and P11 contributing significantly. This code generated two sub-themes presented as follows:

Challenges:

- Incubatee
- TBI

Table 7.13 presents the Challenges' sub-themes and categories.

Table 7. 13: Sub-themes and categories

Theme	Sub-themes	Categories
Challenges	Incubatee Challenges	• Financial Constraints • Limited access to TBI services/ TBI programmes limitations • Limited Incubatees' skill set to support technology-based enterprises • Rural and Township Challenges • Lack of synergies between the TBIs
	TBI Challenges	• Resources Constraints • Disbursement of grant funding from the government • Employment vs Technological improvements and innovation • Insufficient Partnerships to Fund Incubatees • Inadequate promotion or focus on entrepreneurship and technological innovation in KZN • COVID-19 and July 2021 unrest

Source: Researcher's creation

The findings revealed that the technology incubation space in KwaZulu-Natal is marred with challenges affecting incubatees and the TBI. The main challenges are directly linked to the limited resources necessary to develop, nurture, and graduate successful technology-focused enterprises. Table 7.14 presents the supporting data.

Table 7. 14: Theme 4: Challenges

	Incubatee Challenges	TBI Challenges	Summary of Findings for Individual Participant
1	*“various support and assistance incubators work in silos; no synergy in the service offering.”* *"hops from this incubator to another, but there is no improvement, no value added in, resources have been used in a wasteful manner.";*	*“government funding.” "resources are somewhat of a hindrance, and the unit can only go as far as it can currently."* *"ensure that incubators have enough funding to run for a certain cycle"; “So if the cycle is five years, you give that incubator enough funding to run for that entire cycle.”* *“If these incubators can have enough funding on an annual basis, just ensure that the incubator is fully funded at the beginning of the year so that they can deliver on whatever mandate."* *"most of the time, you find that incubators are running, but they are not fully operational, be it issues of funding, be it issues of some contracting documents that are not signed."*	There is variety in service offerings for different incubators, coupled with operating in silos, resulting in incubatees hopping from one incubator to another without fully benefitting from the engagements. This scenario is one of the concerns as it implies efficient use of insufficient resources. The second challenge relates to overreliance on government funding for the TBIs. The associated challenge is that the funding itself needs to be increased for the incubator. Government funding also has other difficulties of access and administration shortcomings, resulting in funding failing to reach TBIs on time.
2	*“Incubation programs operate differently; they follow certain different models.”*	*“that is able to source funding outside, making the incubatees pay for services received.”* *“DTI, Ithala, and many more government funders.”* *“Others even charge incubatees by so doing they attract a smaller number of people that they would have possibly been able to incubate”.*	There needs to be more consistency or conformity in terms of incubator operations. To address the funding challenges, TBIs must charge incubatees for services rendered.
3	*"SMMEs do not have money to pay the auditing firms."*	*“funded by various government institutions to invest in the technology.”* *"The Fourth Industrial Revolution”* *“be on par with the current market."* *"keep up with the current trends to invest in the technology."*	Incubatees have limited financial resources. Government institutions fund TBIs through three—or five-year contracts to stay on the cutting edge of technology and keep up with global standards. The challenge is that TBIS are unable to generate profits.

		“three-year contract or a five-year contract, for the first three years you are funded the same amount. Limited on being funded.” *“cannot generate your profit; forever funded.”*	
4	*"KZN is predominantly rural.”* *“In rural areas, there are technological challenges.”* *“issues of access to technology in the rural areas, and a lack of information because of where they are placed."*	*“government funding”*	The rurality of KZN and the corresponding lack of infrastructure, inaccessible technology, and information scarcity are cited as the challenges facing incubatees. Government funding is a challenge for TBIS.
5	*“The biggest challenge was really during Covid.” “The unrest.”* *“If something comes up, we look for a way to find a way around it.”* *“There was no structured program”,* *“We do not give finance, but we link our businesses to other financial institutions, connect them to other grants and funding opportunities, encourage them to apply, and then support them in their applications.”* *“Partnerships are key; can’t operate in a vacuum”; “partnered with most of the banks, SEFA, that is for funding”* *“Commercialising is another thing, very good at developing things, do not have the skills in terms of marketing, do not understand where the markets are, how to actually take it to markets. The biggest challenge is doing market research on who you will be selling to and what the demand is.”* *“We developed this product. However, the challenge is to get it commercialised.”*	*“Some people say funding is a big challenge. No, we do not have much funding.”* *“weren’t getting the people coming out in terms of the numbers for the workshops”*	Funding is a challenge as it is considered insufficient. However, T s have experienced the most significant funding challenge during COVID-19, when funds were diverted to address the urgent matters of the pandemic and the KZN unrest in 2021. There are also concerns about programmes that need more structure and achieve the targeted objectives. TBIs do not directly inject funding into incubatees but rather assist them in securing grants from financiers. Hence, partnerships with financiers are considered necessary. Commercialisation is the biggest challenge and requires clarity on the identified target market. Therefore, market research is regarded as a critical factor in successful commercialisation.
6	*“Our academic system does not encourage students or researchers to take ideas that have developed as an academic project or an*	*“focused approach, invest in these skills, skills for the future, may not get the rewards soon, but ultimately, it will bear fruits.”*	One of the challenges relating to incubatees is the academic system's failure to commercialise knowledge. The participant cited a need for a more

	academic pursuit towards realising commercial activities"; *"We don't have enough, especially that focus on technical incubation focus approach, rather than a piecemeal approach, which does seem to be a challenge at this stage."*		conscious focus on technical aspects and the adoption of fragmentary intervention. The participant advocates for focused investment in sectors identified for the future and developing relevant skills to meet future needs. However, caution is advised that these investments will require a long-term commitment. The benefits of these long-term investments include new economies, diversification of the fiscus, and an increased tax base for the government.
7	*"pre-COVID the economy behaved very differently, and post-COVID, it is different, not enough of those jobs going around. The economy is quite flat; there was the looting, and there was the flooding in KZN, so all of that has impacted economic output."* *"So you have to be very mindful of the economy and realistic."* *"Work as virtuals, but we still support them."*	*"government funding doesn't come in like with Covid; many incubators lost funding because the money went into the Covid fund."*	The incubatees are still facing post-COVID-19 challenges, exacerbated by the July 2021 looting in the province of KwaZulu-Natal. However, the TBIs also did not spare the COVID-19-related challenges as the government, the primary funder for the TBIs, diverted funding to ensure the country could survive the pandemic.
8	*"Students who come out of the university find a good space to implement the ideas,"* *"challenges that I find quite strong are the connection between our education system and the industry."* *"When we talk about technology institutions or even technology in businesses. For some, it would mean a reduction of employees."* *"It would require a skilled person.*	*"challenge to look at technology or even innovation and also look at employment."* *"it affects the functionality that we have when we are forced to provide how we are improving employment, yet we are in the technology space";* *"cannot necessarily overlook the downside of improving business through technology or innovation."*	Incubatees expect the TBI to be an ideal space for creativity despite the challenge of the disconnect between academics and industry. The notion of technology reducing jobs or requiring skills that are not in abundance is also a challenge for TBIs. This dilemma shall also emerge in the expectation of TBIs to increase employment among their crucial performance areas, which becomes the downside of technology and innovation in the context of the province and SA.
9	*"During the lockdown, he was one of the companies affected. he has kick-started his business, got back on his feet, and things are picking up again, so he is looking good, but without all those systems in place, he would have never been able to recover."* *"too much of an overlap between us and the different incubators need to be a transparent*	*"Competing for the same funds is diluting our energy, and that's not helping us to become focused."* *" farming is not our strength; where do they go?"*	The lockdown impact on TBI incubatees was softened by the TBI ecosystem, which assisted enterprises in bouncing back. Incubatees also need help with a limited industry focus on TBIs and the unavailability of TBIs in other sectors, despite the opportunities that are evident based on the province's geography of KwaZulu-Natal.

	standard model of what the incubation should be." *"We don't have a facility here where we can support the incubatee on site. If we had a softer landing place, it would be easier."* *"no incubator for the maritime sector, maritime province, Durban, Richards Bay and even potentially other small little towns that are along the coast."* *"When incubatees have come to our centre, we used to plummet them with an extension of their academic work."* *"a lot of overlap, a lot of confusion for the clients in particular in terms of being clear on what service each one of us provides"* *"we don't have a centre in Pietermaritzburg."* *"have limited focus and a limited funder, and the funder is unable also to create the impetus for the separation for the mutual benefit or the mutual benefit of the entire province".*		
10	*"still a lot of silos. Up to 80% of all start-ups fail in their first three or five, three to five years.". "Funding is not really a critical factor, but it's an enabler."*	*"Provide funding to students who are not yet in business; that is the biggest benefit."*	The challenge of TBIs operating in silos is critical for incubatees, especially given the high failure rates and hence the need for nurturing during the early years of their formation. The ability of the TBIs to finance some of the activities of the incubatees remains an advantage.
11	*"Our support is limited",* *"A lot of these programs are generic." "Institutions or organisations themselves are not flexible enough to adapt their programs and customise them according to the needs of the participants."* *"There are capacity constraints at these incubators, and it isn't easy to be able to customise every time you get a new cohort."*	*"capacity constraints, funding being one, funding constraints."* *"can only fund up to a certain amount."* *"tech space, some of the prototype development fees are actually coming at substantially more than what we are budgeting for"* *"every project and program that we run, we run with a partner or multiple partners" "someone that can advise on finances."*	The TBI support needs to provide complete coverage of the incubatee needs due to capacity constraints, lack of flexibility, generic programme offerings that are difficult to customise, and the inability of the TBIs to collaborate and focus on streams dictated by available resources. Incubatees end up tapping into various TBI programmes at the same time, which is also facilitated by the TBIS' inability to engage and communicate. The capacity constraint for TBIs is funding, which is exacerbated by the increasing costs of prototype development.

	" A lot of location incubators do not necessarily speak or engage with each other as they should; a lot of beneficiaries tapping into multiple programs deliver the same or very similar results; one innovator, benefitting from at least two different programs."	*"We are always able to secure funding, budgets are not significant, funding for additional support."*	This limitation implies that while TBIs support innovation through activities like prototype development, the associated costs are only sometimes available.
12	*"incubators need to be run in such a way that they attract money; people want to come and put their money in those incubators, rather, (lack of resources), and also technical resources"*	*"tend to be funded by the government; a huge reliance on government funding."* *"the public sector to leverage one funding, leverage an inclusion of the private sector to the governance of the incubator."*	The incubatees face financial constraints and rely on TBIs to provide funding to bridge the gap in their operations. Therefore, the necessary technical resources become available to the incubatees with funding support from the TBIs. Therefore, TBI must identify non-governmental funding support to supplement the government grants. The participants also vouch for the private sector's involvement in the governance of TBIs, which can benefit the programme through funding injections.
13	*"assist most of our researchers in terms of securing funding that will assist them in technology or furthering their technological development."* *"ensuring that our academics basically understand, or they are aware of, they are aware that they need to disclose to us basically." "access to market, tough to take your product and make it into the market businesses being stunned with few products and not be able to do mass production and basically meet the demand of their customers."* *"quite difficult to enter in that particular stream when you're trying to commercialise your technology"* *"Small, medium enterprise, the technological-based enterprise which I would say are privately owned, they do show support in terms of having to commercialise"licencing your technology."*	*"funding, access of funds, that is also a major challenge."*	Incubatees also need assistance with securing funding for their technological advancement. University-based TBIs also need help convincing academic researchers to commercialise their technologies. Being unable to take innovations through the entire commercialisation value chain results in incubatees with products that cannot be mass-produced or generated in large quantities to impact the market. Licensing also presents challenges for incubatees as it needs to be done in a way that will realise revenue for the innovator. These issues are further complicated by the limited funding available to the TBIs.

Source: Researcher's creation

Incubatee

Incubatees of technology business incubators in KwaZulu-Natal are also prone to typical small business challenges. These challenges result in early fatalities among small businesses (P10: *up to 80% of all start-ups fail in their first three or five, between three to five years").* The TBIs are among the instruments designed to address these challenges in the case of TBIs, as well as the technology and business incubation of small businesses. This section only focuses on those small business challenges the TBIs are designed to address. The first challenge concerns incubatees lacking sufficient financial resources to develop and sustain their technology-focused small businesses.

7.7.1 Financial constraints

TBI incubatees, like other small businesses, endure resource limitations, and the key to these is funding (P3: *"SMMEs they do not have money"*). Funding is essential for small businesses to develop, grow, and eventually become sustainable, thus making it an enabler to success (P10: *Funding is not really a critical factor, but it's an enabler"*). The technology business incubators, as the programmes focusing on providing holistic development of incubatees depicted in Theme 2) through business and technological support, require finances to support technology development (P13: *"Assist most of our researchers in terms of securing funding that will assist them in technology or furthering their technological development").* The TBIs refer the incubatees to organisations that fund small businesses (P5: *"We don't give finance, but we link our businesses to other financial institutions"*). Hence, the benefit for the incubatees relates to having access to the information on grant and funding opportunities, as well as assistance with formulating applications to enhance the chances of success (P5: "*We also link them out to other different grants and funding opportunities and encourage them to apply and then we support them in the applications*")*.*

7.7.2 Limited access to TBI services/ TBI programmes limitations

Incubatees, small business innovators or entrepreneurs need a platform to nurture their innovations until they are ready for the markets (P9: "*If we had a softer landing place, it would be easier"*). These incubatees of the TBIs approach these technology and business support programmes to access resources that may be physical (equipment and facilities) or human (experts); however, some TBIs are not sufficiently resourced to meet these needs (P9: *"don't have a facility here where we can support the incubatee on-site" for their incubatees),* These platforms are also essential for providing the incubatees with space, time and resources to assess the viability of the innovations (P9: the *which allows them sufficient time for trials in sustaining their innovations)*. Emerging innovators can only fully participate in the high-technology space with this support. However, the TBIs themselves experience financial challenges, which renders them unable to support the incubatees. In responding to these challenges comprehensively, they provide generic programmes. The generic interventions of the TBIs are not always ready to give the support specific to the incubatee's needs (P9: *"When incubatees have come to our centre, we used to plummet them with an extension of their academic work"*). Among the reasons for the TBIS's failure to provide tailored interventions for the incubatees are those relating to limited capacities. This challenge can also be alleviated through collaborations (P11: *There are capacity constraints at these incubators, and it is difficult to be able to customise every time you get a new cohort"*). Collaborations can assist TBIs with shifting mandates or industry sectors that the government dictates through funding instruments. The TBIs also face challenges based on the shifting industrial focus imposed on these programmes through funding, rendering them unable to deliver on the incubatees due to limited knowledge, expertise, or facilities (P9: *"farming is not our strength; where do they go"*).

7.7.3 Limited Incubatees' skill set to support technology-based enterprises

Incubatees need several skills to steer their small businesses to success and sustainability. Small businesses that are active or emerging in technology-focused sectors seem to be struggling with commercialising their products (P5: *But the challenge is not getting it commercialised*"). Commercialisation support is one of the critical

support interventions that TBIs provide to the incubatees. Commercialisation challenges imply that, on their own, incubatees will need help in taking their products to the markets and will, therefore, rely on the services provided by the TBIs. They face challenges in bringing their products from the idea stages to the fully commercial stage where they are acceptable to the targeted market (P13: *"quite difficult to enter in that particular stream when you're trying to commercialise your technology").* Hence, one of the issues of interest in approaching TBIs is having access to support with entry to specific markets. The incubatees have the capabilities to develop ideas; however, they lack skills like identifying appropriate markets for their novel products or services (P5: *very good at developing things, do not have the skills in terms of marketing, do not understand where the markets are"*). The lack of marketing and other business development skills requires the TBIs to undertake technical and business management support. When introducing new products to the markets, the incubatees must conduct market research to determine the demand for their product or services and identify the routes to entry in the targeted markets (P5: *how to actually take it to markets. The biggest challenge is doing the market research on who you are going to be selling to", "and what the demand is developed this product"*; P13: *"access to market, tough to take your product and make it into the market businesses*). The TBIs need to have sufficient funding and access to expert knowledge to deliver these services to incubatees, and the only hindrance to providing holistic support is limited resources (P11: *"Our support is limited"*). The limitations in the available resources that TBIs have access to also affect their ability to service the small businesses in rural areas and townships of KwaZulu-Natal, as these populations inherently present another set of challenges, which will be discussed.

7.7.4 Rural and Township Challenges

The rural areas of KwaZulu-Natal are characterised by limited access to technological infrastructure, which equally affects small businesses who wish to venture into the high-technology space (P4: *"KZN is predominantly rural; rural there are technological challenges; issues of access to technology in the rural areas"*). The inadequate communications infrastructure also leads to restricted access to information necessary for developing and sustaining technology-focused small businesses (P4: *lack of information because of where they are placed."*). The TBIs in KZN, therefore, tend to be

concentrated in cities with a profound absence in the rural areas and township (P9: *"we don't have a centre in Pietermaritzburg"*). The restricted funding that is only sufficient for TBIs to meet their annual targets becomes a limiting factor in the ability of these programmes to extend the benefit to the entire province (P9: *"the funder is unable also to create the impetus for the mutual benefit or the mutual benefit of the entire province"*). The TBIs also lack the necessary flexibility to adapt their programmes in line with the needs of the small businesses in the province, including the impoverished rural areas and townships (P11: *"Institutions or organisations themselves are not flexible enough to adapt their programs and customise them according to the needs of the participants."*).

The TBIs need to be sufficiently resourced to have sufficient funds to address the infrastructure challenges and further support those SMMEs that can benefit from their services. The other challenge that incubatees experience in KZN is the need for more synergies among TBIs. This challenge will be addressed in detail.

7.7.5 Lack of synergies between the TBIs

The challenge of working in silos is still prevalent among the TBIs, and it affects their ability to service incubatees (P10: *"still a lot of silos"*). There seems to be a lack of communication and engagement between the TBIs in the province of KwaZulu-Natal (P11: a *lot of duplication incubators do not necessarily speak or engage with each other as they should"*). This lack of collaboration can be attributed to these programmes' different approaches to addressing incubatee challenges. The TBIs employ various operational systems when providing services to their incubatees (P2: *incubation programs operate differently; they follow certain different models*), and others do not follow a particular structured programme (P5: *"there was no structured program"*), as they fashion their support around the needs of a specific incubatee. Hence, TBIs' support varies from programme to programme (P1: *"various support and assistance*). The TBIs seem to be focused on their programmes, and there is no consistent effort to work effectively with one another in the province (P1: *incubators work in silos").*

The lack of collaboration among TBI leads to missed opportunities for creating synergies that can be built within the programmes to benefit the incubatees that may require

access to various services (P1: *no synergy in the service offering"*). The lack of collaborations and subsequent synergies leads to incubatees joining numerous programmes within the same period, thus stretching their energies and time resources as they move between TBIs, resulting in minimal to no improvement or value-added in their small businesses and the TBIs having wasted resources in services provided (P1: *"hops from this incubator to another but there is no improvement, no value added in, resources have been used in a wasteful manner."*). The movement of incubatees between the different TBIs is a wasteful exercise for them as the time required to participate in various programmes that seek to achieve the same results could have been invested successfully in the business operations (P11: *"lot of beneficiaries tapping into multiple programs deliver the same or very similar results"*). Similarly, it presents a challenge for the incubators and government as entrepreneurs or innovators will receive the same services from two different TBIs, thus limiting the number of people accessing the available services (P11: *"one innovator, benefitting from at least two different programs"*).

There seems to be an overlap of service offerings and programmes among TBIs in KZN, partly due to the absence of the provincial model on technology business incubation(P9: *"too much of an overlap between us and the different incubators needs to be a clear standard model of what the incubation should be"*). The challenge with overlaps and lack of clearly defined operational parameters among the KZN TBIs creates confusion for the incubatees (P9: *a lot of overlap, a lot of confusion for the clients in particular in terms of being clear on what service each one of us provides"*).

The following sub-theme concerns the challenges that relate to TBIs.

7.7.6 TBI

The technology incubation programmes face numerous challenges, the most critical is related to funding (P5: *"Some people would say funding is a big challenge. No, we don't have a lot of funding";* P11: *"capacity constraints, funding being one;* (P13: *"funding, access of funds, that is also a major challenge "*). The findings of Theme 2 and Theme 3 demonstrated that TBIs require substantial investment in high-tech equipment and

facilities to provide the support necessary for incubatees in the technology-focused space. The challenge is to have sufficient resources for prototype development, as these activities are marred by many uncertainties (P11: *“tech space, some of the prototype development fees are actually coming at substantially more than what we are budgeting for”*). The limitations on the resources that the TBIs need to deliver support to incubatees will be discussed.

7.7.7 Resources constraints

The TBIs have limited resources, compelling the programme to focus on what is possible within the available funding (P1: *"Resources are somewhat of a hindrance, and the unit can only go as far as it can currently.";* P9: *“have limited focus and a limited funder”)*. Limited funding is also related to the fact that the government is the primary funder for these programmes under the mandate of investing and promoting the use of technology (P1: *government funding;* P3: *funded by various government institutions to invest in the technology”;* P4: *government funding;* P9: *competing for the same funds diluting our energy that’s not helping us to become focused”;* P12: *tend to be funded by the government*) The government financial injection to the TBIs is critical in assisting small businesses to venture into the fourth industrial revolution space and investing in generating knowledge and skills for the future (P3: *"the fourth industrial revolution”;* P6: “*focused approach, invest in these skills, skills for the future”*), compete in the global markets as peers to other countries (P3: *“be in par with the current market.")*, and keep up with the latest technological developments (P3: *"keep up with the current trends to invest in the technology"*). Having the government as the primary funding agency is an asset in driving investments towards projects geared at securing the future, and where there are no immediate rewards or return on investment(P6: *may not get the rewards soon, but ultimately, it will bear fruits”*). Resource constraints also prevent the TBIs from including all industries that need to be exploited to develop the province's economy (P9: “*no incubator for the maritime sector, maritime province, Durban, Richards Bay and even potentially other small little towns that are along the coast”*). The challenge with resources can also be linked to how funds are disbursed into these programmes, and these hindrances will be presented.

7.7.8 Disbursement of grant funding from the Government

The related challenge to limited funding is the inconsistencies in the disbursement of funds by the relevant government department, leading to delays in funding reaching the TBIs and allowing the programme to discharge its duties (P1: *ensure that the incubator is fully funded right at the beginning of the year so that it can be able to deliver on whatever mandate"*). TBIs are also facing the challenge of inflation as they are receiving set amounts over the financial years, which limits the scope of what they can do to raise more funds or generate profit, resulting in perpetual reliance on government funding (P3: *first three years you are funded the same amount. Limited on being funded can't generate your own profit, forever funded;* P11: *funding constraints'"; can only fund up to a certain amount"*).

The findings also established that the challenge with the disbursement of funding can be resolved through defining funding cycles and allocating funds for the entire cycle (P1: *"ensure that incubators have enough funding to run for a certain cycle"; "So if the cycle is five years, you give that incubator enough funding to run for that entire"*). The onus is on the government as the funding partner to ensure that the TBIs are fully funded and, therefore, able to provide the support they were designed to deliver (P1: *"If these incubators can have enough funding"; "on an annual basis, but just "most of the time you find that incubators are running but they are not fully operational*"). The delays in funding also emanate from the delays in contracting from one cycle of operation to another, as these processes can lead to delays in funding and therefore prevent TBIs from discharging their duties (P1: *be it issues of funding, be it issues of some contracting documents that are not signed*). Furthermore, TBIs need to be managed and operated in a manner that allows these entities to attract investors or gain access to other streams of revenue (P12: *incubators need to be run in such a way that they attract money"*).

The COVID-19 pandemic also negatively affected the TBIs; funds were diverted from other government programmes (P7: "*Government funding doesn't come in like with COVID; a lot of incubators lost funding because the money went into the COVID fund").* This COVID-19 challenge also exposed the risk of heavy reliance on government funding (P12: *a significant reliance on government funding"*) and the need to actively find ways to solicit funds from other institutions both in the public and private sector

(P12: *public sector to leverage one funding, leverage an inclusion of private sector to the governance of the incubator*). Hence, the TBIs need to consistently consider alternative avenues through which the funds can be directed to the TBI and its operation. The possible solutions to the funding problem are presented.

7.7.9 Employment vs technological improvements and innovation

Amongst the challenges facing TBIs in the province is attempting to respond to both technology and innovation amid employment challenges (P8: *"challenge to look at technology or even innovation and also look at employment. ")* Hence, job creation and improving technology present a challenge for TBIs (P8: "It *affects the functionality that we have when we are forced to provide how we are improving employment, yet we are in the technology space"*). It, therefore, becomes the responsibility of Managers/CEOs/directors of TBIs to ensure that the incubated small businesses can identify areas where they can provide employment opportunities for the communities.

7.7.10 Insufficient partnerships to fund incubatees

The TBIs rely on partnerships in addressing some of the challenges faced by the incubatees; among these is the initiation of relationships with financial institutions and agencies of government that provide financial support to small businesses (P5: *"Partnerships are key can't operate in a vacuum"; "partnered with most of the banks, SEFA, that's for funding"*). Partnerships are also vital in assisting incubatees to produce enough quantities to meet the demand created in the market by their new products (P13: *being stuck with few products and not being able to do mass production, and basically meet the demand of their customers*

7.7.10.1 Inadequate promotion or focus on entrepreneurship and technological innovation in KZN

The academics and researchers in the universities are at an early stage in terms of adopting the concept of developing research ideas and outcomes into commercial projects that can be introduced into the markets (P6: *"Our academic system does not*

encourage students or researchers to take ideas that have developed as an academic project or an academic pursuit towards realising commercial activities"; P8: *"challenges that I find quite strong is the connection between our education system with the industry.*). The reluctance to divulge ideas developed through research funded by public funds is also a challenge to TBIs as they are designed to assist in the improvement and, subsequently, commercialisation of these technologies (P13: *"ensuring that our academics, they basically understand or they are aware of, they are aware that they need to disclose to us basically"*)*;* which then requires staff of the TBI to actively encourage participation of the students, staff and researchers in technology development and innovation.

Technological support and incubation are currently not receiving the desired focus and attention. The lack of concerted effort to promote technological innovations presents a challenge for those SMMEs who wish to pursue projects in this field (P6: "*We do not have enough, especially that focus on technical incubation focus approach rather than a* piecemeal, *which does seem to be a challenge at this stage*"). The role and importance of TBIs surfaces as these programs provide a nurturing space for emerging innovators armed with ideas (P8: *"Students who come out of the university find the good space to implement the ideas."*). Hence, the financial support that TBIs provide to students who do not have sufficient resources and knowledge to take their ideas to the sustainable small business levels is critical for ensuring a continuous pipeline of ideas that will benefit the province (P10: *"provide funding to students who are not yet in business, biggest benefit"*). Supporting ideation is one way TBIs promote ideas' development in the commercialisation stage.

The TBIs need programmes to provide a landing space for new ideas (P9: *"don't have a facility here where we can support the incubatee on site. If we had a softer landing place, it would be easier"*). The absence of these programmes that are tailored to support innovation leads to TBIs taking incubatees through programmes that are similar to those provided by the university, and these lack benefits and positive impact for incubatees (P9: *"when incubatees have come to our centre, we used to plummet them with an extension of their academic work";* P11: *"A lot of these programs are generic"*).

Technology-focused businesses are also facing the challenge of a negative reputation associated with the notion of losing jobs or the business requiring new or unknown skills that the entrepreneur will have to master (P8*: "When we talk about technology institutions or even technology in businesses, for some, it would mean reduction of employees. "It would require a skilled person"*). It is therefore difficult for SMMEs to consider technological improvements and innovation without considering the possible effects on employment (P8: *"cannot necessarily overlook the downside of improving business through technology or innovation."*).

7.7.11 Covid19 and July 2021 unrest

There is an observable difference between the economic conditions prevalent before and after the COVID-19 pandemic (P7: *pre-Covid, the economy behaved very differently and post-Covid*). These challenges were particularly felt in KwaZulu-Natal as the province further suffered under political unrest in July 2021 and, followed by floods in April 2022 (P7: *"there was the looting, there was the flooding in KZN";* "*So all of that has impacted on economic output."*). The TBIs' incubatees are among the businesses that suffered negatively during the COVID-19 pandemic and the July 2021 unrest (P5: *"The biggest challenge was really during Covid. the unrest";* P9: *"During the lockdown, he (the incubatee) was one of the companies affected"*). The pandemic, political unrest and natural disasters also affected the supply of jobs in the province, thus placing a strain on the economy (P7: *it is different not enough of those jobs going around*"; *the economy is quite flat*). The TBIs assisted the incubatees in identifying survival strategies, with a clear understanding of the challenges in the economy and, therefore, imposing further limitations on the available financial resources from both the government and the incubatees (P5: *If something comes up, we look for a way of finding a way around it"*; P7: *"So you have got to be very mindful of the economy and be realistic; we worked virtually and we still supported them"*). TBIs have a history of actively seeking additional income to complement government funding and provide further support that may be required; however, that avenue is no longer viable (P11: "*We were always able to secure funding, but budgets are not big, for funding for additional support").*

The TBIs had a positive impact on the incubatees in the survival of COVID-19 through their interventions and support systems (P9: *he kick-started his business, got back on his feet, and things are picking up again, so he's looking good, but without all those systems in a place he would have never been able to recover"*).

7.7.12 Possible solutions to the funding challenge

TBIs in KZN levy fees from incubatees (P2: *"Others even charge incubatees")*, and this excludes those who cannot afford to pay and also renders the TBI inefficient as it ends up servicing a lesser number of incubatees *(*P2: *"by so doing they attract a smaller number of people that they would have possibly been able to incubate".* P5: *"We weren't getting the people coming out in terms of the numbers for the workshops"*). One possible solution to these funding challenges is to diversify the funding sources by approaching various government departments and entities (P2: *"able to source funding outside, making the incubatees pay for services received. DTI, Ithala, many more government funders"*). The partnership between TBIs will assist in stretching the rand (P11: *"every project and program that we run, we run with a partner or multiple partners";* (P11: *"someone that can advise on finances"*). These individuals and organisations can also invest funds into the TBI, assist it in meeting its mandate, and further drive sustainability projects (P12: *people want to come and put their money in those incubators rather;* (P12: *lack of resources), and also technical resources).* However, government funding also presents the challenge of job creation expectations being one of the areas impacted by TBIs, which cannot be guaranteed through TBI activities.

7.7.13 Discussion and conclusion: Theme 4

This section focuses on the discussion and conclusions based on Theme 4: Challenges.

7.7.14 Discussions

The findings revealed that resource limitations are at the core of the challenges faced by incubatees and TBIs. However, the lack of resources is typical of SMMEs in South Africa. Hence, they need financial support to develop and grow their businesses. The

persistent challenges of the KZN rural and small-town SMMEs bear evidence of the failure of the local economic development interventions, as noted by Bomani & Derera (2018:152). The study showed that funding that the TBIs secure goes toward developing the technology and providing the necessary business and technological skills and competencies that the incubatee will need to introduce the products to the market successfully. The findings also revealed that TBIs do not provide direct funding to incubatees but provide the services that small businesses would have paid for at no cost or with a minimal contribution. They provide financial relief to incubatees by subsidising their services. The TBIs also need resources to match the constantly changing technological landscape, and such support is only sometimes available. Limited resources also prevent TBIs from offering incubatee-specific support, which is time-consuming and, therefore, costly, opting for generic programmes, which might not benefit some incubatees. To ensure the prosperity and sustainability of the graduate incubatees, the TBIs should consider the adoption of the supplementary virtual models of incubation, which could also enhance their ability to provide monitoring and evaluation (Hewitt & van Rensburg, 2020:5).

The TBIs in KZN experience further financial challenges relating to delays in the disbursement of funds from various government departments. They also need help with the government's inability to increase grants in response to inflation and the rising cost of living. The advantage of government funding lies in its ability to drive the mandate of the TBIs (Theme 1) towards achieving the desirable national goals for a developing state.

For various reasons, TBIs are not always easily accessible to potential incubatees. These range from limited intake, which is restricted by available resources, to a lack of adequate geographical spread and the inability of incubatees to make minimal contributions to their development. Inadequate infrastructure and reliable internet connectivity characterise the province's rural areas of KwaZulu-Natal (Jili *et al.,* 2017:6). These challenges lead to physical inaccessibility and the need for more information, thus restricting the potential TBI benefit to rural mall businesses. The degree of internet and broadband infrastructure penetration into rural areas is slow; hence, these communities cannot keep pace with global and even national developments (Aruleba & Jere, 2022:1). The restrictions on financial resources do not allow TBIs to expand into

rural areas. The provincial and local governments must provide adequate resources to address the infrastructure and communication challenges before providing services to small businesses in these areas.

The level of skills that the incubatees bring into the programme sometimes needs improvement to enhance their ability to assimilate the skills and knowledge being imparted by the TBIs. The provincial government should be able to rely on local government's direct interventions through mechanisms that expedite human development and capacitate local people with the necessary skills to attract investment, leading to job creation, economic growth and development (Khambule & Mtapuri, 2018:439).

The TBIs need to collaborate more extensively, as is expected in an environment with limited resources, to eliminate duplication of services and unintentional expenditure on the same group of incubatees. It also limits the number of incubatees that can potentially benefit from the programme. The lack of collaborations is particularly concerning given that most of these programs are funded by the government. These collaborations can be initiated and supported by both the government and the TBIs (discussed extensively in Theme 8). Collaboration among the TBIs will result in improvements in the manner in which the TBI programmes are structured. The benefit to the incubatee will be immediate as it will minimise registration times and a repeat of initial assessments as information will be shared among the TBIs. It will also increase the number of incubatees in the province as sole resources are wasted on the same people moving from one TBI to the next. The close working relationship among the TBIs will create synergies that will have mutual benefits, and each programme will improve its expertise and facilities in a specific area of technology with an active referral system in other areas.

7.7.15 Conclusion

Developing and supporting technology-focused small businesses can only survive with the resources and support from provincial and local government and other funding agencies (Malebana, 2017:76). The incubatees in KZN cannot provide the necessary finances by themselves; therefore, they will continue to rely on TBIs' support in the

foreseeable future. Therefore, it is necessary to ensure that TBIs are fully resourced so that they can provide the support required by the incubatees. The development of technology also requires specific skills that incubatee need to possess to manage and sustain a high-technology small business. Providing state-of-the-art technology requires investment and means of adapting to the changes in the technology space. The support the TBIs can provide is limited by their financial resources, thus dictating the services they can provide and the number of incubatees they can accommodate in a particular financial period. The growth of technology-focused small businesses is therefore essential for them to benefit from high-end funding that is available through the DTIC (Department of Trade Industry and Competition, 2024:117). The findings also revealed that TBIs' inaccessibility stems from their limited geographic spread and the restricted number of incubatees they can safely accommodate. Financial support from the government and other funding agencies is essential for rural small businesses to benefit from TBIs in the province of KwaZulu-Natal. This challenge and proposed recommendations will be elaborated upon in Theme 8.

The lack of collaboration among TBIs is a concern that needs to be addressed, as this may lead to unnecessary duplication and wasteful expenditures. The government can play a critical role in providing guidelines for collaborations among the provincial TBIs. Collaborations and partnerships remain critical tools that TBIs and incubatee can employ to address the challenges of funding, experts, and infrastructure constraints. Researchers in the incubation space advocate for collaborations and the creation of sustainable ecosystems (Audretsch, Cunningham, Kurakto, , Lehmann & Menter, 2019:320). In the current economic climate, where there is competition for government funding, collaborations can further assist the TBIs in maximising the benefit from the funding they receive and increasing their impact in the province of KwaZulu-Natal.

7.7.16 Alignment with the primary aim and secondary objectives of the study

The primary objective of this study is to develop a framework for incubating technology businesses in growing sustainable small companies in KwaZulu-Natal. The findings of Theme 4, which is the Challenges, revealed that the challenge of access to adequate financial resources affects both the incubatees and the TBIs. This challenge hampers

the TBIs' ability to offer comprehensive support to the incubatees. The skill sets of the incubatees and the challenges associated with rurality are contributory factors the TBIs cannot address independently, as they require financial input to design tailor-made interventions, provide the necessary infrastructure and ensure sufficient connectivity. The government of the KwaZulu-Natal province should assist in providing an enabling environment and increase the financial injection to TBIs. This support can also be achieved through the province lobbying for a substantial increase in financial support for the KZN TBIs. The TBIs can also improve the level and intensity of their support if they can enhance collaborations and create synergies that will increase efficiency in their operations, allow for specialisation and strengthen the number of incubators that will benefit from the programmes.

Table 7.15 presents the links with the secondary objectives of the study.

Table 7. 15: Theme 4: Links with the secondary objectives of the study

Research objective	
SO4: To explore and describe the mode of operation for technology business incubators.	The financial challenges affect both the incubatees and the TBIs in the province of KwaZulu-Natal.Addressing this challenge will equip the TBIs to provide tailored support to incubatees, which will address the challenges in their skill sets and give them access to resources, thus improving their success. The TBIs should collaborate and create synergies that will eliminate offering similar services to the same incubatees, therefore enhancing efficiencies within the system duplicates as
SO5: To explore and describe the experiences of technology incubation programme managers/CEOS/directors	The TBIs should actively enhance collaborations among themselves. Collaborations can create systems that allow for interactions and eliminate duplication in registration and initial assessment processes. The incubatees will be able to transition from one TBI to another seamlessly. The collaboration will also assist the TBIs in developing expertise and strengths in specific areas and benefit the whole province.

Source: Researcher's creation

The following section focuses on the theme that addresses strategies for improving the effectiveness of TBIs.

7.8 THEME 5: STRATEGIES FOR IMPROVING THE EFFECTIVENESS OF TBIS

This theme focuses on strategies for improving the effectiveness of TBIs. This theme includes opinions of the TBI management on strategies that can be used to increase the effectiveness of the TBIs in the province of KwaZulu-Natal. This theme contributes to the aim of the study in developing a framework for improving the efficacy of TBIs in the province of KwaZulu-Natal, South Africa. A total of 187 codes were recognised in this theme, with P1, P6, and P11 contributing significantly to the codes. These codes generated two sub-themes presented as follows:

- Continuous Improvement Strategies
- Lessons Learnt and Advice for Future TBI Managers

Table 7.16 presents the summary of sub-themes and the respective categories.

Table 7. 16: Theme 5: Sub-themes and categories

Theme	Sub-themes	Categories
Strategies for Improving the Effectiveness of TBIs	Continuous Improvement Strategies	• Stakeholder Management • Programme Management Strategies • Diversify Revenue Streams • Promote Inclusion • Investments in technology, Promoting Innovation and New industries • Collaboration among TBIs
	Lessons Learnt and Advice for Future TBI Managers	• Creating synergies • Holistic and complete support • TBI strength • Funding Management • Sustainability of the TBIs • TBI Environmental Scan • Incubatee progression/development • Provincial Economic Development • Pre-assessment • Post-incubation support • Entrepreneur character development

Source: Researcher's creation

The findings revealed that there are improvement strategies within the control of TBI management. These are discussed as continuous improvement strategies. These include improvements in stakeholder management, programme management,

diversification of revenue streams, improving the service offering in providing holistic support, promoting inclusion, investing in technology, and promoting innovation.

The second set of strategies is those interventions requiring the participation of other stakeholders to ensure the overall improvement in the provincial TBI impacts. These strategies include creating synergies and holistic and complete support, developing the TBI strength, developing funding management strategies, ensuring the sustainability of the TBIs, contributing to the provincial environmental scan, monitoring incubatee progression and development, improving the provincial economic growth, improving on pre-and post-incubation assessments and developing the entrepreneurial character among the incubatees. These are presented in Table 7.17. This table also presents a summary of the findings for each participant. This data is then followed by an extensive analysis, dissecting each code in an endeavour to develop a framework for improving the effectiveness of TBIs in KZN.

Table 7. 17: THEME 5: Strategies for improving the effectiveness of TBIs

	Continuous improvement strategies	Lessons Learnt and Advice for future TBI Managers	Summary of Findings for Individual Participant
1	*“Bring them together –different stakeholders” “One package…business is destined to rise and be successful.”* *"better, I’d say management of the program that can be put into place";* *"better performance and better results than the current management style that is in operation"* *“allowing incubators to run in a site efficient manner.”* *"without having to rely heavily on, I don't want to say, the government."* *"We bridge this gap of an incubatee coming to our X for a particular service, and when they are done here, they go to a different X where they get a similar kind of service."* *“Look at the complete value chain in terms of these clients' business.”* *“Identifying partners or stakeholders that you can rope in clients when they come out of this program, they actually tick all the boxes, they have received a holistic support.”*	*“improve on synergies and working together.”* *"Always look for opportunities to work with other incubators"* *"the support that you give to this particular incubatee is as complete as possible."* *“look what their strong points are.”* *"look at where they are not necessarily weaknesses but where can they actually rope in other incubators"* *“synergies in terms of the service offering.”* *"incubatees can hop from one incubator to another without having to receive the same kind of service at different incubators"* *"look at a holistic support for the incubatees that come into the unit”* *“at times we find we are so focused on what little we can do for that particular SMME, we don’t broaden our lives in terms of why not take this individual from this point to the highest point possible.”*	Stakeholder engagement is critical for continuous improvement. In terms of service offerings, the participant felt that the package and improved management practices should be an enabler for an incubatee rise and success. There is also concern about overreliance on government, which dictates operations that may be better for the particular site of the TBI. There is a need to ensure that the incubatee does not visit different TBIs and receive the same service; instead, a system that considers the holistic development of an incubatee should be put in place. The level of support should also be enhanced to ensure that the incubatees graduate at a higher level. The advice is for improving synergies and collaborations among TBIs, and this should not be viewed as a weakness but as the merging of solid points for the holistic benefit of the incubatee. Opportunities to advance the support received by incubatees continuously need to be explored.

	“improve the service offering and the level at which we offer our services.” *“change the targeted, not client but the targeted level of support”; “to improve a client to the point of leaving a client at the highest point possible.”* *“ identify stakeholders that we can work with.”* *“ensure that the kind of support we offer to our clients is as complete as possible.”* *“Working together and looking at who else can rope in to try and assist this person to the highest point possible.”*		
2	*“So I would say inviting successful entrepreneurs to come and make presentations.”* *“by getting successful people to come and make presentations, that also opens up another avenue.”* *"role models to these young people, to these incubatees”* *“So if I visit them and see how they operate, that’s going to assist me in actually running my business. So those are the things.”*	*“seek or be able to access funding."* *“It going to be easy for an incubation program to attract service providers that have expertise.”* *"We are not trying to provide hundred per cent of the needs of the SMEs and cooperatives.”*	There is a need to create role models for incubatees through those who are successful in their fields. As part of the support provided by the TBI, it is necessary to visit incubatee sites. Funding and access to funding should be a priority for the TBI so that it can be in the position to provide support to incubatees, even though that support will not meet all the needs of the incubatee
3	*“Get to know what the challenges in that province are, especially facing SMME because we are operating in that sector.”* *“another stream of income, there are technological changes that are happening to invest in the technology.”*	*“One is legally eligible to generate profit,"* *"stop thinking that we will be forever funded by the government."* *"find a way of being self-sustainable,"* *"need to have a separate entity. That will be able to assist the program."*	Understanding the environment in which incubatees operate and the challenges facing incubatees is a strength for TBIs. The injection of intellectual abilities through postgraduate support is also considered critical, as it might lead to new technologies or investments in emerging technologies in the sector, which

	“There are tools that we use as part of the operations.”	*"another stream or income, there are technological changes that are happening."* *"We work together as X and the SMME to close those gaps."*	may translate to funds accessible to the TBI. There is a great need to reduce the over-reliance on government funding. Several strategies can be adopted, including a functional entity exploiting emerging technologies and generating income to sustain the TBI.
4	*“We need to reach that in the larger communities in order for that to benefit all.”* *"Making information more accessible, mainly to young people."* *"Young people because they are the ones who become interested."* *"Ixopo in KZN takes places like Mbwazana; those are rural areas, but there are a lot of young people there."* *“Improving that is the infrastructure.”* *“important that there are strong relations”* *"stakeholders that are involved in that space are really not; there isn’t much collaboration."*	*: not working in silos.”* *"come together and put efforts together in incubation that would have a lot of impacts."* *“ensuring that those ideas are feasible, ideas are viable and feasible.”* *“Researchers are going to support and understand the industry.”*	The TBI programmes need to reach the larger community so that they can be impactful. The general public needs information, and the province is home to young people who may take advantage of the TBI information and programmes. The programme should also be able to reach out to rural areas, but it should also address the challenges of the adequacy of infrastructure. For these ideals to be realised, the TBI should build strong relations with relevant stakeholders and forge collaborations where possible. The collaboration will also help in addressing the current challenge of working silos; this will result in the reinforcement of strengths, thus increasing the impact of the TBIs. Engaging researchers will also have a positive effect as they will understand the industry better.
5	*“How can we help our communities and our business?"* *"Use our knowledge system to develop products focused more on the sectors specifically?"*	*“look at your environment; what do you have? Look around the value chain.”* *“You don’t have to copy somebody else.”* *"Turn your institution or your centre into a world-class centre."*	There is a need to help communities with sector-specific or industry-specific knowledge to generate interest and increase participation. An environmental scan or assessment, meticulous recording of experiences and knowledge sharing are

	"found there was an improvement in terms of the numbers that were attending the programs."	*"Record what you are doing and share the knowledge."* *"There isn't linear progress in terms of how businesses will progress."* *"It might not look so good initially, but after a while, it just flourishes and seems brilliant, but then they struggle."* *"more practical ways of doing things linking them with for example, the clothing and textile people organising cheaper rates."*	essential attitudes towards creating world-class TBI. A point of a non-linear growth path for businesses requires that TBIs should learn from previous experiences to improve future engagements. Again, funding is a factor to consider for the sustainability of TBIs. Identifying partners who can assist and lessen the financial burden of the TBIs is critical.
6	*"multitudes of researchers with good ideas, have fewer researchers who can take those ideas to a commercial reality, a critical mass of researchers";* *"accessibility of certain facilities"* *"maybe access to financial opportunities that could improve the experience";* *"access to current high tech equipment";* *"enough clients who need support but lack of funding support becomes a challenge."* *"alternative funding models"* *"methods beyond just government funding"* *"Association with Venture Capital"; "private funding;*	*"incubator can leverage from the existence of another."* *"need to improve interactions within the incubation space and especially for incubators."* *"more incubators, especially in rural areas, more funding, especially to enable projects, should be given to incubators."* *"what new economies can we start exploring or investing in?"* *"coordination of resources both in a private and public space";* *"focus approach rather than a piecemeal which does seem to be a challenge at this stage.*	Researchers are critical components of the TBI ecosystem; however, despite a large population of researchers, only a limited number can translate ideas into commercial products or services. To enhance the experience of incubatees, access to facilities and financial opportunities needs to be increased. Insufficient funding limits the number of incubatees the TBI can support. The future of TBIs relies on these entities piloting alternative funding models beyond government funding to encompass private and venture capital sources.
7	*"Many, many more companies are gaining access to opportunities for programmes."* *"meet the needs of the fourth industrial revolution"*	*"effectively manage funding and resources."* *"build a sustainable model don't have to rely on funding"* *"develop a sustainable model where you don't rely on funding"*	The ideal scenario is for the number of enterprises getting support from TBIs to increase. The TBI space also assists incubatees in meeting the needs and

	"Encourage app development. New app development, new and innovative thinking." *"have to understand the technology space"; "have to understand the needs of SMMEs."*	*"build a nice contingency, capital back up."* *"invest in your staff."* *"invest in your equipment."*	requirements for taking advantage of the opportunities associated with the 4IR. TBIs should understand the environment and technology requirements of the incubatees. The limitation of funding is well noted. However, there is also the need to ensure that the available funds are appropriately managed and used as intended for the programme. A sustainable funding model is essential for the financial sustainability of the TBI and will assist it in surviving dry financial spells, such as those experienced during COVID-19. Another critical consideration for TBIs is investment in equipment.
8	*"Creativity on the other side. So that requires the different institutions that operate in the same sector or in the same field to work together, not competing."* *"discouraging one institution from wanting to benefit on its own without the others."* *"Focused programs may help businesses, and they will also look at the specific areas that need to be encouraged or promoted in the country."* *"no one size fits all. There has to be more flexibility in looking at the intake of incubatees and they will also see other people who have been established."*	*"the preparatory framework which will prepare people to create an understanding of how businesses operate."* *"There has to be a way of bridging the gap between the academic understanding and also the business understanding."* *"Developing the individuals that we work with",; "encouraging that part where a person would be inquisitive."* *"developing a culture where a person would look at it more vigorously than most of them do."* *"important to have the post-incubator program, funds may not permit most of the time, encouraged to work together, even after leaving the incubator."* *"Introduce them to institutions like chambers of business where they will also get support."*	Collaboration should be a favoured mode of operation as opposed to competition. It is also advisable to have programmes focusing on specific areas that are challenging incubatees. However, the TBI should also exercise flexibility in admitting incubatees. There is also a need to bridge the academia-industry gap, and one such programme could be the preparatory framework that introduces entrepreneurs to business operations. Creativity and paying attention to detail should be encouraged. Post-incubation support should also be designed so that graduate incubatees have some form of support system, and these may include business chambers.

9	*“Collaboration, I want to achieve provincially, but the overlap would not be as great as it is.”* *“facility where the full pipeline of the client can be addressed”* *“.If you are not in the facility, it’s a problem to focus on this lane. I think the impact could be greater, and the benefit for society could be much greater.”*	*"address the character of the person and whether that person would fit into an entrepreneurial system"* *"don’t think that everybody can be an entrepreneur overnight"* *“model on paper looks great; however, it has its limitations, and we are constantly looking at new ways, innovative ways to improve the quality and the output.”* *"haven’t quite tapped into what is the pedigree of person that we need to be successful”* *"maybe we should have one incubator that deals with IT and technology and support ensure that it has a footprint around the province"* *“do software development incubation, somebody else could do hardware development, somebody could focus on just the IT part, and somebody focus on the electronics part"* *“dilutes the focus of government, dilutes the funding model that we want to achieve”* *"incubation and it doesn't have the social element."* *“I see a lot of the imposing of those standards here where people are more liberal; they grew up in systems where they were able to communicate and share their views, etcetera. It does not suit our environment.”* *"do not know what their day-to-day struggles are."* *“We don’t know what the issues are that relate to the operational plans, are they assessing them, are they anywhere near their operational plans, what are the challenges that they experience, what interventions do they have”*	Collaboration and elimination of overlaps benefit the province. Another suggestion for enhancing the incubator's impact is having a facility that will help identify candidates for TBI, thus ensuring greater benefit for the community. The facility will also assist small businesses in focusing their efforts. Developing the incubatee as an individual that will fit within the broader entrepreneurship ecosystem is also important. Part of this individual support should be cognisance that information is part of the culture. Hence, entrepreneurs might not be privy to avoiding sharing too much. Also, given that IT seems to be a universal skill, it may be possible to advocate for such support to be available province-wide Greater emphasis should also be placed on understanding incubatees' challenges and their adherence to the business operational plans, which will be monitored for performance. It is imperative for TBIs to continuously identify new and innovative ways of enhancing the support they offer incubatees.

		"neither do we have interventions for them in that instance. We're assuming that everything else is going okay." *"So if you ask me to draw a report today and say how many incubatees of yours have made your full complement of the revenue target, I'm not going to be in a position to do that."*	
10	*"Assess university-based incubators; they graduate, and we hand them over to SEDA."* *"Training, a session for maybe six hours in a day, is too much for someone unfamiliar."*	*"putting aside funding to help the students."* *"you don't have to go and pay for something that SEDA is offering; don't have to go and pay for something that NYDA is offering"* *"ecosystem is that the partners don't normally sort of work together; there has got to be an integration,"* *"instead of having a two-year contract with students, maybe you have a five-year contract."*	There is a working relationship between the TBI at the university and the SEDA as the graduates are handed over to the SEDA. Still, there is no evidence of monitoring that relationship. Individual needs should also be considered to align support for maximum benefit. Funding should be an enabler for small businesses, contributing to business growth. TBIs can also exploit collaborations as a means of sustaining their resources. An ecosystem for TBI is therefore critical where TBIs work together. The incubation period may also be considered for review in the longer term.
11	*"too generic and needing to be more customised to suit the needs of the beneficiaries."* *"willing to adapt and change their program to suit their needs. "* *"hire more people in the right places to offer more sustainable services and solutions and customise more programs"*	*"common platform or regular check-ins where they can communicate, so that we can see that we are not supporting the same people with the same service";* *"needs assessment needs to be undertaken"* *"Being able to meet the needs of whom you are serving correctly.".* *"be intentional about whom you are supporting, how you are supporting them"*	There is concern about the generic nature of the TBI services, thus necessitating an effort to develop customised support. The incubatee needs to be evaluated, and the programme should offer sufficient flexibility to accommodate these. A point of concern is incubatees who tap into the different incubators without showing any progress. Mechanisms should be implemented to manage these movements, as this will assist

	“recruit more to ensure that my team has all the right skills.” *“work more closely with other stakeholders to develop more of these institutions.”* *“improve communication”* *“physical incubation was relevant ten years ago but is not relevant now."* *"Not everyone wants to sit at an incubator where they can be sitting at a coffee shop or from home and run their business."* *“Collaboration is important, come together with like-minded individuals,”* *“theory of change model,”* *“mentor or someone who can guide them. A mentor and someone that will guide and advise, definitely that’s important.”* *“Communication and collaboration amongst incubators would avoid the problem of the same people getting the same support over and over again, creating more innovative spaces and three program areas. Program area one is innovation support, the second program area is capacity building and skills development, and the third program area is research.”*	*“needs analysis is so important to try and tailor your support".*	in spreading the support over a bigger population than the same individuals benefiting from different TBIs. TBIs must ensure that they sufficiently and appropriately have staff resources for sustainability. Stakeholder engagement and collaboration are other critical functions of the TBI. However, these collaborations should target organisations with a drive similar to the TBI. Physical incubation may be outside the current era. Mentorship and coaching should be formalised. TBI should support innovation, build capacity and conduct research.
12	*“dismissiveness in interrogating the idea, dismissive and being vague.”* *“an incubate that has an idea, but in some cases, they haven’t workshopped the idea,*	*“Management has to be experienced.”* *"deliberate and intent to upgrade them in terms of the know-how."* *"How do they find funding over and above the funding that they have? There’s a huge reliance on government.”*	The management of TBIs should find ways to assist incubatees who need to refine their ideas. TBI management must be appropriately skilled and willing to enhance their skills and knowledge.

	done a lot of work, put in there a lot of money in their idea, a viable idea, it's just that it's foggy." *"must-have networks be skilled in network development, have a plethora of networks, in various disciplines, various sectors." "relationship building"* *"provide different assistive sort of interventions."*	*"Have a sustainability plan that is beyond government and also beyond grants; incubators need to be run in such a way that they attract money; people want to come and put their money in those incubators rather than the incubator going out there begging for money, experience and willingness to learn and improve."*	Alternative funding streams are necessary for the sustainability of TBIs; therefore, money-generating strategies must be developed. Networking is another desirable trait for TBI management.
13	*"Provide training for an incubator for business development or the financial model."* *"Ensure that all the required tools are acquired for those individuals."* *"All the resources needed to drive technology development and entrepreneurship."*	*"need to network and collaborate as much as possible would not say avoid competition."* *"commercialisation is slow."* *"evaluate the model that they use incubators tend to focus mostly on pre if I will say incubation; entrepreneurs graduate from pre-incubation. Do we have any follow-up strategy to ensure that those who graduated actually know how they are doing outside of the incubation process? Post-incubation kind of follow-up programme to ensure that they are succeeding in their business."* *"looking abroad outside of the provinces and Africa and then South Africa, we can have a post kind of support that will give after incubation."*	TBIs need a business or financial model to improve efficiencies within the incubator. Networking and collaborations are essential to impactful engagements, including in the industry, where potential prototype development and commercialisation partners can be identified. The industry's role is essential as total production is impossible within the university environment. Post-incubation support needs to be designed and implemented to continue supporting the incubatees. Such post-incubation support systems can be national or international.

Source: Researcher's creation

7.8.1 Continuous improvement strategies

Participants recommended these strategies to ensure the successful and impactful discharge of the TBIs' duties. They involve areas of operations that, if managed effectively, will lead to continuous improvement in the TBIs' overall performance. These areas are stakeholder management, program management strategies, and reducing over-reliance on government funding, which will be discussed.

7.8.1.1 Stakeholder management

The TBIs need to identify the critical stakeholders (P1*: "identify stakeholders that we can work with"*) that are essential to assist the incubatees over the entire value chain of technology-focused small businesses and engage these entities to ensure that the incubatees enjoy holistic support from the TBI (P1: *"identifying partners or stakeholders that you can rope in client when they come out of this program they tick all the boxes"*). Networks are vital in providing access points to the relevant stakeholders (P12: *"must-have networks be skilled in network development"*). It is generally the responsibility of the TBI management to ensure that they have sufficient networks from diverse stakeholders that will bring complementary skills and support to the TBI. (P12: *have a plethora of networks, in various disciplines, various sectors."; "relationship building"; "provide different assistive sort of interventions."*).

The effectiveness of the TBIs can be improved through appropriate stakeholder management practices, including ensuring that there is positive engagement between the different stakeholders that are critical to the TBI's success (P1: *"Bring them together, different stakeholders"*; P11: *"Work more closely with other stakeholders to develop more of these institutions"*). A close working relationship needs to be established, maintained and improved over time to assist the TBIs in responding to the needs of the incubatees. An essential part of stakeholder management is the ability of the TBI to communicate with its key partners, collaborators, and clients (P11: *"improve communication"*; *"communication and collaboration amongst incubators"*). Managing stakeholders will rely on the TBI's communication strategy, which needs to be consistently improved and aligned with the changing needs of the TBI.

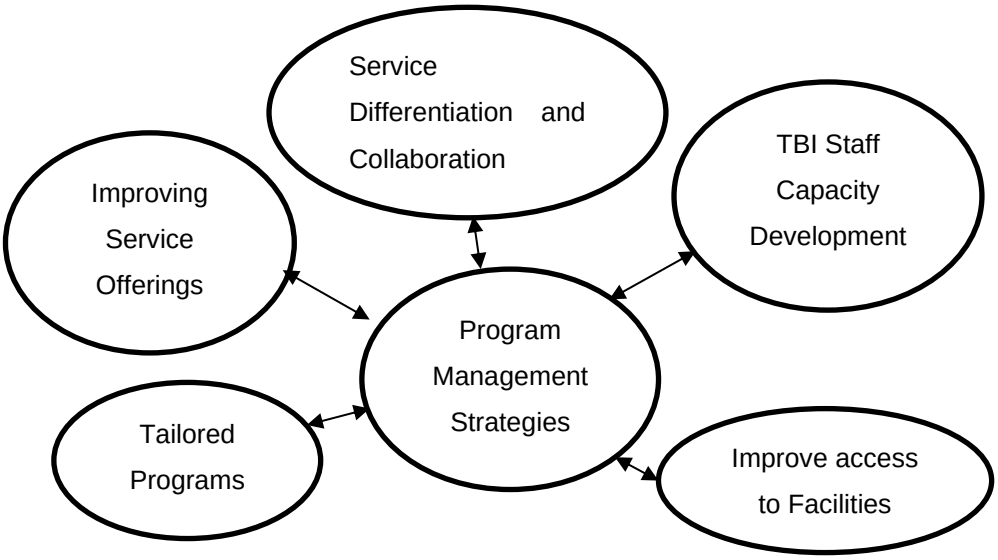
7.8.1.2 Programme management strategies

The TBIs have a specific mandate to support small businesses in technology-enabled enterprises (Theme 1 of the research study). They undertake this function by designing a set of services that address the needs of the incubatees. To ensure the effectiveness of the TBIs, their services must be packaged to allow for the total and full development of the small business to self-sustainability (P1: *“One package, business is destined to rise and be successful”*). The current program management strategies need to be improved into models that will allow for improvements in outcomes (P1: *"better, I would say management of the program that can be put into place"; "better performance and better results than the current management style that is in operation"*). Using the knowledge that accumulates within the TBIs over the years, these programs can be instrumental in rethinking and designing programs that will improve their effectiveness among incubatees (P5 *"Use own knowledge system to develop product focused more on the sectors specifically"; "found there was an improvement in terms of the numbers that were attending the programs"*). According to participants, one of the critical enhancement strategies is to improve operations efficiencies (P1: *“allowing incubators to run in a site efficient manner”*). An efficient resource management strategy will ensure that the TBI can service more incubatees for the available resources, including funding and experts that support small businesses.

The following strategies, as represented in Figure 7.7, were identified as key in assisting the TBIs to improve their programmes continuously:

- Improving service offering
- Service differentiation and collaborations
- TBI Staff capacity development
- Improve access to facilities
- Tailored Programs

Figure 7. 7: Schematic representation of Programme Improvement Strategies



Source: Researcher's creation

7.8.1.2.1 Improving the service offering

The holistic support to the incubatees requires defining what it entails from the perspective of the TBI managers/CEOs/directors. Providing holistic support is about ensuring that the incubators receive the services that assist them in all aspects of a business that need attention to ensure that it develops, grows, and becomes sustainable (P1 *"ensure that the kind of support we offer to our clients is as complete as possible"*). Holistic support also incorporates that the service rendered should identify support aligned with the entire value chain (P1: *"Look at the complete value chain in terms of these clients' business"*). TBI management is responsible for ensuring that the service provided by the TBI is holistic and relevant. Relevant also implies continuous improvement. The services provided by the TBIs need improvement to ensure enhanced benefits accrue to the incubatees (P1: *"improve the service offering and the level at which we offer our services"; "change the targeted, not client but the targeted level of support").*

7.8.1.2.2 Service differentiation and collaboration

Some TBIs provide similar services, which then allows incubatees to move from one TBI to another (P1: *"We bridge this gap of an incubatee coming to our X for a particular service, and when they are done here, they go to a different X where they get a similar kind of service.")*. TBIs, through their service offering, should differentiate themselves from others; hence, there is a need for each TBI to identify the gaps in the systems and develop expertise, knowledge and facilities around that are of specialisation that each incubator is addressing. However, this high level of specialisation will only be possible if there is a strong collaboration between TBIs. Therefore TBIs cannot and should not work in silos (P4: *"not working in silos"*); hence there is a need to forge collaborations that will enhance the impact of their services on incubatees.

The interventions of the TBIs should lead to a graduate incubatee who is at the highest level of performance (P1: *"to improve a client to the point of leaving a client at the highest point possible"*). This kind of support and the expected outcome cannot be achieved by the incubator alone, hence the need to understand the entire value chain and identify stakeholders who can address the various aspects of the incubatees and the small businesses' developmental journey (P1 *"working together and looking at who else can rope in to try and assist this person to the highest point possible"*). Similarly, the TBI should ensure access to the necessary tools for its operations (P3: *"There are tools that we use as part of the operations"*). Some TBIs adopt the operational models that guide the design of programmes and incubator interventions (P11: *"theory of change model"*) to guarantee positive change in the small business being incubated.

7.8.1.2.3 TBI staff capacity development

TBIs need access to staff that is well equipped in terms of skills and sufficiency to meet the demand for the services of the TBIs in KZN (P6: *"multitudes of researchers with good ideas, have fewer researchers who can take those ideas to a commercial reality"*; P11: *"recruit more to ensure that my team has all the right skills"*; P13: *"provide training for an incubator for business development or financial model*). The TBIs need a critical mass in terms of researchers that can assist the incubatee in developing an idea to

the point where it reaches the markets (P6: a *critical mass of researchers"*). TBI is responsible for understanding the technology space within which it operates (P7: *"have to understand the technology space"*). Investing in the TBI staff is one the essential survival toolkits for the TBIs (P7: *"invest in your staff"*; P8: *"developing the individuals that we work with"*). In some instances it may be necessary to complement the TBI staff with the required skills to allow for tailored, relevant and impactful service to the incubatees (P11: *".hire more people in the right places offer more sustainable services and solutions customise more programs"*).

Management should be experienced and competent in providing leadership in the TBI (P12: "*Management has to be experienced"*). The management experience should be supplemented by the skills and personal development plans to ensure that their knowledge and expertise remain relevant *(P12: "deliberate and intent to upgrade them in terms of the know-how."*). One critical function of the TBIs is assisting the incubatees in assessing the feasibility of the idea and its potential viability in the markets (P4: *"ensuring that those ideas are feasible*"). Therefore, the TBI staff should have adequate industry knowledge to provide such advice (P4: *"Researchers that are going to support in understanding even the industry"*).

7.8.1.2.4 Improve access to TBI facilities

The TBIs in KwaZulu-Natal should increase access to their facilities to ensure maximum benefit for incubatees (P6: *"accessibility of certain facilities"*). This includes access to high-end technological equipment within these programmes (P6: *"access to current high tech equipment"*). Therefore, the TBI needs adequate funding to invest in equipment (P7: *"Invest in your equipment"*). Access to the facility eliminates the challenge of operating space for the incubatees and allows them to focus on building the businesses, thus increasing the impact of the small businesses on the community and the province (P9: *"If you are not in the facility, it's a problem focus in this lane I think the impact could be greater and the benefit for society could be much greater."*). The TBIs should ensure that the facilities are equipped with all the tools that the incubatee will require to develop from idea to commercialisation (P13*: "ensure that all*

the tools that are required are acquired for those individuals"; *"all the resources that are needed to drive technology development and entrepreneurship*).

Collaborations can also assist in creating a pipeline of incubatees that will be utilising the services of the TBIs and probably lead to the establishment of the facility or programme that will direct incubatees to the relevant TBI (P9: *"facility where the full pipeline of the client can be addressed"*). Creating this feeder mechanism will enhance the generation of technology-focused entrepreneurs in the province. One of the benefits of collaboration is the elimination of overlaps among the TBI interventions (P9:*overlap wouldn't be as great as it is"*).

7.8.1.2.5 Tailored programmes

One-size-fits-all is inappropriate in supporting a diverse set of incubatees (P8: *"no one size fits all"*; P11: *"too generic"*). The programmes of the TBIs should allow for some level of flexibility (P8: *There has to be more flexibility in looking at the intake of incubatees";* P11: *"willing to adapt and change their program to suit their needs"*) to enable the interventions to focus on the needs of a particular incubatee (P8: *"focused program may help businesses"*; P11: *"needing to be more customised to suit the needs of the beneficiaries"*).

The flexibility of the TBI programme should also be applied to afford incubatees the option to take only those interventions that they need, including the option of not taking the physical spaces that (P11: *"physical incubation was relevant ten years ago, but is not relevant now"*; P11: *"not everyone wants to be sitting at an incubator where they can be seated at a coffee shop or from home and run their business*).

7.8.1.2.6 Diversify revenue streams

The TBIs in KwaZulu-Natal rely on the national government to fund their operations (P1: "without having to rely heavily on, I don't want to say, *the government"*). This heavy reliance on the government presents a risk of being unable to function should there be a financial challenge for the national government. This scenario was evident

during COVID-19 when the government diverted from all sectors to meet the challenges of this global pandemic (Theme 4: Challenges). TBI management, therefore, needs to develop measures to ensure the sustainability of these programmes outside of government funding (P6: *"methods beyond just government funding*). The TBIs need to seek alternative funding models that will support and sustain their operations (P6: *"alternative funding models"*). A well resourced TBI, in terms of finances will be able to attract enough incubatees to be supported, thus increase its client base and spread the available support (P6: *"enough clients who need support but lack of funding support becomes a challenge*). Increasing the number of incubatees should be planned against resource availability and adherence to offering quality services.

The development of technological ideas to full commercialisation requires financial inputs from the incubatee and therefore presents a challenge for the resource-constrained small businesses; hence TBIs can be instrumental in facilitating access to finances (P6: *"maybe access to financial opportunities that could improve the experience")*. It is, therefore, crucial for the TBI management to develop strategies for attracting funding that will assist incubatees in the various stages of their development. One possible avenue towards attracting funding is developing networks that include such organisations as venture capitalists and private funders of technology and innovation (P6: *"Association with Venture Capital"*; *"private funding"*). The added benefit to the incubatees is that these organisations also provide access to expertise and potential finance to sustain small businesses in the precarious business environment.

7.8.1.2.7 Promote inclusion

The TBIs need funding to support their operations and to increase the number of people who can access their services (P6: *"Enough clients who need support but lack of funding support becomes a challenge*). There needs to be more than the current funding for TBIs to reach out to all small businesses that can benefit from them. However, several small businesses still require the support of the TBIs (P7: "many, *many more companies gaining access to opportunities for programmes"*). The TBI

programmes should also employ flexibility in meeting the needs of incubatees who do not have prior business experience, as they may be overwhelmed, which will negatively affect their prosperity and benefit (P10: *“Training, a session for maybe six hours in a day, is too much for someone who is not familiar”*).

7.8.1.2.8 Inclusion - youth

There is also a need for the TBIs to consider strategies for encouraging young people to participate in their programmes. Such interventions will require the TBis to ensure that information about these programmes is accessible to the youth of the province of KZN, especially considering that these young people also need information on funding and support opportunities (P4: "*making information more accessible that is mainly to young people*"; "young people because they are the ones who become interested"). This is particularly important for rural areas of KZN, where there is a scarcity of information (P4: “*rural areas but have a lot of young people that are there"*). Therefore, youth-specific marketing programmes are required to increase the participation of young people.

7.8.1.2.9 Creating role models

The incubatees need role models that will assist them to focus on developing their businesses and for encouragement whomever they may be able to undertake this function on their own (P2: *“So I would say inviting successful entrepreneurs to come and make presentations. by getting successful people to come and make presentations, that also opens up another avenue for the”*). Role models become even more critical for young incubatees, who lack the essential experience and knowledge base (P2: *"role models to these young people, to these incubatees”*). Through its networks, the TBI can help in creating platforms where the graduated incubatees can encourage the upcoming SMMEs (P2: *“So if I pay them a visit and see how they operate, that’s going to assist me in actually running my business”*). Among these links is establishing relationships with graduates who are firmly established in their turf (P8: *They will also see other people who have been established."*; P11: *“mentor or someone who can guide them. A mentor and someone that will guide and advise,*

definitely that's important"). The networking programmes of the TBIs should include identifying potential mentors and linking them to their incubatees.

7.8.1.2.10 Investments in technology, advancing innovation and new industries

The TBIs are exposed to the technology advancements and innovations that are brought to by incubatees and should be vigilant enough to identify areas of possible investments that will generate future revenues that can sustain the programme (P3: *"another stream of income there are technological changes that are happening to invest in the technology"*). TBIs in KZN also assist the country's small businesses in meeting the needs of the fourth industrial revolution (P7: *"meet the needs of the fourth industrial revolution"*). There are instances where the incubatees present projects that require refining before acceptance to the TBI, and it is the responsibility of the TBI staff to provide the necessary support to the great ideas and acknowledge the hard work that the incubatee has invested in developing the concept (P12: *done a lot of work, put in there a lot of money in their idea, a viable idea, it's just that it's foggy."*). TBIs should be nurturing environments for early-stage innovators. The TBIs can be critical in encouraging small businesses to innovate and introduce new solutions to the country that may benefit the economy (P7: *"Encourage app development. New app development, new and innovative thinking").* TBIs can also promote innovation by training staff in assisting incubatees in developing their ideas, *as some* incubatees may have good ideas that need further assistance to be ready for enrolment in the TBI (P12: *an incubatee that has an idea, but in some cases, they haven't workshopped the idea"*). A positive and encouraging reception is critical in developing ideas(P12: *dismissiveness in interrogating the idea, dismissive and being vague"*). The TBIs can also assist the province and the country with the identification, encouragement and support of emerging industries through the development of new technologies (P8: *also look at the specific areas that need to be encouraged or promoted in the country"*). To achieve this outcome, there should be a concerted effort to increase the number of spaces contributing to innovation, thus creating avenues for developing new industries (P11: *more innovative spaces"*).

7.8.1.2.11 Promoting collaboration among TBI

Collaboration among TBIs is critical to the successful discharge of their mandate. (P9: *collaboration"*; P11: *"Collaboration is important: "come together with like-minded individuals,"*; P4: *"come together and put efforts together in incubation that would have much impact"*). The competition among institutions can also hinder collaboration among TBIs, particularly those associated with institutions of higher learning (P8: *"discouraging one institution from wanting to benefit on its own without the others."*). It is important to ensure that TBIs have healthy competition driven by creativity, allowing them to work together based on strengths and in alignment with the industry sector (P8: "*Creativity on the other side. So that requires the different institutions that operate in the same sector or in the same field to work together, not competing";* P13: *wouldn't say avoid competition."*). University-based TBIs need to develop relationships to ensure that the graduate incubatees can receive the support they need to grow by linking them up with mainstream SMME support agencies (P10: *"Assess university-based incubators; they graduate, and we hand them over to SEDA"*).

7.8.1.2.12 Discussion and conclusion: Continuous improvement strategies

The TBIs' stakeholders must be identified and managed, as they are critical in improving their effectiveness. Managing stakeholders should be one of the critical functions of TBI management as it adds and enhances the value that the TBI delivers to the incubatees. The TBIs should have a dependable relationship that can be invoked to assist in providing services to the incubatee. The TBI services should also be packaged to accelerate the development and growth of the incubatee. The avenues employed to review service delivery packages should be geared for the success of incubatees

The programmes of the TBIs should be focused on achieving the outcomes of a capacitated graduate incubatee with the long-term impact of a successful, growing, and sustainable small business. The TBIs will, therefore, have to continuously review and improve their service offering to respond to the changing needs of the incubatees.

Improving efficiencies within the system leads to a TBI that can reach even more incubatees with minimal resources.

The TBIs should constantly review their services in response to the changing needs of small businesses and other economic and industrial factors. The package of services the TBI offers to the public is instrumental in attracting incubatees to a particular programme. Therefore, TBIs must employ strategies that will ensure that their services remain relevant, helpful, and attractive to potential incubatees so that they remain active and competitive.

TBIs in KwaZulu-Natal need to reduce their overreliance on the national government for funding. To survive and operate continuously, TBIs need multiple sources of funding. The shortage of government funds or the emergence of natural disasters or pandemics where funding needs to be redirected affects programmes that rely heavily on government funding.

The TBIs seek to provide services that embrace the entire value chain for small businesses in technology-focused enterprises. Meaningful support should be holistic and relevant enough for the incubatee to operate within the latest and best-available technologies. It is, therefore, the responsibility of the TBI management to ensure that the TBI has sufficient resources to deliver such service. These involve a focus on areas of staff with the necessary expertise and access to technologically advanced facilities. The TBIs should also use their service offering to differentiate themselves from one another to ensure maximum benefit to incubatees.

Technology-focused businesses also require a financial injection to operate at the cutting edge of technology continually. The TBI management should also have avenues through which incubatees can access finance. TBI marketing programmes should also reach rural and township areas where young people seek opportunities for development

Incubatees also need mentors and role models to assist, encourage and guide emerging businesses. The TBIs can facilitate the process of incubatees accessing mentors through focused networking sessions. TBIs also need to invest in

technologies and develop systems to identify new knowledge by promoting innovations and further providing support in protecting novel ideas.

Collaboration among TBIs in the province of KwaZulu-Natal is critical in sustaining the support the incubatees can receive. There are several reasons in favour of collaborations, the first being the possibility of stretching the existing financial resources to meet the needs of a more significant number of incubatees through sharing responsibilities. The most significant financial relief will also occur through the sharing of facilities and experts, which will ensure that, irrespective of the geographic location of the incubatees, systems are put in place that will ensure they benefit from these programmes. Collaborations will improve the impact of TBIs in the province and will lead to sustainability among graduate incubatees. In addition. Collaborating with TBIs will streamline services and ensure maximum participation in the TBI programmes. The province will further benefit from the increase in technology-focused SMMEs. Given that the TBIs also nurture new technologies and innovations, the province will benefit through diversification of fiscus, thus promoting economic development by increasing the number of avenues for economic engagements locally, nationally and globally.

7.8.2 Lessons learnt and advice for future TBI managers

This category focuses on issues that the TBI management needs to work towards influencing even though they are not in their direct control. Given the challenge of limited resources, as discussed under Theme 4, TBIs will need collaborations or provincial political interventions to address these issues. They include synergies among the TBIs in KZN, efficient provision of holistic support, the development of TBI strengths, and the possible role that the provincial government can play in improving the effectiveness of the TBIs.These are the issues that affect the operations of the TBIs and may also hinder their effectiveness in the province.

7.8.2.1.1 Creating synergies among TBIs in KZN

The need for collaboration in addressing some of the challenges was noted under Theme 4. However, the prosperity of the TBIs lies in ensuring that such engagements create synergies that will enhance the impact of these programmes in the province. Each TBI cannot provide all the services the incubatee may need to grow a sustainable small business (P2: "*We are not trying to provide one hundred per cent of the needs of the SMEs and cooperatives"*). Hence, there is a need to foster collaboration among them *(*P13: "*need to network and collaborate as much as possible*). However, TBIs should be able to build synergies that will allow them maximum benefit from the simple collaborations based on shared expertise and resources of another TBI (P6: *"incubator can leverage from the existence of another"*). The TBIs need to improve synergies (P1: *improve on synergies and working together"*) and opportunities for working together by enhancing interactions among themselves (P1: *"always look for opportunities to work with other incubators"*; P6: *"need to improve interactions within the incubation space and especially for incubators"*). The success of these operations and strategic synergies depends on the willingness of all TBIs in the province to engage actively.

Through these platforms, TBIs can identify areas of strength within each incubator (P1: *Look what their strong points are"*). The TBIs should not create synergies based on weaknesses but from the basis of strengths and what they can offer in the TBI ecosystem (P1: *"look at where they are not necessarily weaknesses but where can they actually rope in other incubators"*). These synergies should be based on the essential services that each TBI is offering and how these will benefit the incubatees (P1: *"synergies in terms of the service offering"*). Synergies will ensure that as the incubatees move between the TBIs they are receiving complementary services (P1: *"incubatees can hop from one incubator to another without having to receive the same kind of service at different incubators";* P11: *we would avoid that problem of the same people getting the same support over and over again"*).

7.8.2.1.2 Ensuring holistic support

The benefit of synergies among the TBIs will ensure that the ultimate benefit is the incubatees who will develop to the highest possible level during the incubation period (P1: *"the support that you give to this particular incubatee is as complete as possible"*). The incubatees must get maximum benefit for the small businesses through participation in the incubation programme (P1: *"look at a holistic support for the incubatees that come into the unit"*). An essential consideration in designing holistic support for incubatees is engaging them in identifying intervention points (P3: *"We work together as X and the SMME to close those gaps"*). Holistic support ensures that the incubatee cannot undergo incubation based on brief interventions that address a single item, thus requiring the incubatee to move to another programme (P6: *"focus approach rather than a piecemeal which does seem to be a challenge at this stage).* The TBI ecosystem should allow for specialisation and strengths while accommodating TBIs that provide generic programmes that all incubatees need. One of the key generic offerings is information technology support. Information technology is an enabler of all small businesses; hence, it should be accessible to all incubatees irrespective of the industrial sector in which they operate (P9: *"Maybe we should have one incubator that deals with IT and technology and support ensure that it has a footprint around the province"*). Financial, facilities and expert constraints prevent individual TBIs from providing complete support to incubatees. Establishing and maintaining working relationships should be an endeavour for all TBIs in the province to be effective.

7.8.2.1.3 TBIs strength

TBIs also need to have a platform in which they can engage on matters concerning the improvement of their service offering and enhancing the effectiveness of these units (P11: *"common platform or regular check-ins where they can communicate"*). This system will assist in ensuring that resources are utilised to benefit more incubatees and discourage those who want to exploit the TBIs and receive similar support from different TBIs (P11: *so that we can see that we are not supporting the same people with the same service"*). TBIs seem to be focused on individual strengths and weaknesses and, based on this, decide on the programme for the incubatee;

instead, the focus should be on what the small business need to develop fully (P1: *“At times we find we are so focused on what little we can do for that particular SMME, we don’t broaden our lives in terms of why not take this individual from this point to the highest point possible”*). Understanding the strengths and weaknesses of each TBI should be the basis of establishing synergies and points of collaboration.

7.8.2.1.4 TBIs as centres of best practices

Given the expertise and availability of advanced technological facilities, TBIs can provide excellent centres of best practices in the particular industry (P5: *"turn your institution or your centre into a world-class centre"*). Knowledge can be expanded and expounded through creating platforms for sharing and learning among the TBIs (P5: *“record what you are doing and share the knowledge”*). Service differentiation can also assist the TBIs in delivering the best service based on available expertise and infrastructure and also allowing for high levels of specialisation (P9: *“do software development incubation, somebody else could do hardware development, somebody could focus on just the IT part, and somebody focus on the electronics part"*). As centres or units demonstrating best practices, TBIs should focus on research to ensure that they keep abreast of the technologies, develop the skills of their experts and provide innovation support (P11: *“innovation support, capacity building and skills development, research”*).

7.8.2.2 Funding management

TBI management should actively seek opportunities for funding or investment in its operations (P2: “*seek or be able to access funding*"). TBIs need financing to attract experts to support incubatees (P2: *“It's going to be easy for an incubation program to attract service providers that have expertise”). This will lead to developing a sustainable model that will generate funding and improve the TBIs' self-sustainability (P7: “Build a sustainable model, don’t have to rely on funding”*).

TBI management should be able to exercise strict processes to ensure efficient use of its financial resources (P7: *"effectively manage funding and resources."*). TBIs can

only realise their objectives with adequate funding as incubatees are also financially challenged and expect to receive financial relief from TBIs (P10: *"putting aside funding to help the students "*).

With respect to collaborations and strengthening relationships among TBIs, they can also assist the processes of lobbying governments for support and streamlining funds to TBIs based on their abilities. This can generate maximum impact for the incubatees, as the current practice diminishes the effect of government funding as incubatees move from one programme to another (P9: *"dilutes the focus of government, dilutes the funding model that we want to achieve"*). The TBIs can manage their funding more efficiently by tapping into other agencies of government who are mandated to support SMMEs (P10: "You *don't have to go and pay for something that SEDA is offering, don't have to go and pay for something that NYDA is offering"*). TBI management needs to develop strategies to minimise its heavy reliance on government funding (P12: *"How to find funding over and above the funding that they have, there's a huge reliance on government"*). The financial management plan should indicate how the TBI intends to develop financial sustainability and have a sound sustainability plan (P12: "Have *a sustainability plan that is beyond government and also beyond grants.").* Attracting finances into the incubator will also depend on the overall functioning and management of the TBI (P12: *Incubators need to be run in such a way that they attract money; people want to come and put their money in those incubators rather than the incubator going out there begging for money, experience and willingness to learn and improve"*). Hence, the TBIs' operations and financial management principles are vital in attracting donors.

7.8.2.3 Sustainability of TBIs

Sustainability is an ideal state for the TBIs in KwaZulu-Natal (P3: *"Find a way of being self-sustainable"*). The TBI should find ways to reduce its reliance on government funding (P3: *"stop thinking that we will be forever funded by government"*). Possible and legal ways can be explored to entrench sustainability with TBIs (P3: *"one is legally eligible to generate profit"*). One such avenue is establishing an investment entity that will help the TBI by generating funds to ensure its sustainability (P3: *"need to have a*

separate entity. That will be able to assist the program"). This entity can exploit technological advancements and innovations that require financial investments to reach the market, where the TBI can share in the profits at a later stage (P3: *"another stream or income there are technological changes that are happening"*). The separate investment entity of the TBIs can also benefit the incubatees with innovations and require financial injections into the markets. Part of the TBI sustainability plan is setting up a contingency plan to ensure smooth operations within the programme P7: *"build a nice contingency, capital back up"*). A sustainable TBI ecosystem is the only way the province can fully benefit from these programmes.

7.8.2.4 TBI environmental scan

The TBIs should constantly conduct an environmental scan, including assessing the industry value chain (P5: "*Look at your environment, what do you have, Look around the value chain*"). Collaboration does not translate to TBIs doing the same things; instead, it allows each TBI to focus on its strengths (P5: "You *don't have to copy somebody else"*). This will assist the TBI in enhancing its understanding of the needs of small businesses (P7: *"have to understand the needs of SMMEs"*). These engagements will assist in developing a healthy TBI ecosystem characterised by collaborations and partnerships designed to deliver maximum impact to the incubatee (P10: *"ecosystem is that the partners don't normally sort of work together, there has got to be an integration"*). Conducting an environmental scan is likely costly for individual TBIs and may require expertise unavailable within the TBI. There needs to be a collective effort, the result of which should benefit the whole province.

7.8.2.5 Incubatee progression

Small business development can not be viewed as a linear and easily predictable journey (P5: *"There isn't a linear progress in terms of how businesses will progress"*). The incubatees may join the TBI with the idea that looks feasible; however, inherent challenges always need to be addressed (P9: *"Model on paper looks great; however, it has its limitations"*; P13: "*Commercialisation it's slow"*). There are instances where ideas might appear to have the potential; however, the incubatee may find it

challenging to take the project to the next level where it can be regarded as successful or translate into a business (P5: *"might not look so good initially but then after a while it just flourishes seem brilliant but then they struggle"*). The TBIs can also promote incubatees by identifying practical ways of accelerating their success, including establishing networks that assist incubatees with input materials for their processes (P5: *"more practical ways of doing things linking them with, for example, the clothing and textile people organising cheaper rates"*; P9: *we are constantly looking at new ways, innovative ways to improve the quality and the output."*). The TBIs, therefore, need to factor these uncertainties into their programme management tools and allocate contingency resources to ensure that the incubatee can derive maximum benefit.

7.8.2.6 Provincial economic development

The government of KwaZulu-Natal can assist the development and sustainability of TBIs and the incubatees in the province by communicating the province's vision to these entities (P9: *want to achieve provincially"*). This vision will assist the TBIs in aligning their service provisions with the province's vision, thus allowing all stakeholders to contribute towards achieving this vision. With a focused vision, the provincial government will provide the necessary resources to ensure that the required infrastructure is in place, the provincial environmental scan is conducted and updated periodically, and small businesses from rural areas are increased in participation.

7.8.2.6.1 Understand the provincial environment.

The TBIs operating in KwaZulu-Natal should try to understand the dynamics of the province in which they operate (P3: *"Get to know what are the challenges in that province, especially facing SMME, because we are operating in that sector"*). The TBIs' mandate also extends to helping communities and businesses in KwaZulu-Natal (P5: *"How we can help our communities and our business"*). TBIs in KZN need to expand their geographic reach to communities that can benefit from their services (P4: *"need to reach that is in the larger communities in order for that is for the benefit of all."*). Expanding the geographic reach will ensure equitable access for all communities within the province of KwaZulu-Natal.

7.8.2.6.2 Rural incubators

Rural areas present a challenging environment for TBIs to operate. Thus, the TBIs servicing these areas need adequate financial support (P6: *“More incubators, especially in rural areas, and more funding, especially to enable projects, should be given to incubators”*). The funding will assist the TBI in first addressing some of the barriers due to limitations in infrastructure development (P6: *"What new economies we can start exploring or investing in"*). Resourcing these TBIs may need to be adequately covered through public funds. It may require a financial injection from the province and the country's private sector (P6: *"coordination of resources both in a private and public space"*). The success of the TBIs in rural areas depends on the provincial government providing sufficient resources and infrastructure to reach SMMEs operating in these areas. The province of KwaZulu-Natal can benefit from infrastructural development to support entrepreneurship and innovation, which will benefit the TBIs and their functions (P4: *“improving that is the infrastructure”*). However, the TBIs cannot affect the necessary infrastructural development, and they will need to build relationships with other stakeholders in the province (P4: *“important that there are strong relations”*; *"Stakeholders that are involved in that space are really not, there isn’t much collab*oration").

7.8.2.7 Pre-assessment

The province of KwaZulu-Natal can also benefit from an intervention or facility that will assist in preparing the potential incubatees for the technology-focused businesses (P8: *"the preparatory framework which will prepare people in creating that understanding of how businesses operate"*). Given the high rate of unemployment among youth and even graduates, it is vital to assist the innovators and emerging entrepreneurs in the technology-focused small businesses to bridge the gap between the knowledge accumulated at the university and the business world (P8: *“There has to be a way of bridging the gap between the academic understanding and also the business understanding”*). Therefore, the TBIs must develop a needs assessment strategy so that incubatees who enrol in the TBI programmes can derive maximum

value from the interventions (P11: *"needs assessment needs to be undertaken"*). Academics and researchers who have identified ideas and projects with commercial value will also benefit from the pre-assessment feedback. These interventions also require the TBIs to review the duration of incubation programmes to factor in the individual development input, which is essential in ensuring that graduate incubatees have the necessary personal attributes (P10: *"instead of having a two-year contract with students, maybe you have a five-year contract"*).

The success of the TBIs relies on identifying the needs that the programme can address and defining recruitment strategies that will attract the ideal incubatees (P11: "*Being able to correctly meet the needs of who you serving"*). The enrolment incubatees should be aligned to the mandate and mission of the TBI (P11*"be intentional about who you supporting, how you are supporting them"*). The proper alignment of the TBI services and capabilities with the potential incubatee can only be achieved if an efficient needs analysis tool is in place. (P11: *"Needs analysis is so important to try and tailor your support"*).

The TBIs need to constantly review their operating models, including the processes they use to screen or conduct pre-assessments to ensure that inexperienced incubatees will gain maximum benefit through the incubation " (P13: *"evaluate the model that they use incubators tend to focus mostly on pre if I will say incubation, entrepreneurs are graduate from pre-incubation do we have any follow-up strategy to ensure that those that graduated actually how they are doing outside of the incubation process"*). The pre-assessment intervention will ensure that there is a filter to eliminate the small businesses that require support before venturing into the incubation programme.

7.8.2.8 Post-incubation support

The graduate incubatees also require support in the post-incubation period to ensure they are sustainable and continue to operate efficiently (P8: *"important to have the post-incubator program"*). However, this may not always be possible due to limited (P8: *funds may not permit most of the time"*). The graduate incubatees should also be

encouraged to maintain relationships and networks forged during the incubation programme (P8: *encouraged to work together, even after leaving the incubator"*). It is also essential to forge collaborations with other small business support systems to ensure continued support (P8: "*introduce them to the institutions that are like chambers of business where they will also get support"*).

Post-incubation is particularly important for incubatees who started as students, researchers or academics, including non-entrepreneurial innovators who might struggle with survival in the real business world (P13: *"post-incubation kind of follow-up programme, to ensure that they are succeeding, that their businesses are looking abroad and outside of the province and in Africa).* This end-of-the-pipeline intervention will improve the probability of small businesses surviving their infancy years.

7.8.2.9 Entrepreneur character development

The TBIs are also confronted with the challenges of incubatees who join the programme with ideas but do not have the necessary aptitude for entrepreneurship, and the process of entrenching entrepreneurial values and characters is lengthy(P9: *"don't think that everybody can be an entrepreneur overnight"*). The TBIs focus on small business development and providing technological support without emphasising the requisite personality (P9: "*haven't quite tapped into what the pedigree of person that we need to be successful*"). There is a need to have a programme or intervention that will assist incubatees in developing the appropriate character to survive and thrive within the entrepreneurship ecosystem (P9: *"address the character of the person and whether that person would fit into an entrepreneurial system"*). The TBI engagements with incubatees should also promote the culture of perpetual inquiry (P8: *"encourage that part where a person would be inquisitive"*); this attitude will be vital in sustaining their businesses as they need to keep pace with developments in the industry and technology (P8: *"develop a culture where a person would look at it more vigorously than most of them do."*).

The entrepreneur development can also assist in addressing the social challenges that the incubatee may face, which may hinder achieving a positive outcome during the

incubation process (P9: *"doesn't have the social element"*). Incubatees may have good ideas, but their success is hindered by their social background (P9: *I see a lot of the imposing of those standards here where people are more liberal; they grew up in systems where they were able to communicate and share their views etcetera*). Young people face numerous social struggles; if not addressed, they may find their way into the incubation programme, negatively affecting their progress (P9: *It does not suit our environment. "don't know what their day-to-day struggles are"*). The challenge of the TBIs taking on the programme incubatees who lack the fundamental character and attitude of an entrepreneur or innovator presents the risks of wasting resources and preventing the potential candidate from benefitting.

7.8.3 Discussion and conclusion

This section presents a discussion and conclusions on Theme 5.

7.8.3.1 Discussion

The study participants believe that TBIs should constantly review their service offerings to ensure that they will lead to the complete and total development of the small business. The current policy landscape (Chapter 3) focuses on developing enterprises to address the challenges of poverty, inequality, and unemployment. However, there is an argument for moving from these policies to those focused on enterprise growth and stimulation of innovation (Anwana & Anwana, 2020:4). Rethinking and redesigning the programs will also ensure their relevance. Providing holistic support should consider the needs of small businesses and support them throughout the value chain of their operations (Kansheba & Wald, 2020:951). The participants also raised a concern that the TBI interventions theme (Theme 2) is focused on providing business technological support to incubatees without assessing the personal fitness of the incubatee. This view is supported by Pillay and Kikasu, (2024:342), who emphasised the need to develop the personal entrepreneurial attributes of incubatees. Pre- and post-incubation interventions may assist in developing the appropriate entrepreneur or innovator traits to sustain the business in a technologically evolving world.

The South African government, thought leaders, private sector, academics and educational and vocational training centres all agree that technological entrepreneurship has become a vital component of economic growth and sustenance (Lose, 2021:2). Hence, service differentiation will also allow for improvements in the offerings of each TBI, eliminating duplication and fostering collaborations that will benefit the province. This approach will also eliminate the challenge of incubatees moving from one incubator to another, leading to wasteful expenditures. TBI staff is one of the critical resources in the support provided by the TBIs. They need to have the necessary experience and credentials to provide support to the incubatees. However, the findings of the studies indicated that this assertion is not always true, as there are incidents of mismatch between the available skills and funding stipulations. Their contribution as field experts requires improvement through targeted staff capacity development initiatives. However, (Audretsch *et al.,* 2019:314), argue that strategic advantage cannot be solely based on in-house resources but rather on shared resources available through collaborations. Their scientific and technological know-how should also keep pace with developments in their fields and be shared with other TBIs in the province. Similar arguments apply to facilities and infrastructural advantages available within the TBI space in the province.

The findings also revealed that the effectiveness of TBI support could be improved by designing an intervention that addresses specific challenges confronting incubatees. Therefore, tailored support is preferred over generic programmes. There is space for generic interventions in the area of skills development, where the incubatees are faced with similar challenges. The TBIs should have sufficient flexibility to move from generic to tailored interventions to provide complete support to incubatees. However, this proposition may be hindered by the challenge of limited financial resources even within the TBIs (Theme 4). The TBIs have to devise strategies for revenue diversification to ensure that they are sufficiently resourced and can meet the needs of a greater number of incubatees. These strategies may also include exploring private-public partnerships involving industry and higher education institutions (Department of Trade, Industry and Competition, 2024: 117). The partnerships can also assist the TBIs in achieving their inclusivity targets.

7.8.3.2 Conclusion

TBIs can benefit from the active establishment of synergies among TBIs in KZN, as the current scenario leans more towards silo development. Improvements in providing holistic support will benefit incubatees, minimise the need to move from one TBI to another and establish new relationships. TBIs can be extensions of one another, allowing for smooth transitioning between them. The TBIs must also identify and build on strengths and use these abilities to collaborate and partner with other organisations, including government, industry and universities (Audretsch *et al.*, 2019). While TBIs need to diversify income streams, the ability to manage funds effectively and the development of a stakeholder management strategy will ensure continued access to financial resources. These efforts will lead to sustainable TBIs in the province. Undertaking constant environmental scans for alignment with the needs of small businesses and other TBIs. The TBI should also consider intensifying its monitoring process for incubatee developments, which will require strong pre- and post-incubation assessment tools and methods. The focus on developing the entrepreneurial character must also be refined so that capable entrepreneurs or innovators can emerge from the TBIs (Tutuba & Tundui, 2022:10).

7.8.4 Alignment with the primary aim and secondary objectives of the study

The primary objective of this study is to develop a framework for incubating technology businesses in growing sustainable small companies in KwaZulu-Natal. The findings of Theme 5 provide strategies for improving the effectiveness of the TBIs in KwaZulu-Natal.The theme first provides methods within the sphere of influence of TBI management that will improve the effectiveness of TBIs. These challenges relate to improving areas of the TBI operations, including programme design, diverse income streams, and establishing collaborations and partnerships. The second set of improvement strategies, classified as lessons learnt and advice for future managers, include all the interventions that will require the TBI to engage with other stakeholders to improve their effectiveness. Such strategies include creating synergies in the operations of the TBIs across the province, government involvement and establishing

mutually beneficial relationships with the TBIs.These strategies can collectively improve the effectiveness of the TBIs in the province of KwaZulu-Natal.

Table 7.18 presents the links with the secondary objectives of the study.

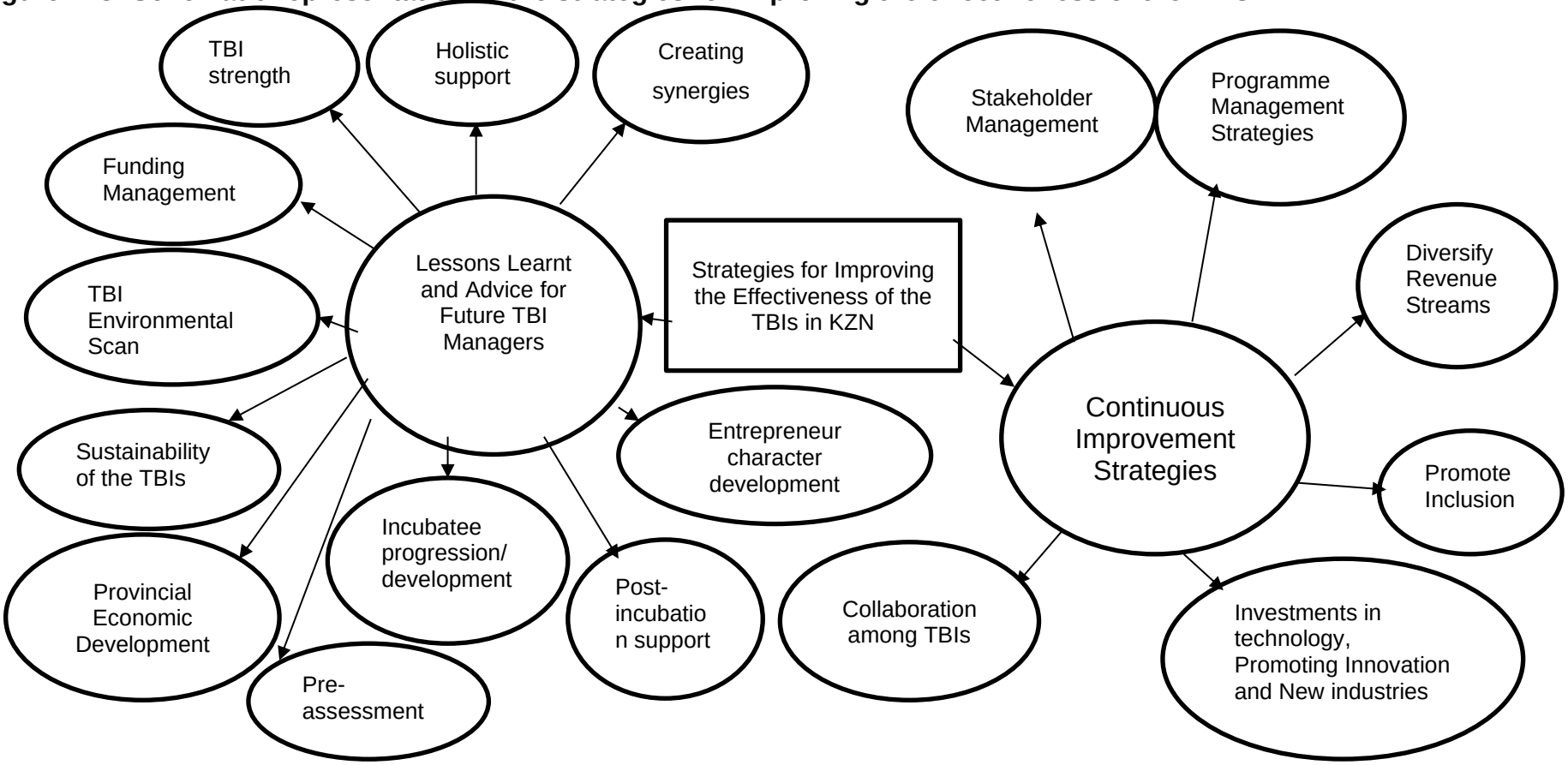
Table 7. 18: Theme 5: Links with the secondary objectives of the study

Research objective	
SO4: To explore and describe the mode of operation for technology business incubators.	Theme 5 presents strategies that TBIs can utilise to improve their effectiveness. The continuous improvement strategies provide the areas the TBI can target for constant improvement. The areas relate to redesigning their interventions and enhancing relationships with other roleplayers. Lessons learnt by TBI management pave the way for future management to consider collaborations that will generate synergies for the incubatees in the province.
SO5: To explore and describe the experiences of technology incubation programme managers/CEOS/directors	TBI management has identified areas it can influence to ensure that TBIs respond positively to their mandate. These relate to areas that TBI management cannot influence directly and will require a collective view and approach from all TBIs in the province, other stakeholders, and the provincial government.

Source: Researcher's creation

Figure 7.8 presents a schematic representation of the strategies for improving the effectiveness of TBIs in KwaZulu-Natal.

Figure 7. 8: Schematic representation of the strategies for improving the effectiveness of the TBIs in KZN



Source: Researcher's creation

7.9 THEME 6: MODE OF OPERATION FOR TBI

The mode of operation theme considers the distinct approach to technology business incubation in the province of KwaZulu-Natal based on a specific combination of techniques, skills, networks, compliance issues, monitoring and evaluation factors, or settings related to that mode. A total of 296 codes were recognised in this theme, with P12 contributing significantly to the codes. These codes generated four sub-themes presented as follows:

- TBI Networks
- Profile of TBI Staff
- Importance of Compliance within the TBI space
- Monitoring and Evaluation

Table 7.19 presents the sub-themes and categories for Theme 6.

Table 7. 19: Theme 6: Sub-themes and categories for Theme 6

Theme	Sub-themes	Categories
Mode of Operation for TBIs	TBI Networks	• Partnerships • Networks to strengthen the pipeline of incubatees • Relevant Stakeholders: Partners and Collaborators • Increasing the pipeline of incubatees • Pool of Relevant Stakeholders • Access to Complementary Services • Access to new technologies • Benefits to incubatees • TBI's position within the ecosystem • Benefits to incubatees • Benefits to incubatees
	Profile of TBI Staff	• TBI Staff Capabilities • Relevant Technical knowledge and experience • TBI Leadership Development Contractual Agreements • Product/Service Compliance • Legal Compliance • Community of Practice
	Importance of Compliance within the TBI space	• Contractual Agreements • Product/Service Compliance • Legal Compliance • Community of Practice
	Monitoring and Evaluation	• M&E Driven by Funding Agencies • M&E TBI services

Source: Researcher's creation

The findings revealed that TBIs cannot operate independently of other stakeholders and roleplayers in the province of KwaZulu-Natal. The summary of stakeholders is presented in Table 7.21. The findings also revealed the importance and role of establishing and maintaining networks and how these will contribute towards the holistic development of the incubatee. It also established that the TBI staff should be adequately skilled and experienced to provide the best experience for the incubatees. Compliance monitoring and evaluation sessions apply to both the TBI and the incubatee. These are essential in adhering to best practices that align with global standards.

The data collected is presented in Table 7.20, with each participant's findings summarised. This data is then followed by an extensive analysis that examines each code to develop a framework for improving the effectiveness of TBIs in KZN.

Table 7. 20: THEME 6: Mode of Operation for TBIs

	TBI Networks	Profile of TBI Staff	Importance of Compliance	Monitoring and Evaluation	Summary of Findings for individual participants
1	*"identified and worked with a few stakeholders in the past."* *"Forge relationships with other stakeholders and other units."* *"units that can either complement what we do, that can do what we do maybe on a bigger scale, tap into that network."* *"different stakeholders, different departments, different people that can rope in bridging that gap by partnering with other incubators."*	*"people that can actually complement what the unit seeks to achieve."* *"Tap into the experiences of our staff and employees,"* *"capacitate each other so at any point in time, a leadership role is given to a different staff member."*	*"superior product"* *"that gives them an edge over their competitors."* *"that will meet set standards".*	*"The funder does monitoring and evaluation, and it is done bi-annually, twice a year, in the second quarter and the last quarter."* *"We have our planning meetings for different activities within the unit."*	TBI networks with other units and relevant stakeholders have the potential to enhance its effectiveness. TBI management needs to be instrumental in identifying relationships that will complement the TBI's services. The TBIs' experiences must be enhanced, and measures must be taken to ensure capable leadership is always in place. Compliance assists incubatees in delivering superior products and services that meet the applicable standards and will give them an edge over their competitors. Monitoring and evaluation are critical functions within the TBI linked to funding conditions and, hence, carried out by the funder. However, internal planning within the TBI is needed.
2	*"Whenever we don't provide them, we enable them to see where they can find assistance with their needs";*	*"The staff at the incubation program can identify specific areas where they should make improvements or where they have achieved specific successes."*	*"Legally compliant, in other words, the company must submit CIPC returns. Registration on the central supply database."*	*"People from the incubation program visit the people, the incubatees at their businesses, the local business."* *"See how they set up their operations."*	The TBI networks benefit the incubatees through referrals on challenges that cannot be addressed internally. The TBI also organises engagements with entrepreneurs who are successful in their fields of interest.

			“Compliance with the SARS program enables them to get into the business, emphasise the importance of compliance.” *“have to have bank accounts.”*	*“Incubatees come to the incubation centre and share challenges and successes. Say to them, but what about that? We noticed this when we visited you last month. How do we address that?”*	The experiences of the TBI staff should assist incubatees in identifying and addressing business challenges. Legal compliance is one critical compliance measure for a registered company in SA. Other areas include paying taxes through SARS, registering on the central supplier database, and always having a bankable business plan.
3	*“partnered with other institutions.”* *We have to partner with other institutions, which will also add value to our SMMEs.”* *“The issue of partnership it is.”*	*“We are sector-specific, but as far as we know, XL is highly broad.”*	*"comply with all those requirements with the department."* *“companies have to be registered with the Department of Labour all the compliance issues they have to adhere to them”* *"CSD registration and compliance with SARS.”* *"SMMEs benefit from that for the growth of their business; all the compliance issues are met, and all these regulations*	*“All the engagement feeds into the report, what has been discussed and agreed and achieved.”*	Partnerships benefit incubatees as the TBIs acknowledge the fact that they cannot continue operating in silos, and other institutions in the province are crucial to the development of incubatees. TBI is focused on specific technology Compliance is critical to the success and growth of the business, and adherence should always be ensured. Entities that must be complied with include Labour, CSD, and SARS. TBI activities should always be documented in a report that is readily available as may be required.

			can now compete with the other businesses in the market, which will also add value to our SMMEs."		
4	*"a lot of gaps in terms of entrepreneurship development"* *"We would have a lot of people who have skills and who can start their businesses."* *"Strengthening the TVET colleges; schools giving information,."* *"Capacitating people to start their business."* *"Stakeholders that are involved in that space are really not; there isn't much collaboration, and more can be done."*	*"was an X, which is an expert that can be able to handhold."* *"Access to the expert knowledge, best practices, industry experience."* *"Being able to network with other small businesses; learn from others."* *"Walk with the client all the way";*	*"issues of compliance, registration with CIPC."*	*"What is the progress that the client has made after the implementation of the intervention?"* *"Measure the impact of the intervention, improvement assessment, after a minimum of six months, after the operation, or after the intervention, in terms of the turnover, in terms of creating employment."* *"continuous monitoring. Measure the impact of the intervention, clear indicators at the beginning, and assist you in terms of when you do that. That is the evaluation."*	essential things. Networks can facilitate the gaps in entrepreneurship development in the province. TVET Colleges can contribute to a healthy entrepreneurship ecosystem by instilling an entrepreneurial mindset amongst their artisans and technicians. Schools can also contribute by providing information support to learners at an early stage. The absence or minimal collaboration amongst stakeholders is noted as a concern. TBI management should have the relevant expertise in the industry of choice and be able to establish and maintain networks. Compliance issues are fundamental for the incubatees, including registration of the CIPC. Monitoring and evaluation are critical to monitor the progress of the incubatee and should be planned at critical intervals as it also assists in gauging the effectiveness of the intervention.

				“constant monitoring”	
5	*"Understand your capacity and capabilities."* *“Bring in fresh ideas; partnerships are very important.”* *"We share resources, we share a lot of our information."* *"We partnered with them and ran the sessions with them.”* *“It brings everybody together to run a couple of partner programs with them to develop programs and to run programs with start-ups' essential ability to network university opportunities links with industry, academia, and communities and facilitate those relationships.”* *“building relationships with tech stations at the university.”*	*“We have a very small team, while we have a very good team within our incubator, our staff is very well-trained and very capable.”* *“Some areas where we are different from the experts bring in other people, like people in finance and marketing.”* *“The biggest part of our focus is on mentoring and coaching.”.*	*“compliance, the certification.”* *“the statutory regulations.”* *“obtain ISO standards."*	*“SEDA gives us our key performance indicators, and from that, we develop our programs.”* *“Our businesses in terms of their sales and finances. At a glance, we know that if a business is not doing well, it needs to be fixed before it reaches a critical stage”* *“conduct site visits understanding of where the business is, their markets, how their operations”* *“reviewed it and to say is thus making an impact, constantly reviewing”; “look at our program, see where we are, what are some of the key challenges, how we need to address them, what needs to change, what*	Partnerships are essential for the effectiveness of TBIs. Programs run in partnership with others result in incubatees benefiting from the resources, information, and skills of each partner. The capacitation of TBI staff is critical in its ability to deliver effective programmes. However, it is equally important to identify areas of limitations in capacity and further identify partners or external stakeholders that bridge the skills gap. General TBIs employ people who meet traditional business requirements, such as marketing and finance, among others. Compliance with statutory requirements is needed to ensure incubatee success. There is a clear indication that the funder or funding organisations dictate the KPI for the TBI and that instruments will be used to determine and identify success factors. The impact of the TBI programme is aligned with the funding agency's KPIs.

	“I am not doing the research like I should be doing as a manager;”			*can stay, do on a regular basis.”*	
6	*“providing the same service to the same clients; they are not competition, an extension of each other, coexisting and not competing.”* *“Vigorously establishing interrelations, both within the X family or beyond, deliver can be more.”* *"Leverage on the resource, the benefit of the incubatee, key if the incubation system is going to exist, the fiscus is diminishing.”* *"Support that one incubator may want to provide may not be sufficient, limited resources.”* *“Business support and other incubators provide technical support, and, in combination, the best of both, rather than one focusing on both.”*	*“recruit, appoint and retain the correct skills.”* *"If you do not have the correct skills to support or even guide the innovators as they develop their processes, the circle is still not complete”*	*“improving on those administrative aspects”*	*“key aspect impactful if you can monitor and evaluate”* *"internal processes of ensuring monitoring and evaluation."* *“monitor progress on projects assess the impact.”;* *"quantify if the value really justifies the outcome"* *“necessary for reporting purposes, monitor progress on projects, number of jobs created, within the specified budget, within the specified time.”*	One of the challenges facing TBIs is servicing the same client with a number of TBIs, given that there is communication between their systems. The atmosphere of competition, as opposed to collaboration, dominates the sector. Interrelationships are a possible solution to this dilemma, especially given that most TBIs receive funding from similar institutions. The interrelationships are also said to benefit incubatees through leveraging resources, especially in the light of fiancial difficulties experienced by the government. The limited funds render each TBI unable to function fully. Collaboration among TBIs and within government departments is going to be vital in ensuring that TBIs continue to operate. Running a TBI requires extensive funding due to the nature of its operations and high-end infrastructure requirements. Ensuring that TBIs operate within an ecosystem or network will ensure that they maximise their benefit to the incubatee and entrench their sustainability. The critical skills shortage is also a challenge for TBIs as they need to identify ways to recruit and retain the right skills for the industry in

	"Interrelations affect the perspective and the function of the incubator," *"hop around from one incubator to the next, depending on the type of service that they can offer."* *"one incubator is not within a network or an ecosystem; it's very likely not going to be able to render all the services."* *"end-user experience to incubatees"; collaboration with the government department"* *: Collaborating with other funders."* *"SMME that needs to benefit rather than competing for the same resources."* *"SMMEs to access, to have access to other high tech infrastructure or high tech skills beyond just KZN."*				which the TBi is focused. The administrative function of the TBi also needs to be streamlined, along with the operations and position of the TBIs.Monitoring and evaluation are critical functions within TBIs as they are systems designed to ensure that the programme delivers its outputs and outcomes and is likely to render the desired impact.
7	*"interrelationship with the other incubatees, you*	*"Bi-annual performance appraisals*	*"do not have to rely on funding; as an*	*"also assess progress in terms of turnover,*	Interrelationships among incubatees are the critical success factor. TBIs do

	know with KZN, we are not so densely populated as with Gauteng and Cape Town." *"Our models are different because our inputs are different as well."* *"when the need arises we can collaborate on programmes."* *"Can collaborate on anything if the need arises."* *"The incubation ecosystem is structured, you can operate quite independently as well."* *"who at some stage support, invest in and fund our programs."*	*are also for our staff. "* *" staff, if we don't perform, it will be very difficult for our SMMEs to perform."* *training, internally our staff,* *"for training, for development, for growth."*	*incubator, you also need to develop a sustainable model that does not rely on funding."* *"So when government funding does not come in, like with Covid, many incubators lost funding because the money went into the Covid fund."*	*clients access success in terms of jobs."* *"Internal reports happen, and monthly reports are sent to all our funders. It is a very streamlined affair."* *"Deliverables that you are supposed to be achieving are monitored against those deliverables.* *"Have your deliverables which you are supposed to be achieving?"* *"Staff, if we don't perform, it is going to be very difficult for our SMMEs to perform."* *quarterly satisfaction survey with our SMMEs."* *"It is not us who designs the survey form; it comes from our funder, SEDA."*	collaborate when necessary. Staff performance appraisals ensure that the incubatee will benefit from the programme. Hence, staff development measures are essential for TBI. The challenges associated with how TBIs are funded became evident during COVID-19 when they lost funding to mitigate the virus's spread. This diversion of funds calls for the development of a sustainable model for TBIs. Turnover and job creation are among the success measures that TBIs monitor. Other measures relate to how well incubatees meet the targets that they have set for themselves.
8	*"We also have some relationships in terms of funding."*	*"chaired the board"* *"Affects the perspective where necessary; we have to*	*"in an environment which is not*	*"no monitoring of how far it went."*	TBIs face the challenge of having multiple funders, each with a set of stipulations and mandates. These relationships need to be

	“So our funders also help us in fulfilling the mandate of the establishment of the institutions." *"Relationship between personalities in different institutions and provision of support"* *“Political changes in the country somehow it affect delivery or even provision of the services.”* *"Creativity on the other side. So that requires the different institutions that operate in the same sector or in the same field to work together, not competing."*	*improve our line of production and allow our line of operation.”* *“No exposure to what businesses need, such as institutions which have the base mostly of the previously disadvantaged individuals."*	*business compliant."* *"governments absorb these people and have them supply government departments and government offices."* *“Technology goes with quality; produce similar products and no compromise on that quality.”* *"There are industries where you will find that it has been looking so impossible."* *." Every funder comes up with the mandate.”* *"Those that you get funds from, they come with their own expectations."*	*“It helps us to monitor the growth of each business.”* *“How is the business growing in all areas of development, and how is the business owner growing in understanding his or her own business?”* *“You would find that one department would go there and report on its own without looking at the other.”*	managed, and they can range from funding agreements to institutional and political influences. Managing these requires creativity from the side of the TBI and fostering relationships with other incubators. There is the challenge of the need for more exposure to businesses and their challenges, mainly in institutions having previously disadvantaged individuals. The business environment in which the incubatee operates must comply with applicable regulations. One measure of assisting incubatees is encouraging the government to source from small businesses. However, the success of this is the ability of small companies to produce products of acceptable standards and quality. TBis conduct M&E for incubatees, with each one focusing on its set of variables, which may not communicate to other entities that support the incubatee.

9	*"Interrelationships between the incubators are nonexistent."* *" Interrelationships, the lack thereof, do not encourage collaboration between the stakeholders and the partners."*	*"We haven't quite, in my view, really do not think we quite understand some of the challenges that relate to business incubation in our country."* *"Challenges from other countries, the U.S. and Europe in particular, and imposed those challenges upon us."* *"Social challenges are very different in our country,"*	*"need to meet international standards and regulations and international standards."*	*"Our monitoring is not the best. We rely solely on the financial performance of the organisation, and we are assuming that everything else is going okay."* *"What support do you need? Then we put in the support."* *"The monitoring in that respect is not developed."*	Interrelationships among TBIs are nonexistent, and so are the collaborations with partners and stakeholders. The lack of a tailor-made incubation model for SA is a concern. The challenges experienced by these programmes should be identified and understood, and mitigation measures should be put in place. These include measures to address SA-specific challenges. Incubatees should be assisted in complying with international and national standards, thus preparing for the global economy. There is also a need to improve the M&E measures that TBIs put in place to ensure the holistic development of the incubatee.
10	*"Relationships with the lecturers, the SRC with the broader ecosystem."* *"these relationships are essential in order to achieve synergy."* *"to make sure that we use the resources efficiently."*	*"heading the unit."*	*"CIPC is critical in that entrepreneurs must register to participate in the formal economy."* *"SARS they will not be able to get their contract from big entities because you need to be tax compliant."* *SABS approval of other health vendors*	*"a project plan, their milestones on monthly basis, they meet with one of the officers, then during those sessions, we can evaluate and monitor and help them to improve inform the tranche payment because all we do is not give them the payment as a lump sum."*	The TBIs associated with universities need to adopt a broader stakeholder management approach encompassing staff and students, further highlighting the importance of a lively TBI ecosystem. Building relationships will also assist with efficient resource management. Compliance, including alignment with legal requirements for operating a business in South Africa, is substantial. M&E is an essential tool for improving the business of the incubatee.M&E outcomes are also used as measures to qualify for further support, including access to funding.

11	*“wary of organisations that claim to be a one-stop shop or be able to do everything.”* *“ensure that we are leveraging those areas of specialisation. within the ecosystem that this is extremely important in order for one to be successful.”* *"A mentor and someone that will guide and advise, definitely that’s important."* *“have good mentors; all have areas of expertise, specialise.”*	*“Capacity constraints at these incubators, and it isn't easy to be able to customise every time you get a new cohort.”* *"A lot of people need support, and given the capacity constraints, there is only so much support that we can deliver.”* *“There is a small skills gap in the team.”* *“We have good mentors.”* *“We all have areas of expertise. We ensure that we are leveraging those areas of specialisation within the ecosystem. This is extremely important in order for one to be successful."*	*“partner that can help to understand the governance and legal compliance other than IP.”* *“Governance does not equal legal.”* *"*	*“Monitoring and evaluation framework.”* *"Measure outputs, outcomes and impacts."* *“Program areas and platforms are measured on our MNE framework, which collects the data and stats from beneficiaries, partners, and whoever it may be."* *“got an internal M&E system, which looks at outputs, do M&E during the program, and as soon as the program is concluded.”*	Each TBI should focus its efforts on specific areas where they have specialist knowledge and operate within a bigger ecosystem. The complementary skills and competencies can be accessed through partnerships within the ecosystem. The TBIs should ensure access to good mentors and specialists who can provide advice where necessary. Such advice will include matters of governance, IP and Capacity constraints, and funding limitations, which will make it difficult for TBIs to generate tailor-made solutions for incubatees. The skills gap among TBI staff is also another factor in the level of service that TBIs can provide. The M&E framework for incubatees and the programme itself assist in identifying successes for the TBI. M&E is conducted at initiation, during and at the end of the intervention.
12	*“Part of their relationship, your incubatees, they have an outlet, the product that they are probably working on could be sold to some of these partners.”* *“Partners could find potential buyers of these products, access for*	*“incubators are affected by a shortage of skilled incubators, people who can lead incubators.”* *“People who’ve been in the game or understand the whole value chain of incubation.”* *“Incubators would just take anyone who’s closely*	*“form a community of practice possible mentorship opportunities.”*	*"monitor all the steps, you know,* *all the steps that are articulated in a business plan."* *"make sure that all the sub-line items* *within the business plan are done as per*	Introducing stakeholders to incubatees also assist them in identifying future partners and clients. There is also a challenge of huge reliance on the government from both the TBI and the incubatee. Stakeholders will also entail successful entrepreneurs who can share their stories of success and motivate incubatees or create role models for the entrepreneurs. It is also important for TBI

	potential buyers of the incubatee product." *"Activators at a policy level, activators of SMMEs, incubation and entrepreneurship."* *"Can actually solve their problems."* *"huge reliance on government,* *"Exposing entrepreneurs or innovators to similar successful stories.";* *"secure X investment to those small businesses that were incubated; derisking, how do you engage, mustn't engage in a manner that will discourage people." Derisk the investment that the institution would have made in supporting those institutions."* *"some ideas might not necessarily fit the funding mechanism, your funding mechanism, but does it mean they don't fit other funding mechanisms?"*	*associated or close enough to run an incubator."* *"lack of resources, human resources:; "to run an incubator you really need someone who is very skilled in that space"* *":ncubators have their own nuances that needs to be, that you can sometimes only understand because of the, you've been long enough in that space."* *"skilled incubation management."* *"Administrative personnel, warm bodies and technical individuals."* *"resident specialist, able to technically troubleshoot at any stage of the technical process. but that costs money to have a technical specialist resident."* *"Incubators right now will tend to rely, say, on ad hoc technical assistance, may not know the genesis of where everything started, solution*		*plan and within of course budget,"* *monthly meetings* *"monitoring and evaluation is* *deliberately planned into every project " from the conceptualisation of the idea to the incubation of the idea, "progress tracking,* *quarterly meetings, the steering committee go there physically to check, develop a checklist* *Sit down with the entrepreneur, ask specific questions, show you around, "supposed to buy business equipment,* *that equipment is there, it's functional," producing as per intention. Taking stock of what was said."*	staff to engage with incubatees in a manner that will encourage them. Derisking businesses and presenting acceptable investments are some of the critical functions of the TBI. TBI staff should be able to help clients refine ideas and, where possible, signpost them for others if they can fund or support the potential incubatee. There is a skills gap in the TBI staff around ideation and understanding the whole value chain, which is critical in assessing the idea presented by the incubatee. This situation results in the TBI utilising external support to assist with the technical know-how essential for an appropriate feasibility study. TBI staff should also be able to identify areas where they can source funding and have networks and knowledge to achieve the sustainability goal for the TBI. The community of practice is a possible solution to assisting the skills development initiatives for TBIs. The M&E function should apply to all projects, be linked to incubatees' business plans, and monitor all aspects of the business.

		provided is not holistic"skilled incubation leaders." *"Individuals know, how and where to find additional funding; other than just the government, many other avenues where funding can be leveraged, inexperienced incubation manager that has no networks has no experience of applying for grants management upskilling; have trained people, experienced people, people who are continuously improving in their craft of incubating businesses, of being incubation managers."*			
13	*"Institutions like to work independently, which is a major challenge."* *"Existing partnership."* *"Academics that come up with an idea to translate each into a working prototype, we will need somebody with the skills that would basically."* *"translate that into a tangible prototype."*	*"level of IP management, specialised kind of advice."* *"if maybe you will also have a relationship from abroad.* *"provide mentorship in terms of business development."* *"It is important also to have international stakeholders."* *"can't really depend on yourselves,."*	*"office goes to the extent of working or outsourcing external expertise."* *"Other issues are complicated. A complicated or complex matter, but then the level of advice."*	*"A platform like your X, which basically assists you in technology analysis and evaluation the moment we see your spreadsheets."* *" rank your technologists that you have and patents* *conduct your market assessments*	TBIs require rare skills in prototype development, which are only sometimes available within the TBI and have to be sourced from outside. Both the public and private sectors, which are predominantly SMMES, have a role to play in the technology development and funding of such projects. This stage determines the success of the project. TBIs also need specialised skills in the area of IP management. Skilled mentors are valuable in supporting the TBIs. The TBI should also establish national and

	“Both the private sector and the public sector play a huge role in terms of funding and development.” *"Small, medium enterprises, mostly those that play an important role, for example, in terms of technology development."* *"That is one aspect that will drive entrepreneurship into success."*			*Do your commercial case technologies that are still relevant to the market. The trend and drivers for each portfolio of technologists' management teams, with the researchers' ongoing meetings.”* *“Check on how the portfolio is doing.”*	international stakeholders to drive the programme's success. Outsourcing some key skills and purchasing suitable software packages are factors that assist the TBI in discharging its duties. The combination will assist the TBI with assessments, market trends and, subsequently, the project's successful conclusion.

Source: Researcher’s creation

7.9.1 TBI networks

The TBI need the network to achieve various objectives that are essential in improving the effectiveness of these entities and ensuring long-term impact and benefit to incubatees. These networking engagements are discussed. Working together eliminates the duplications of service and perceived competition, thus ensuring maximum utilisation of resources and saving incubatees time of engaging with numerous TBIs to get comprehensive support (P6: *“providing the same service to the same clients; the TBIs are not competition, they are an extension of each other, coexisting and not competing”)*. TBIs bring variations in models of operations, and therefore, each can provide a learning platform for other TBIs (P7: *Our models are different because our inputs are different as well"*). The TBIs have numerous stakeholders within the KZN TBI ecosystem, and they need to make a conscientious effort to forge collaborations with these entities to strengthen the TBI impact within the province (P4: *“There are stakeholders that are involved in that space, and there is not much collaboration, more that can be done"*).

The formation of networks is essential to bridge the gaps within the entrepreneurship ecosystem those within the TBI itself (P4: *"a lot of gaps in entrepreneurship development"*; P1: *"units that can either complement what we do, that can do what we do maybe on a bigger scale, tap into that network*”). The TBI may also need different stakeholders for the various stages of its life, development, and operations (P1: *different stakeholders, departments, and people who can rope in to bridge that gap by partnering with other incubators*). The effectiveness of networks requires the TBI to establish a clear understanding of its capabilities and capacity as the baseline for identifying the necessary networks. These become the points of engagement with potential partners or stakeholders (P5: "understand what *your capacity and your capabilities are”*; P6: *"SMMEs to actually access, to have access to other high tech infrastructure or high tech skills beyond just KZN*). This exercise will also assist the TBI in identifying the expertise it can offer to the targeted partners and stakeholders (P6: *"leverage on the resource, the benefit of the incubatee, key if the incubation system is going to exist" fiscus is diminishing”*; P6: *business support and other incubators providing technical support and in combination the best of both rather that one focusing on both”*). It is also important to note that a functional ecosystem allows for both

collaboration and independence (P7: *"The incubation ecosystem is structured, and you can operate quite independently as well"*)

The following sections discuss the importance of partnerships and how these can benefit both the TBI and its incubatees.

7.9.1.1 Partnerships

One challenge within the TBI sector is the lack of partnerships (P13: "*Institutions like to work independently, which is a major challenge"*). The hindrances to collaborations also emanate from programmes that seek to provide holistic support to incubatees without collaborations with other organisations (P11: *"wary of organisations that claim to be a one-stop shop or be able to do everything"*). Networks present TBI with potential partners and establish partnerships to assist TBI in gaining access to physical, human, and financial resources that will positively impact the programme. The TBIs also need alliances and networks of individuals who can assist in developing ideas into marketable products (P13: "*Academics who come with an idea, to translate each into a working prototype, we will need somebody with the skills that would basically translate that into a tangible prototype"*). The reality of limited resources is one of the motivators that assist TBI management in considering the importance of establishing networks and forging partnerships and collaborations (P6: *"limited resources"*; P10: *"to make sure that we use the resources efficiently"*). The search for resources should guide the TBIs towards forging good relationships with funding agencies (P8: *"interrelationships we also have with some in terms of funding"*). The TBIs undertake resource-intensive operations to support the incubatees, which will require funding support (P8: "*Our funders also help us fulfil the mandate of the establishment of the institutions"*). Funding the TBI should be a combination of revenue streams from the public and private sectors (P13: "*both private sector and public sector playing a huge role in funding and development"*). The networks can also assist the TBIs in reducing the heavy reliance on the government through private company engagements that can alleviate the resources pressure currently experienced by the TBIs and their incubatees (P12: *can actually solve their problems a huge reliance on government"*). Given that the government is critical to funding TBIs, these programmes are unavoidably affected by the political movements within the country (P8: "*Political*

changes in the country"). The government's priorities will impact the mandate and resource access (P8: "Somehow *it affects delivery or even provision of the services"*). The scourge of the COVID-19 pandemic bears evidence to the challenge of government redirecting finances to address a global challenge. Similarly, the TBI should work towards maintaining good relationships with other TBIs and stakeholders to safeguard their operations from changing political leadership (P8 *"Relationship between personalities in different institutions and provision of support"*). Some networks can be with vital stakeholders in ensuring continued and practical support for innovators at the policy level (P12: *"activators at a policy level, activators of SMMEs, incubation and entrepreneurship"*).

7.9.1.2 Increasing the pipeline of incubatees

The sustainability of TBIs requires a maintainable pipeline of incubatees with skills and innovative ideas to join the incubation programme (P4: *we would have a lot of people that have skills and can start their businesses"*). Hence, TBI networks consisting of schools and institutions post-school learning will assist in generating and encouraging interest in high-tech among SMMEs (P4: "*strengthening that is the TVET colleges; schools giving information capacitating people to start their own business"*). A singular reference point for incubatees will also assist in eliminating the challenge of incubatees having to move from one TBI to another for essential services (P6: *"hop around from one incubator to the next depending on the type of service that they can offer"*). This support will also increase the potential incubatees for TBIs. The TBIs that operate within universities need to understand that academics and the student body are amongst their potential incubatees (P10: *relationships, this is not just a strategic move, but a call to action for all stakeholders with the lecturers, the SRC with the broader ecosystem"*). The TBI management must create synergies with internal stakeholders to improve the number of incubatees and the quality of interventions and outcomes (P10: *"These relationships are essential in order to achieve synergy"*).

7.9.1.3 Pool of relevant stakeholders

The TBI's management needs to identify the stakeholders so that the appropriate relationships can be established (P1: *"identified and worked with a few stakeholders*

in the past"; "Forge relationships with other stakeholders and other units"; P6: *collaboration with the government department" collaborating with other funders";* P7: *"can collaborate on anything if the need arises"*). The TBIs must creatively develop interrelationships among themselves (P9: *"Interrelationships between the incubators is nonexistent"*) to enhance their ability to design interventions that will address incubatee challenges collaboratively (P8: *"Creativity, on the other hand, requires the different institutions that operate in the same sector or in the same field to work together not competing*"). TBIs lack the relevant interrelationships necessary for establishing and maintaining beneficial collaborations and partnerships (P9: "Interrelationships*, the lack thereof, does not encourage collaboration between the stakeholders and the partners"*).

Forging relationships with stakeholders requires creating spaces for all affected parties to engage and provide holistic support to the incubatees (P5*: brings everybody together to run a couple of partner programs with them to develop programs and to run programs with for start-ups the basic ability to network"*). Being part of the ecosystems forces the TBI to identify its niche and operate within the ecosystem by adding value to other TBIs and thus benefitting incubatees (P6: *"interrelations affect the perspective and the function of the incubator"*).

To remain competitive, TBI management should be capable of scanning the environment and engaging partners that will refresh its service offering and assist it in being more practical (P5: "*Bring in fresh ideas partnerships are very important"; P5: I am not doing the research like I should be doing as manager"*). Keeping abreast of developments is particularly important as the technology space is dynamic and requires TBI to offer support at the cutting edge of technology.

It is also possible for TBI to share resources and undertake interventions jointly; hence relying on each partner's strengths (P5: "*We share resources, we share a lot of our information,"* P6: *"one incubator is not within a network or within an ecosystem, it's very likely not going to be able to render all the services";* P7: *"when the need arises we can collaborate on programmes"*). Universities and other post-school education institutions provide an excellent platform to access the information generated by researchers and academics and build on the existing industry and community

relationships with these institutions who have a history of excellent relationships (P5: *university opportunities links with industry, academia, communities*").

7.9.1.4 Access complementary services

The TBIs also use networks to complement their services to provide holistic support to the incubatee (P2: *"Whenever we don't provide them, we enable them to see where they can find assistance with their needs";* P6: *"Support that one incubator may want to provide may not be sufficient"*). Each TBI cannot contain all experts and complete facilities for technology development and business support (P11: *"ensure that we are leveraging those areas of specialisation. within the ecosystem that this is extremely important in order for one to be successful"*). The formation of networks is essential to bridge the gaps within the entrepreneurship ecosystem (P4: *"a lot of gaps in entrepreneurship development"*).

The TBIs also become instrumental in using their networks to identify mentors who can guide and encourage incubatees (P11: *"A mentor and someone that will guide and advise, definitely that's important"*). Such support of the mentors can be achieved through a single TBI and hence requires networks that will link the TBI to these experts (P11: *"have good mentors, all have areas of expertise, specialise"*). The TBI staff play a crucial role as a support system for the incubatees. They provide an environment that nurtures ideas and encourages innovation rather than discouraging it (P12: *'derisking how do you engage, mustn't engage in a manner that will discourage people'*).

7.9.1.5 Access to new technologies and innovation

Small businesses are critical in developing and adopting new technologies (P13: *"Small, medium enterprises mostly play an important role, for example, in terms of technology development")*. Incubatees also develop technologies in unchartered spaces and will therefore need stakeholders who can partner with small businesses to develop the technology and provide resources to entrench it into the markets (P12: *secure X investment to those small businesses that were incubated"*). These new

technologies will drive entrepreneurship in the province (P13: *"that is one aspect that will drive entrepreneurship into success"*).

The potential buyers or investors in these novel technologies can also be networks that approach the stakeholders, thus emphasising the importance of creating and sustaining networks (P12: *partners could find potential buyers of these products access for potential buyers of the incubatee product"*). TBIs should also view their role as identifying projects to invest in and assisting the incubatee in derisking the market perfomance of the innovation (P12: *"derisk the investment that the institution would have made in supporting those institutions"*). Role modelling is also critical as it firstly addresses the matters of support and encouragement for the incubatees but also provides mentors that will guide the incubatee towards developing a sustainable small business (P12: *"exposing entrepreneurs or innovators"; "to similar successful stories"*).

7.9.1.6 Benefits of networks to incubatees

TBIs need partnerships with other provincial institutions (P3: *We have to partner with other institutions"*), and these relationships need to benefit the incubatees (P3: *will also add value to our SMMEs"*). Networks also ensure that benefits accrue to the SMMEs as incubatees of the TBIs without duplicating services and creating undue competition for resources (P6: *"SMME that needs to benefit rather than competing for the same resources."*). Networks among TBIs will also assist incubatees in developing working relationships among themselves (P7: *"interrelationship with the other incubatees, you know with KZN we are not so densely populated as with Gauteng and Cape Town"*). The TBI management needs to establish networks with other incubatees that will ensure that the potential incubatees that cannot be accommodated within one programme can be referred to other incubators (P12: *"some ideas might not necessarily fit the funding mechanism, your funding mechanism but does it mean they don't fit other funding mechanism"*). Funding agencies and other entities that provide funding to incubatees are also targets for establishing networks *(P7: "Who at some stage supports, invests in, and funds our programs?"*).

The TBI should strive to exploit existing partnerships to benefit both the TBI and the incubatee (P13: "existing partnership). TBI networks can also help the incubatees

directly by linking them to potential buyers and markets for their products and services (P12: part of their relationship, your incubatees, they have an outlet, *the product that they are probably working on could be sold to some of these partners*).

7.9.2 Profile of TBI staff

TBI management should constitute individuals who understand the TBI ecosystem and have established networks and relationships that can address the challenges of the TBI, including funding and technical expertise (P12: *"Individuals know-how and where to find additional funding; other than just the government, many other avenues where funding can be leveraged, inexperienced incubation manager that has no networks has no experience of applying for grants management upskilling"*).

7.9.2.1 TBI staff capabilities

The TBI staff constitutes one of the critical resources that the TBI needs to deliver on its mandate effectively. Hence, there should be strong relations between the staff complement and the TBI's mandate (P1: *"people that can actually complement what the unit seeks to achieve"*; P6: *"recruit, appoint and retain the correct skills*"; P12: *"skilled incubation leaders"*).

The service offerings of the TBIs are influenced, to some degree, by the available expertise (P1: *"Tap into experiences of our staff and employees"*; P6: *"If you do not have the correct skills" to provide the support or even guide the innovators as they develop their processes, the circle is still not complete"*). TBIs are generally sector-specific; however, these sectors tend to be broad in terms of industries and require relevant knowledge (P3: "*We are sector-specific, but as much as we know XI, it is highly broad"*). TBI management should be equipped to support staff and incubatees (P4: *"experts that can be able to handhold"*; P4: *"walk with the client all the way"*; P11: *have good mentors, all have areas of expertise, specialising ensures that we are leveraging of those areas of specialisation within the ecosystem that this is extremely important in order for one to be successful"*). Hence, TBI management should have the necessary expertise and knowledge to influence the TBI's operations and drive its success (P4:*Access to that is the expert knowledge, best practices"*). It is also worth

acknowledging that the TBI may not have all the expertise and knowledge but should have sufficient networks to complement what exists within the TBI (P4: *"being able to network with other small businesses"*).

While the TBIs have adequately trained staff to assist the incubatees (P5: *Our staff is very well trained and very capable*), these human resources are generally few (P5: *"We have a very small team, while we have a very good team within our incubator"*; P12: *solution provided is not holistic"*). The insufficient number of qualified staff members presents capacity constraints within the TBI, which limits the services that can be provided, including customised support to incubatees (P11: *capacity constraints at these incubators, and it is difficult to be able to customise every time you get a new cohort"*). The TBIs will then have to balance the reach to a larger number of incubatees and the ability to increase depth in terms of supporting fewer incubatees (P11: *A lot of people need support, and there is only so much support that we can deliver, given the capacity constraints. there is a small skills gap in the team"*) The performance of the TBI is also impacted by the strengths that are available among its human resources *(P7: "bi-annual performance appraisals as well for our staff"*).

It often becomes necessary for the TBI to supplement its human resources with external experts who will be engaged for specific services needed by the incubatees (P5: *some areas where we believe we are not the experts, bring in other people, like people in finance, marketing"*). One of the greatest attributes of TBI management is the ability to learn from others, as this is a relatively new and growing intervention area for small businesses (P4: *learn from others"*).

7.9.2.2 Relevant technical knowledge and experience

The TBI management should be familiar with the individual challenges facing the TBIs and guard against the loss of capital through people exiting the system (P12:*" Incubators have their own nuances that need to be understood, that you can sometimes only understand because you've been long enough in that space". "skilled incubation management"*). The required TBI staff should demonstrate relevant knowledge and experience in matters of technology business incubation. The TBIs need capable staff who are competent in the TBI areas, including administrative,

technical and scientific expertise, to provide the relevant technological and administrative support to incubatees (P12: *"administrative personnel, warm bodies and technical individuals."*). In some instances, the TBi should have access to a full-time technical specialist who can assist the incubatees in navigating the technological developmental challenges with the incubatee, even though this may be a costly engagement (*"resident specialist, able to technically troubleshoot at any stage of the technical process. but that costs money to have a technical specialist resident"*). Lack of funding leads to the TBIs accessing such expertise through other organisations, and hence the incubatees lack the benefit of stating and concluding the project with the same cohort of experts (P12: *"incubators right now will tend to rely say on ad hoc technical assistance, and may not know the genesis of where everything started"*). The TBI staff need to be trained and skilled in the relevant craft of the incubation. These skills require constant development to ensure alliance with the developments in the different industrial sectors (P12: *"have trained people, experienced people, people who are continuously improving in their craft of incubating businesses, of being incubation managers"*).

There is a challenge in accessing qualified staff for the incubators, that are characterised by the full knowledge and understanding of the specific sector of the TBI and have the necessary experience to share with incubatees (P12: *incubators are affected by a shortage of skilled incubators, people who can lead incubators. People who've been in the game or understand the whole value chain of incubation"*). The TBIs should review their staff recruitment processes to ensure that those employed add a wealth of experience and knowledge that will benefit the TBI and the incubatees (P12: *incubators would just take anyone who's closely associated or close enough to run an incubator; lack of resources, human resources:* " To *run an incubator you really need someone who is very skilled in that space"*). The TBI staff should be able to provide mentorship to incubatees based on their experience and knowledge (P13: "*Provide mentorship in business development"*). Among these capabilities and networks are the industry knowledge and networks of the targeted industrial sector (P4: *industry experience"*).

TBI management should have, as a minimum, working knowledge of intellectual property (IP), protection and management (P13: *"level of IP management"*); otherwise,

the TBI will need to establish relationships with stakeholders who will provide expert advice on the matter of IP (P13: *specialised kind of advice"*). Relationships and networks should not be focused on local and national stakeholders but should also explore avenues with international stakeholders (P13: *"if maybe you will also have a relationship from abroad; important to also have international stakeholder"*). IP protection and management is a highly specialised area, and the TBI management cannot afford to work independently of other roleplayers (P13: "*can't really depend on yourselves"*).

7.9.2.3 TBI leadership development

The TBIs should make an effort to build future leadership in the technology business incubation space to ensure continuous learning and improvement that will sustain the support provided to incubatees (P1: *"capacitate each other so at any point time a leadership role is given to a different staff member"*). TBI staff should be able to identify successes, build on them, and devise measures to address areas of improvement (P2: *the staff at the incubation program can identify areas where they should make improvements or where they have achieved certain successes"*). That implies that TBI staff training programmes should target areas of development that will enhance the support that incubatees receive from the TBI *(P7: "training, internally of staff, for training, for development, for growth"*). One essential element of TBI support is the provision of coaching and mentorship interventions; hence, TBI staff should be knowledgeable and capable in these areas (P5: "The *biggest part of our focus is on mentoring and coaching"*). The capabilities of management staff are crucial to the overall performance of the TBIs *(P7: "if we don't perform it is going to be very difficult for our SMMEs to perform"*).

The responsibility of TBI management also extends to the ability to develop avenues for revenue accrual to the TBIs and ensure that they are always adequately resourced (P7: "*don't have to rely on funding." As an incubator, you also need to develop a sustainable model where you don't rely on funding"*). TBI management need extensive experience in business management and, in some instances, governance (P8: *"chaired the board"*). This kind of exposure assists the TBIs through the management providing direction and support to other TBI staff members who are novices who did

not have development opportunities (P8: *“no exposure to what businesses need "institutions which have the base mostly of the previously disadvantaged individuals"*). Exposure to management and governance of other organisations assists in reforming and reviews that will improve the service offerings of the TBI (P8: *“affects the perspective, where necessary we have to improve on our line of production and allow our line of operation”*)

7.9.3 Importance of compliance

Compliance with applicable regulations is a measure that benefits both the TBI and incubatee (P3: *will also add value to our SMMEs*”). The following discussion presents the areas of the TBI operations that rely on compliance to ensure the effectiveness of their services to incubatees.

7.9.3.1 Contractual agreements

The TBI must comply with contractual agreements between itself and the funding partner that provides the majority of the funding for its operations (P3: *"comply with all those requirements with the department"*). In an environment where multiple entities provide funding for the TBI operations or projects, the TBI needs to adhere to the specific mandate agreed upon with the funder (P8: *“Every funder comes up with the mandate”*) and deliver as expected (P8: *"Those that you get funds from, they come with their own expectations"*). In all its operations, the TBI must ensure continuous improvement in its processes (P6: “improving on those administrative aspects”). The TBI benefits from maintaining good relationships with its funding partners. M&E systems among the TBIs need to be developed (P9: *“the monitoring in that respect is not* developed”) to provide feedback on all aspects of small business development and avoid the emphasis on finances (P9: *our monitoring is not the best, relying solely on the financial”*)

7.9.3.2 Product/Service compliance

The incubatees consider gaining a competitive edge over their competitors, and the support that the TBIs can realise this goal through strategies toward producing a

product or service to the appropriate quality norms (P1: *“superior product”; “that gives them an edge over their competitors.”; “that will meet set standards*”). The incubatees can increase their markets and improve their sales, which will assist in developing a growing and sustainable business (P3: *meet all these regulations can be able now to compete with the other businesses in the market*”; P5: *“compliance, the certification, the statutory regulations”*). Technology-focused small businesses are responsible for compliance with the standards and regulations set for products and services in a particular industry (P8: *Technology goes with quality; produce similar products and no compromise on that quality”*). Generally, compliance assists enterprises to grow their businesses through offering compliant products and services and operating within the given legal and administrative regulations (P3: *"SMMEs to benefit on that for the growth of their business all the compliance issues*”).

The support provided by the TBIs assists the incubatees in meeting these standards and undertakings they would not have accomplished on their own (P8: *"There are industries where you will find that it has been looking so impossible"*). To improve compliance in the product and processes of the incubatees, other internationally recognised quality management systems like the ISO quality management systems are recommended for incubatees (P5: *obtain ISO standards”*). These measures assist the incubatees in demonstrating that their business environment complies with global standards. (P8: *"in an environment which is business compliant"*; P9: *"need to meet international standards and regulations and international standards"*). Compliance with applicable industry standards demonstrates good practices for the incubatees.

7.9.3.3 Legal compliance

It is necessary to ensure that all compliances are attended to and operations are aligned with the stipulated regulations (P3: “*all the compliance issues they have to adhere to them”*). The TBIs should also assist the incubatees in ensuring that efforts go towards legal compliance and enforcing appropriate governance principles (P11: *“partner that can help to understand the governance and legal compliance other than IP, governance does not equal legal”*). The TBIs emphasise compliance with various regulations, including company registration with the CIPC, Department of Labour, and SARS, to comply with the legal requirements for operating a business in South Africa.

(P2: *“Legally compliant in other words, the company must submit CIPC returns”; “Compliance with SARS”*; P3: *“Companies have to be registered with the Department of Labour”*; *Compliance with SARS”*; P10: *CIPC is key in the sense that without entrepreneurs registering, they will not be able to participate in the formal economy. "SARS; they will not be able to get their contract from big entities because you need to be tax compliant "SABS approval of other health vendors”*).

To help businesses grow and become sustainable, they also require companies to register on the central suppliers’ database (CSD), which allows them to build their reputations as small businesses in the economy (P2: *Registration on the central supply database”*; P3: *"CSD registration*). The registration of incubatees on the CSD also positions them to access the markets with the government departments (P8: *"Governments absorb these people and have them supply government departments and government offices"*). Businesses are also expected to operate a formal bank account, which is one measure that separates formal from informal businesses (P2: “*have to have bank accounts”).*

7.9.3.4 Community of practice

The TBI management should also consider forming a community of practice that will assist, especially new management, in gaining ground and build confidence in developing a system to support incubatees (P12: “*Form a community of practice possible mentorship opportunities”*). This body can also assist the TBI by providing a pool of expertise that will complement the available skills and resources. Compliance with the legal aspects of managing and protecting IP sometimes warrants the appointment of an external expert to assist with complicated legal matters (P13: *“The office goes to the extent of working or outsourcing external expertise as other issues are kind of complicated”*).

7.9.4 Monitoring and evaluation

The monitoring and evaluation (M&E) within the TBIs serve two purposes. The first is the M&E of the actual TBI against its mandate, targets, and financial inputs, which the

funding agencies generally conduct. The TBIs conduct the second aspect of M&E, which is to monitor and evaluate the services they provide to SMMEs.

7.9.4.1 M&E Driven by funding agencies

Some TBIs have scheduled M&E processes that are informed and regulated by the funding agreement between the TBI and the funding organisation (P1: *“Monitoring and evaluation is done by the funder, and it is done biannually; done twice a year; biannually, second quarter and the last quarter.: "we have our own planning meetings for different activities within the unit”*; *P6: "quantify if the value it really justify the outcome"*; P7: *reports are sent to all our funders.”; very streamlined affair”*). The funding agreement will then dictate the frequency of the M&E session for the TBI. The TBI must ensure that its operations and engagements with the incubatees are captured in the report and serve as evidence of achieving the set objectives and targets (P3: “*All the engagement feeds into the report what has been discussed, agreed upon, and achieved.”;* (P5: *“SEDA gives us our key performance indicators and from that we develop our programs”*; P7: *"deliverables which you are supposed”; “to be achieving." monitored against those deliverables”).* The incubatees are also subjected to M&E exercises to assess their performance, which then determines if they will qualify for further funding and support (P10: *informs the tranche payment because all we do, we don’t give them the payment as a lump sum”*).

Monitoring and evaluation are also crucial to developing a view on the impact of the TBI on small businesses, communities, and the economy (P4: *“measure the impact of the intervention, improvement assessment, after a minimum of six months, after the operation, or after the intervention, in terms of the turnover, in terms of creating employment”*; P5: *“look at our program, see where we are, what are some of the key challenges, how we need to address them, what needs to change, what can stay, do on a regular basis.”*; *P6: necessary for reporting purposes monitor progress on projects number of jobs created, within the specified budget, within the specified time*; P7: *“also assess progress in terms of turnover, clients access success in terms of jobs”; internal reports happen monthly”*; P11: *“monitoring and evaluation framework, measure outputs, outcomes and impacts program areas and platforms is measured on our M&E*

framework"). Hence, TBI management and staff must understand and appreciate the implications of failing to deliver on the mandate and targets for the TBIs.

7.9.4.2 M&E TBI services

The TBIs conduct the second tier of M&E to monitor the services they provide to incubatees. The internal monitoring systems (P11: *got an internal M&E system")* assist the TBI with tools and procedures for collecting data that will inform the ecosystem partners of the progress made by incubatees (P11: *"collecting the* data *and stats from beneficiaries, partners and whomever it may be"*). Software tools that can assist TBI management in monitoring and evaluating IP are available (P13: *platform like your X, which basically assists you in technology analysis and evaluation at the moment we just see your spreadsheets*"). These tools are excellent in managing the TBI's IP portfolio (P13: *check on how the portfolio is doing*).

These internal M&E strategies are designed to monitor and evaluate the services the TBI offer and also how the incubatees and their small businesses respond to the support provided (P2: *"people from the incubation program to visit the people, the incubatees at their businesses, local business";* P4: *"what is the progress that the client has made after the implementation of the intervention?"*; P5: *conduct site visits understanding of where the business is, their markets, how their operations reviewed it and to say is thus making an impact, constantly reviewing";* P10: *a project plan, their milestones monthly basis they meet with one of the officers, then during those sessions, we are able to evaluate and monitor help them to improve"*). This M&E also examines the operations of small businesses (P2: *"See how they set up their operations"*; P5: *Our businesses in terms of their sales and finances.. At a glance, we know if a business is not doing well, fix it before it reaches a critical stage)*.

Operating within the budget is a critical skill and attitude that will assist resource-constrained small businesses (P12: *"make sure that all the sub-line items within the business plan are done as per plan and within of course budget"*). The M&E exercises should be designed such that they fit within the services that the incubatees receive from the TBI, thus avoiding the attitude of these being add-on support, which is time-consuming (P12: *"monitoring and evaluation is deliberately planned into every project*

from the conceptualisation of the idea to the incubation of the idea"progress tracking"). They can become the point of continuous improvement analysis for the TBI and the incubatee. The TBI staff can assist the incubatees in monitoring their activities and using regular meetings to drive perfomance (P12: *"monthly meetings, quarterly meetings steering committee, go there physically to check, develop a checklist"*). The TBIs should also assist the incubatees in honouring their commitments and ensuring that grant funding received by incubatees is used accordingly and will generate the desired outcomes (P12*: Sit down with the entrepreneur, ask specific questions, show you around "supposed to buy business equipment, that equipment is there, it's functional," producing as per intention, taking stock of what was said"*).

The TBI should be able to assist the incubatees in adhering to their business plans and aligning their operations with the available budget (P12: "*monitor all the steps, you know, all the steps that are articulated in a business plan"*). Business planning is one of the skills that is critical to the development of small businesses. The incubatees can engage the TBI on their challenges and success to have a platform that can evaluate their performance with a view of identifying areas of improvement (P2: *"incubatees come to the incubation centre and share challenges and also successes, then we say to them "but what about that?", and "when we visited you last month this is what we noticed and how do we address that?"*).

The impact of the TBIs can only be determined through ensuring continuous monitoring informed by clearly defined indicators (P4: *"continuous monitoring. Measure the impact of the intervention, clear indicators at the beginning, assist you in terms of when you do that is the evaluation, constant monitoring is one of the things that are important"; P6: "key aspect impactful if you can monitor and evaluate"*; P8: *"How the business is growing in all areas of development*"). The M&E process also the TBI assesses the growth of the incubatee as an entrepreneur (P8 "*the growth of the business owner in understanding his or her own business"*).

The M&E exercise also benefits the TBI process by identifying gaps, allowing the TBI management to improve on the drive of the programme to more significant impacts for the incubatees *(P6: "internal processes of ensuring monitoring and evaluation"; "monitor progress on projects"; "assess the impact"*). The TBI can also share the

responsibility of measuring the effects of the interventions with its networks or key stakeholders, thus allowing for synergies between support agencies and improving the services rendered to the incubatees (P8: *You would find that one department would go there and report on its own without looking at the other no monitoring of how far it went"*).

M&E systems among the TBIs need to be developed further (P9: *"The monitoring in that respect is not* developed") to provide feedback on all aspects of small business development and avoid the emphasis on finances (P9: *"Our monitoring is not the best; it relies solely on the financials").*

7.9.5 Discussion and conclusion

This discussion presents the discussions and conclusion on Theme 6.

7.9.5.1 Discussion

The study revealed that networks are essential to the operations of the TBIs in KwaZulu-Natal and present several benefits, including providing an environment of learning and streamlining service offerings. Networks allow the TBI to identify partners with whom to engage and establish mutually beneficial relationships. The TBIs tend to work in silos and seek to provide as many services as they can without consulting with other TBIs. This view is supported by the GEM 2025 reports, which highlighted the need to establish networks that are essential in amassing the know-how and collective experiences that shape the foundation of a growing small business (Entrepreneurship Monitor 2025, 2025:20).

The study also identified the ideation process as one of the critical stages in supporting technology-focused incubatees, which can benefit from partnerships and offer peer support. In addition, partnerships also add resources that relieve the financial strain from the TBI. As discussed under Theme 4, partnerships are essential in managing a healthy ecosystem, which will improve efficiencies among TBIs in KZN (Kansheba & Wald, 2020:944). The survival of the incubatees depends on having a healthy pipeline of incubatees with high-tech or scientific ideas to be developed to grow sustainable small businesses. Through their networks, the TBIs identify stakeholders that can assist them with ensuring that they have sufficient numbers of high-tech small

businesses to be supported. Important role players, as revealed by the findings of this study, include all the post-school education institutions, mainly universities and TVET colleges in the province. Working with post-school education and training (PSET) institutions further widen the network of stakeholders as academics and researchers become an indelible part of the TBI ecosystem (Ngubane & van der Merwe, 2023:105). It is also vital for the TBIs to entice private universities to form part of their networks, as these relationships are currently lacking among TBIs in KwaZulu-Natal. Providing a single entry point for incubatees can also assist in directing incubatees where their needs will be met. The TBIs can also benefit by engaging the roleplayers in these institutions as mentors for the incubatees.

The study revealed that networks also assist the TBIs by providing a pool of stakeholders from which the TBIs can identify partners and collaborators and increase their competitiveness. Stakeholders also bring resources to the relationship, including intellectual property, facilities, equipment and knowledge. Sharing resources is one avenue of minimising overreliance on the government and ensuring best practices for the incubatees. Complementary services that can assist the TBIs in providing holistic support can be coordinated through the networks. This view is supported by researchers who view networks as social capital that can advance the course of the TBIs as well as that of the incubatee (Tang,Walsh, Baskaran, 2021:9).

Competent and skilled TBI staff are essential elements in the TBI support system (Zimmermann, 2017:1). They require technical and business understanding to assist them in designing and delivering the TBI programmes. The skills available sho match the mandate and services provided by the TBI. It can be argued from the findings of the study that the TBI staff are also affected by the low levels of education and skills acquisition that are characteristic areas that are predominantly rural (Aruleba & Jere, 2022:2). Understanding the TBI operations and ecosystem is one of the staff's most desirable attributes. The TBI management should ensure that the staff is fully equipped to support the TBIs. While some TBIs have resident experts assisting incubatees, others revealed capacity constraints within the TBI space. The TBIs are, therefore, responsible for investing in the staff and assisting in improving the skills and expertise of the TBI staff. The TBI management should devise human resource management programmes to minimise the impact of staff exiting the TBI systems. TBIs also access

external support through consulting services and partnerships to supplement the existing expertise. TBI management can also use their networks to supplement their available skills (Hassan, 2020:447). For a long-term staff development strategy for the TBIs, Management should also reconsider their recruitment strategies to ensure they attract the appropriate skills and competencies. The expertise required by the TBIs can also be sourced nationally and internationally through partnerships and collaborations. The TBI management is also responsible for developing future managers through continuous learning and staff development programmes. TBI staff can benefit from coaching and mentorship programmes delivered by TBIs. Partnerships and collaborators can also assist in developing the leadership abilities of TBI staff.

The study findings also emphasised the importance of compliance with regulations stipulated by industry or potential clients for new products or services entering a particular market. Compliance in TBIs also incorporates operations management, alignment with international standards, and service contracts and agreements. The TBIs must first ensure compliance with contractual agreements that they have entered into with various organisations. This compliance can be as complex as the number of accords the TBI has signed with various entities. These agreements are generally managed through periodic monitoring and evaluation sessions. The other level of compliance relates to products that are developed within the TBIs. This view of ensuring compliance throughout the value chain of the TBI is also supported by Dladla (2021:63). Monitoring and evaluation are highlighted in the findings as an essential tool that will ensure continuous improvement throughout the TBI. The funding agencies also monitor performance regarding targets specified in the contracts. The TBIs also provide the second tier of M&E, which focuses on the incubatees and service delivery within the TBI. Monitoring and evaluating their service provision is also a continuous improvement strategy to ensure they remain relevant and competent as service providers.

7.9.5.2 Conclusion

Networks are essential for the functioning of the TBIs, as they bring together organisations and individuals with the potential to add value to the TBI. Projects

undertaken in collaboration with other experts and similar organisations have a higher probability of success and being concluded on time and within budget. Increasing the pipeline of incubatees is essential for the survival of the TBIs. PSET institutions, universities, and TVET colleges can assist TBIs by identifying high-tech and scientific ideas that have the potential to commercialise new products or services in the market successfully. PSET institutions, through their academics and researchers, postgraduate students can also provide mentors for the TBI ecosystem in the province of KZN. This view of incorporating higher education institutions in the TBI networks is essential in developing a knowledge economy (Sun *et al*., 2019:105). The engagement of stakeholders helps the TBI remain competitive and have access to a larger pool of resources. Information, knowledge, intellectual property, facilities, equipment and experience are some resources available through appropriate networks. The complementary services that can be identified through stakeholder engagement benefit incubatees and accelerate their route to markets.

The TBI needs to position itself within the ecosystem while maintaining its independence as dictated by its mandate, capabilities, and service offerings. The TBI staff are a critical resource for the TBIs as they are essential to the services and support they can provide. The TBI management should invest in the skills development programmes for their staff and create an attractive environment for them.
Compliance with all statutory regulations should be applied consistently throughout the TBI value chain. The TBIs should also consider establishing their community of practice, as it is amongst the emerging sectors. This body will also be instrumental in establishing the best practices in the industry (Tang *et al.*, 2021:23).

The findings of this study also contributed to the body of knowledge by identifying TBI stakeholders in the province of KZN. These stakeholders, as presented by the different participants, are presented in Table 7.21:

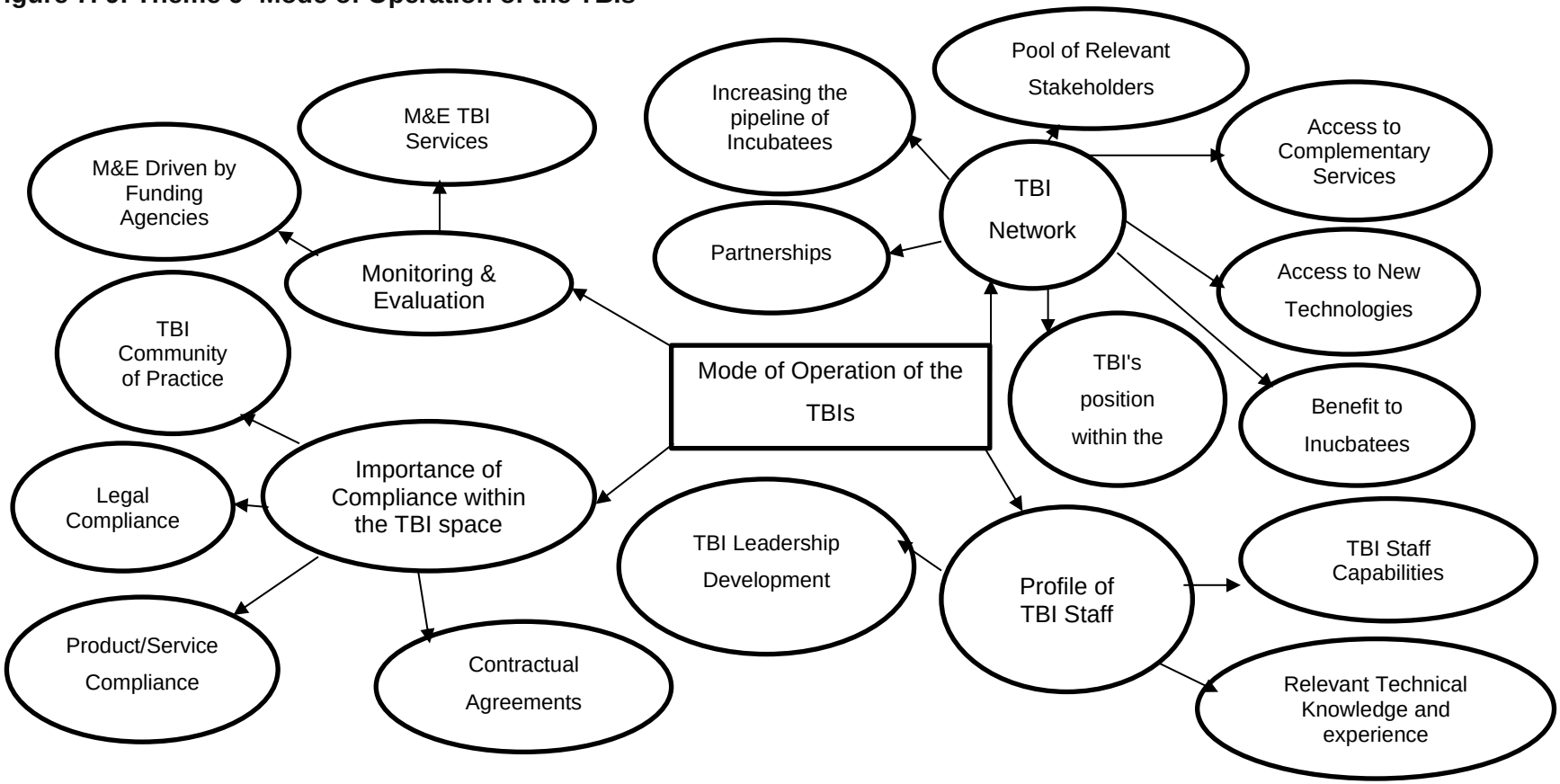
Table 7. 21: TBI Stakeholders

	Stakeholders
1	*Government; government departments, universities or in higher education institutions; industry; bring together, all these different stakeholders; government; task team; University, SEDA, InvoTech"*
2	*Department of Science and Technology; Technology Innovation Agency; SEDA; CHEMIN; Mangosuthu University of Technology Technology Station in Chemicals*
3	*"KwaZulu Natal provincial government" SABS, Department of Labour, SARS"*
4	*schools;TVET colleges; Industries; SETAs;technicians, artisans,*
5	*SEDA; DUT- Durban University of Technology; Department of Small Business Development;Xwhich is based in Cape Town, UMlazi, Mega City; TIA, Moses Kotane, Y; Z;FNB; Ithala. SEFA; eThekwini Municipality*
6	*Technology Innovation Agency; Department of Science and Innovation; Bioprocessing Platform; Government; society at large; SABS; other government departments; municipalities, provincial departments like the Department of Economic Development; SEDA; Mangosuthu University of Technology; University of KZN; DUT; other institutions beyond KZN; Science Councils; CSIR; Minktek*
7	*SEDA; Fintech; Chemin; TVET Colleges; Chamber of Commerce both in Durban and in Port Shepstone; SEFA; eThekwini Municipality; Raynkonyeni Municipality; Technology Innovation Agency; Department of Science and Innovation*
8	*has to be a close working relationship between the government, government departments, institutions that support small businesses, the banks, DUT; MUT; Mangosuthu University of Technology; University of Zululand, University of KwaZulu-Natal, Local government, Municipalities, Department of Science and Technology; the corporates; companies; SEDA; TIA*
9	*"Innovation Technology Business Incubator; eThekwini municipality; InvoTech; Smart Exchange; Bizfarm; in Umkhumbane at the business centre there, eThekwini Business Centre."*
10	*TVET colleges; universities, government agencies; SEDA; SRC; NYDA; provincial economic development committee, I mean the department; Department of Development and Tourism in KwaZulu Natal; South African Revenue Services, CIPC; eThekwini Municipality; local government; business development role players or agencies; support on the innovation developments as well as the business development; City, EThekwini;*
11	*stakeholder forum; Technology Innovation Agency, DUT; UKZN; Durban Chamber of Commerce industry,*
12	*DSI, Department of Science and Innovation, TIA; SEDA; SEFA, small business department, business chamber,*
13	*existing partnerships with the government, also looking at your private sector, being one of the essential partners, academics, clients, I think also is an essential partner, SMMEs*

Source: Researcher's creation

Two major funding sources for TBIs emerged: the Department of Small Business Development and the Department of Science and Innovation. Figure 7.9 presents a schematic representation of the TBIs' operation mode.

Figure 7. 9: Theme 6- Mode of Operation of the TBIs



Source: Researcher's creation

7.9.1 Alignment with the primary aim and secondary objectives of the study

The primary objective of this study is to develop a framework for incubating technology businesses in growing sustainable small companies in KwaZulu-Natal. The findings of Theme 6, which is focused on the mode of operation of the TBIs, revealed that four areas of the TBI operations are essential for the growth of sustainable small businesses. These areas are the networks of the TBI, the profile of the TBI staff, the matters of compliance, and monitoring and evaluation.

Table 7. 22: Theme 6: Links with the secondary objectives of the study

Research objective	
SO4: To explore and describe the mode of operation for technology business incubators.	Theme 6 presented the four pillars of the TBI's operations. The networks are essential for extending the TBIs' resources and services to the incubatees. The TBI staff profile dictates the services that TBIs provide. The TBIs are expected to comply with their contractual obligations and assist the incubatees in complying with industry regulations and legal requirements. Monitoring and evaluation are critical in the TBI environment, firstly to demonstrate compliance with contracts and targets and secondly to assess the operations and impact of the TBI services.
SO5: To explore and describe the experiences of technology incubation programme managers/CEOS/directors	The TBI management is responsible for ensuring that the TBI has sufficient networks to improve its service offerings and benefit the TBIs. Continuous improvement strategies should also include staff capacity development to ensure that the TBI services are at the cutting edge of technology and comply with stipulated business practices. Compliance is critical to long-lasting relationships with funding agencies and ensuring incubated success.

Source: Researcher's creation

7.10 THEME 7: PROFILE OF INCUBATEES

This theme seeks to profile the incubatees serviced by the TBIs in KwaZulu-Natal. The incubatees, as inputs in the TBI process, influence the outcome and, therefore, are a critical component to consider towards improving the effectiveness of the TBIs in supporting growing sustainable small businesses. This theme recognised one hundred forty-seven codes, with P9 contributing significantly to the codes. These codes generated two sub-themes presented as follows:

- Characteristics of TBI incubatees
- Essential skills for incubatee success

Table 7. 23: Theme 7: Sub-themes and categories

Theme	Sub-themes	Categories
Profile of Incubatees	Characteristics of TBI incubatees	• Limited skills • Limited education • Start-up nature of incubatees • Experiences and challenges incubatees bring to the TBIs
	Essential skills for incubatee success	• Business success skills • Technological Mastery • Entrepreneur/innovator/small business owner attributes • Skills to address cultural gaps and Business Resilience • Skills for the Future

Source: Researcher's creation

The incubatees add their skills, capabilities, attitudes, and experiences to the incubation programme. The inherent qualities are presented in the first sub-theme as they are part of the critical input into the TBI system. The participants also revealed some characteristics that they, as management of the TBI, consider essential for the success of the incubation programme and the indicators of the achievement of long-term desirable impacts of the TBI in KZN. These findings demonstrate that the incubatees' attributes to the TBI programme will also impact how that individual assimilates the interventions designed to improve the small business's success potential.

Table 7.46 presents the codes and subcategories associated with this theme that sought to profile TBI incubatees. The empirical study findings showed that the TBI Managers/CEO/Directors Revealed that the incubatees bring different characteristics into the TBI programmes. In response to these, TBI designs interventions that collectively address the identified characters, attitudes, and behaviours.

Table 7. 24: THEME 7: Profile of incubatees

	Characteristics of TBI incubatees	Essential skills for incubatee success	Findings
1	*“support them with those skills that are required for a business to succeed.”*	*“Also need other soft skills, finance skills.”* *Think more like entrepreneurs, produce competent clients that can actually produce the best, no not the best, quality products in terms of the standards that are there in South Africa.”*	The incubatees join the TBI programmes needing skills to support, grow, and sustain their small businesses. Their skills requirements incorporate soft and technical skills.
2	*“We later on realised that being an entrepreneur doesn't always necessitate that one be educated."* *"Very important for a business or a business operator to improvise."* *"They change because they have noticed that there is a better opportunity for business by producing other products or other services."* *"students had those years, was that there was very difficult for them to find employment opportunities."* *"experienced difficulties in placing students in the industry"* *"direct the youth of this country into starting up businesses of their own."* *“the youth, ones, are unemployed. Others are fresh from university, so paying to be*	*“access to funding,”* *“knowledge of marketing skills.”* *“how to market their businesses.”* *“Financial management.”* *“human resources management.”*	The incubatees also have varied levels of education. One of the significant requirements for incubatees is having an idea with the potential to build a small business. However, some incubatees are driven by the challenges relating to high unemployment. Youth and graduates are among the sectors facing the unemployment scourge. Incubatees need funding to grow their small businesses. They also require soft skills to support their enterprises.

	incubated in a certain program makes it difficult for them."		
3	*"Some of our SMMEs, I don't want to use maybe the word to say they are illiterate."* *"don't have a degree or a recognised university qualification."* *"don't discriminate against them based on the level of qualifications."* *have a know-how of the business.* *Drive and passion for the business."*	*"SMMEs.That's the only product as an incubator that we have"* *"Looking at it, if there is a drive and a passion for the business, someone who would be running the business on a daily basis."* *"Access to the market in this country is a huge challenge for small businesses."*	Some incubatees join the TBI programmes without a recognised degree or qualification. Lack of appropriate qualifications requires the TBI to develop interventions to kindle the passion and interest in small business development. The SMMEs are the product of the TBIs.
4	*"ensuring that we capacitate the jockey because the jockey is important as well as the horse."* *"What skills does the jockey need at the assessment stage? What we do first is assess the client, that is, to understand what level they are at. That indicates to us what gaps exist for that particular client, and then we recommend interventions."*	*"that are able to contribute more in this space to small businesses than to the economy".*	The incubatee is responsible for driving the small business to prosperity and, as such, requires skills and support from the TBIs. Pre-incubation assessments are critical in identifying gaps in the incubatee and allowing the TBI to design interventions to address this gap. The incubatees require the skills that will assist them in growing the business and contributing to the economy.
5	*"spin-off companies that we are supporting. So these are businesses that were started by staff within the faculties with creative ideas, things, and products, which are more technology-related."* *"These spin-off companies, and so these are more, these are the ones. If you are talking*	*"how to actually take it to markets."*	The TBIs in universities support academics and students with novel business ideas derived from their research abilities. They also need support converting these ideas into businesses. One of the most significant supports they need is the ability to take their products to markets.

	about technology, there are definitely more technology-related ones." *“Students from different businesses, student businesses are very good at developing things, but they do not have the skills don’t understand where the markets are."*		
6	*“using the knowledge or the scientific know-how gathered, maybe through academic training.”* *"Sometimes, for clients who may not have been exposed to formal education, it could be a hindrance or derailment, negative experience, specifically to small businesses or SMMEs.”*	*“skills for the future.”* *“skills development towards enabling the biotechnology sector.”*	Incubatees who bring ideas developed through academic inquiry and those without formal education bring different expectations to the TBI. The TBI should assist in developing the skills of the future and work in areas that are targeted for growth in the country.
7	*“Education, the level of education.” "Everybody has not had access at schools as well; People have not had access to these digital programmes."* *"It’s difficult for them to compete now against other peers and their colleagues, maybe from the other provinces or even from the other regions."* *"a school leaver who’s then deciding to get into a technology programme, it’s not easy." "most SMMEs don’t have, are not equitably served with the internet, especially once you move into the township and into the rural areas"*	*“need to bring our population on board with digital skills programmes”* *“Everybody needs to be digitally empowered”* *"So we need to roll a lot of digital skills programmes.”*	Incubatees have a different level of education. Those without formal education find it difficult to succeed in the TBI environment. Low education levels imply that they lack the fundamentals in the technology area they want to pursue. The other challenge comes from the incubatee needing more access to the infrastructure ideal for sustaining technology-focused programmes. The population of KwaZulu-Natal requires digital skills and access to fully functional and technologically enabled digital platforms. School programmes can also assist in preparing learners for the world of technology-focused businesses.

	Also, people have not had access to these digital programmes." *"bring in digital skills training and digital skills programmes at school level,"* *"Ensure that every child has access to technology. "* *"access to connectivity for schoolwork,"* *"learning material is all made digitally available."* *"different breed of student that's going to be emerging";* *"Students then who won't fear the technology and the technological, entrepreneurial activities."* *"technology-based entrepreneurial activity, it won't be so difficult for them because it becomes then a part of your life, part of everything that you do";* *"easy then to think about doing programming and to do coding and to embrace technical skills development and software development, you know, because you're in the system."*		
8	*"Those who come from institutions are at a different level from where businesses are operating."* *"Being entitled to get something.because you are black,"*	*"skills of presenting their ideas in a hostile environment at times. "When they get rejected, they have to believe in their product, and they have to be sure that their product is well presented."* *"Understand the business world."*	The incubatees join the TBI at different levels of capabilities. They are generally start-up companies that lack experience and are armed with university qualifications. A thread of entitlement comes with incubatees, especially those associated with previously disadvantaged individuals.

	“do not have experience, most of them are the start-up businesses who are coming out fresh from university, others who are just coming out of the world”; *“Where you would be shy, where you will be respectful. Sometimes you need to be just assertive when you are in business, not necessarily come timid into businesses.”* *"Universities sometimes don’t prepare them to be really fitting into the business world; they have ideas of the theoretical framework of doing things"* *"Make sure that that person gets, feels that he is worth getting it after working for it."*		These individuals need skills to communicate in a hostile environment and move forward despite challenges, including rejection of their business ideas. They need to develop skills for coping with a hostile business environment.
9	*“based only in Durban, reach is across the province.”* *"The strongest area that we are involved in is in the greater Durban area and eThekwini municipality" rural market.”* *“farming communities Pietermaritzburg, Ixopo"* *“address the character of the person and whether that person would fit into an entrepreneurial system."* *"don’t think that everybody can be an entrepreneur overnight."* *"depend on the background of the person, the nature of the person as well as their skills and competencies."*	*"have understood the client what type of environment, do you have a casual environment, a formal environment?"* *"present yourself in that way, in that same manner so that it does not interfere with the cultural issues of that organisation recognised that there’s a need.”* *"have the business plan but we’re not practicalising it"* *"going to be happy with it, they’re going to be laughing at you."* *"huge soft skill and limitation, we do not have that thing to push through regardless, and that’s the capacity."*	The TBIs are densely populated in urban areas even though their planned geographic reach spans throughout the province. Incubatees bring inherence-culturally bound attitudes and behaviours into the programme and the business environment. TBIs need to instil entrepreneurial attributes. The incubatees need to commit to the incubation programme.

	"Certain behavioural competencies that are required for an entrepreneur" *“Interpersonal skills”* *"Engage, who can talk, who can sell a concept, who can handle rejection."* *"More of the young people who come into our incubator don’t have the interpersonal skills";* *"Communication is a basic manner of being successful in a business."* *"children coming from rural areas; they come with a certain behavioural norm."* *"I would have never gone through with that mindset because my mindset is that I’m an engineer, and I’m up."* *“Do not speak unless they are spoken to, something to reverse.”* *"Not playing at an incubation relevant to what South Africa needs"* *"They will always be followers, and if you can’t express your opinion, how are you going to innovate and not be able to communicate your innovation."* *"Fortunately, he also has good financial records.”* *“Go through the programme,"*	*"never become a successful entrepreneur if you don’t engage,"* *"incubatees should also be allowed an opportunity to be active participants as critical stakeholders in an organisation, and they are not getting involved.”* *"Operate in an instructional environment; they’re all waiting for instructions."* *"Even their best ideas will not be put to the test because they are waiting to make you happy, and that’s so dangerous."* *“Then we’ll never get innovative.”* *"will not get innovative in a mindset like that."* *"Vocal and the vocal nature and their ability to share their opinions elevated them."* *"improving those communications and greater softer skills."* *“practical things which talk to how you engage."* *“understand how important it is, when you don’t know anyone, take the attitude that you will always be the one who engages."* *“build a rapport. How do you manage the client?”* *"How do you go on your regular turn-up and your follow-through?";* *"Don’t have that mindset, and that’s destroying the opportunity to grow."*	

10	*“We have noticed that some of our students are engaged in one form of entrepreneurship or the other, support such students who are entrepreneurial”;*	*“The process of getting funding is not as laborious; through government agencies, it takes months, and it doesn’t take that long.”*	The university-based TBIs are challenged by students focusing on various business opportunities presented to them, thus losing focus on developing one business to fruition. Involvement with multiple projects is particularly concerning given the short period of incubation that is allowed for students. The TBIs also assist them with securing funds for their businesses.
11	*“Within our province, being able to communicate more regularly plays a role in lobbying at a national level.”* *“Policies and strategies are being put in place, but send a collective response at the moment. I think we just leave it to the national government to set the policies around innovation and entrepreneurship, and with very little input from KZN, we could do that more as a collective. It could definitely play a bigger role in the ecosystem. You can’t do everything alone.*	*“The challenge that we face is commitment, commitment from the part of beneficiaries, do not commit fully to our program.”* *“Studying some of them already have existing jobs.”* *"customise our support in terms of the scheduling of our sessions or our touch points with them to ensure that we are including and accommodating everyone."*	Incubatees are only partially committed to the programme as they have other commitments, including jobs and studying. TBIs need to lobby for provincial relevance and influence national space. Therefore, programmes must be designed to work with the realities of the incubatees and be adaptable.
12	*"not sure about what to do as the process of incubation progresses."* *"incubatee that is probably shy* *at the beginning."*	*“technical training, the business training, soft skills training, an understanding of the theory,won’t be a real market";* *“an understanding of how to engage with other peers."* *"Assist in ideating and cleaning off the dirt and the debris and assist the innovator in seeing the real idea behind the idea.”* *"get to a point where we both agree that, look, what you really thought was a good idea is*	Incubatees need support to move from the ideation stage to the full prototype development stage as they work through their projects from idea to market. One of the critical roles of the TBIs is assisting incubatees in refining their ideas.

		actually not a good idea. It is probably a good idea, but it's not viable."	
13	*"Once you file a patent for them, they shift their focus and continue publishing but do not participate in commercialisation or business development."* *"Academic staff members' primary objective is teaching and research."*	*"assist most of our researchers in terms of securing funding that will assist them in technology or furthering their technological development."* *"facilitate licenced negotiation where we're licencing technology,"* *"There is a huge gap between academia. Let me define the gap we are trying to fill as the tech transfer."* *"That will be your industry linkage, which is a gap that we are filling. So currently, there is no relationship between academia and the industry."*	Teaching and learning, in competition with technology transfer and commercialisation, is one of the struggles faced by TBIs. Technology businesses also need financing. The TBIs need to fill this space for technology transfer in the university sector.

Source: Researcher's creation

7.10.1 Characteristics of TBI incubatees

This sub-theme presents the characteristics that incubatees. The pre-assessments of the TBIs are the systems put in place to provide a pre-incubation assessment that seeks to identify gaps within the entrepreneur, as an individual, and within the business (P4: "*What skills does the jockey need at the assessment stage because what we do first is we assess the client that is to understand at what level they are at. So that indicates to us what gaps exist for that particular client, and then we recommend interventions."*). The identified gaps will be discussed, which include a lack of business skills, limited education and academic know-how, and lack of access to digital skills and internet connectivity.

7.10.1.1 Limited skills

The TBIs are expected to provide incubatees with skills that will equip them to conduct a business appropriately for success (P1: *"Support them with those skills that are required for business to be able to succeed"*; P3: *have a know-how of the business drive and the passion for the business"*). Incubatees from the university environment are at a different level as compared to the business environment (P8: *"those who are coming from institutions are at a different level from where businesses are operating"*). The universities do not have programmes to prepare the students for the entrepreneurship and world of business (P8: *"Universities sometimes don't prepare them to be fitting into the business world"*). The incubatee or the small business owner has a responsibility to drive the business to success. As such, a capacity development programme should be in place to assist the incubatee in developing the business and moving it towards growth and sustainability (P4: *"ensuring that we capacitate the jockey because the jockey is important as well as the horse"*). The TBI is responsible for ensuring that their interventions address the critical business skills not addressed by the school and post-school education sector and for those incubatees who are first-time SMMEs and need to gain experience in managing small businesses.

The incubatees need to be assisted in developing the personal traits congruent with entrepreneurship and small business ownership (P9: *"address the character of the person and whether that person would fit into an entrepreneurial system"*; P9: *"more of the young people who come into our incubator don't have the interpersonal skills"; "communication, some basic manners to be successful in a business."*). There is an even greater need to assist the incubatees in inculcating the entrepreneurial spirit that will help them to survive irrespective of their cultural background and experience (P9: *"don't think that everybody can be an entrepreneur overnight"; "depend on the background of the person, the nature of the person as well as their skills and competencies"*). The desirable behavioural competencies are those relating to incubatees being able to communicate, pitch their ideas successfully to relevant stakeholders, and accept the outcome of engaging with different stakeholders (P9: *"certain behavioural competencies that are required for an entrepreneur" interpersonal skills"; "engage, who can talk, who can sell a concept, who can handle rejection"*). Interpersonal skills have become essential for small business owners to create networks, build clientele, and maintain positive relationships with their specific industries.

7.10.1.2 Limited access to digital programmes within the school level

The incubatees are challenged in terms of access to the kind of education that exposes them to digital skills, as such programmes are not easily accessible at school levels (P7: *"the level of education everybody has not had at schools as well, people have not had access to these digital programmes"*). The learners graduating from KZN, with limited digital know-how, cannot immediately compete with their peers who had early access to the digital programmes (P7: "It is *difficult for them to compete now against other peers, their colleagues, maybe from the other provinces or even from the other regions as well.").* Limited access to digital access hinders progress for learners who venture into technology programmes *(*P7: *"a school leaver who is then deciding to get into a technology programme, it is not easy"*).

It is, therefore, crucial for the province to bring digital programmes into schools (P7: *"bring in digital skills training and digital skills programmes at school level")*, ensuring

that every child has equal access to technology (P7: *"ensure that every child has access to technology"*). Internet connectivity can also enhance the learning experience for learners and improve access to learning materials (P7: *"access to connectivity for schoolwork"; "learning material is all made digitally available").* A concerted effort by the government to bring internet and digital programmes at school levels will generate a student who is technologically equipped to explore technological-related entrepreneurial activities *(P7: "different breed of student that's going to be emerging"; "students then who won't fear the technology and the technological, entrepreneurial activities"*).

7.10.1.3 Entrepreneurial Abilities

The incubatees join the programme with a particular business focus; however, there is a challenge of experiencing confusion due to competing opportunities (P2: *"They change because they have noticed that there is a better opportunity for business by producing other products or other services"*). These competing interests can also be decisions relating to spending energies developing an idea to the commercialisation stage or increasing the number of publications (P13: "Once *you file a patent for them and then they kind of shift their focus and then keep on publishing and kind of not participate in commercialising in business development"*). This scenario also results in incubatees being engaged in several businesses or a variety of engagements that compete for their attention, resources and energy (P10: *"We have noticed that some of our students are engaged in one form of entrepreneurship or the other*). For academic staff members commercialisation competes with teaching and learning (P13: *"academic staff members are; their primary objective is on teaching and research"*). The challenge also comes with inadequate access to resources to take advantage of all the available opportunities; hence, improvisation becomes a critical skill for the incubatees as small business owners drive the business to productivity (P2: *"very important for a business or a business operator to improvise").* the ability to compromise is particularly important as the province and country are developing the TBI space by introducing country-relevant programmes *(P9: "not playing at an incubation relevant to what South Africa needs")*. These still need to be developed to meet the needs of the incubatees adequately.

7.10.1.4 Limited education

Incubatees bring their educational shortcomings into the TBI space, as academic achievements are outside the requirements for joining the programme or entrepreneurship. (P3: *"Some of our SMMEs I do not want to use maybe the word to say they are illiterate").* Some do not have formal university degrees or qualifications from any post-school education institution (P3: *"don't have a degree or recognised university qualification"*; *P6: "sometimes for clients who may not have been exposed to formal education. It could be a hindrance or derailment, a negative experience" specifically to small businesses or SMMEs"*). Lack of academic qualifications limits the positive experience that is possible for incubatees under the TBI programmes. The expertise of management, however, indicates that the acquisition of the higher qualification does not inadvertently translate to success in the small business (P2: "We *later on realised that being an entrepreneur does not always necessitate that one be educated"*; P3: *"don't discriminate them based on the level of qualifications"*). Hence, there is a certain tolerance level for incubatees who may need to hold higher qualifications when joining the TBI in KwaZulu-Natal.

7.10.1.5 Inadequate internet connectivity in KZN

The province of KwaZulu-Natal is further challenged by limited access to networks and connectivity, especially in rural areas and townships (P7: "*Most SMEs don't have, are not equitably served with internet especially once you move into the township and the rural areas"*). The limited access to connectivity directly impacts people's ability to access digital programmes (P7: "*as well, people have not had access to these digital programmes").* Technology-empowered population forms the basis for developing and promoting technology-based entrepreneurship (P7: "*technology-based entrepreneurial activity, it won't be so difficult for them because it becomes then a part of your life, part of everything that you do"*). Learners and university graduates will find it easy to engage in digitally enabled skills and subsequently into the creation of start-up companies that are based on technology (P7: *"easy then to think about doing programming and to do coding and to embrace technical skills*

development and software development you know because you're in the system"). The province has to realise the importance of a digitally empowered population *(P7: "Everybody needs to be digitally empowered"; "So we need to roll a lot of digital skills programmes."*).

7.10.1.6 Experiences and motivations of incubatees

This section presents the challenges relating to the start-up nature of incubatees, the varied motivators for joining the TBIs, and their inculcated cultural-based behaviours and attitudes.

7.10.1.6.1 Start-up nature of incubatees

The TBIs also support new or novel enterprises based on technologies, projects, or ideas developed from research (P5: *spin-off companies that we are supporting. So these are businesses that were started by staff within the faculty's creative ideas, things and products, more technology related."*). Small business owners of start-up companies do not have sufficient business experience (P8: *"do not have experience, most of them are the start-up businesses who are coming out fresh from university, others who are just coming out of the world"*). These businesses are the products of creative ideas emanating from academic research (P5: *these spin-off companies, and so these are more, these are the ones if you are talking about technology there are more technology related"*). Owners of start-up businesses are usually individuals with the scientific know-how that they have acquired through academic training or research (P6: *"using the knowledge or the scientific know-how gathered maybe through academic training"*; P8: *"have ideas of the theoretical framework of doing things"*). Therefore, for most incubatees, the incubation process is understood as time progresses (P12: *"not sure about what to do as the process of incubation progresses"*). New business owners might have sufficient technical knowledge of the product or service they are introducing. They, nonetheless, require assistance in developing the technology and converting it into a financially viable competitor.

7.10.1.7 Incubatees-driven by unemployment

The challenge of high unemployment, even among students, is one of the factors that contributes to individuals opting for entrepreneurship and small business ownership (P2: "*Students were having those years, and it was very difficult for them to find employment opportunities")*. This challenge of limited employment opportunities affects the universities as they struggle to find work placement opportunities for their students (P2: *"experienced difficulties in placing students in the industry"*). In response to these challenges, higher education institutions have been driving programmes geared towards directing the youth and the unemployed graduates towards entrepreneurship and small business ownership (P2: *"direct the youth of this country into starting up businesses of their own"*). The scourge of unemployment further results in the potential incubatees not possessing sufficient resources to finance their incubation programme (P2: *"the youth, ones, are unemployed, Others are fresh from university to pay to be incubated in a certain program makes it difficult for them"*). The push to entrepreneurship due to limited employment opportunities generates incubatees who are not fully committed to developing a business and making it successful, thus affecting the outcomes of TBI intervention and negatively affecting the desired impacts.

7.10.1.8 Cultural-based behaviours and attitudes

The incubatees are also bringing in their personalities that are informed by their upbringing and cultural exposures (P9: *"Children coming from rural areas; they come with a certain behavioural norm";* P9: *"The culture of don't speak unless spoken to, is something to be reversed").* (P12: *"incubatee that is probably shy at the beginning"*)*.* Incubatees also bring different behaviours and attitudes; they may be interpreted as not fitting with the business environment, and among these is the belief that they are entitled to support from the government, sometimes leading to arrogance (P8: *"Being entitled to get something because you black"*; *P9: "Would have never gone through with that mindset"; "I am an engineer and I am up"*). These ingrained behaviours can be counterproductive in developing a business and ensuring its growth and prosperity (P8: "*Where you would be shy, where you will be*

respectful"; P8: *"Sometimes you need to be just assertive when you are in business" not necessarily come timid into businesses"*).

Therefore, TBIs must implement programmes that will bring the best attitudes and behaviours from incubatees (P8: *"make sure that that person gets, feels that he is worth getting it after working for it"*; *P9: "they will always be followers and if you can't express your opinion, how are you going to innovate and not be able to communicate your innovation"*). The TBIs are forced to assume the responsibility of orientating the incubatees into the business space.

7.10.2 Essential skills for incubatee success

The skills that TBI management considers essential for incubatees are further categorised into business success, technology mastery, entrepreneur/innovators/ small business owner attributes, skills to address cultural gaps, business resilience and skills for the future. These categories will be discussed.

7.10.2.1 Business success skills

These are the skills that the TBIs, through their interventions, are instilling in the incubatees to assist them in navigating the precarious business environment. These relate to business success skills, financing small businesses, marketing and growth of small businesses, human resources management, communication skills and stakeholder engagement, networking skills, managing clients and developing and adhering to the business plan. The required business skills are also classified as soft skills to distinguish between these generic characteristics and the technical capabilities associated with specific industries (P1: *"also need other soft skills"*; P12: *"technical training, the business training, soft skills training and understanding of the theory"*). These skills should inform the interventions and matrix for providing customised services to incubatees that, while generic enough to assist any small business, also display unique challenges for a specific incubatee (P11: *"customise our support in terms of the scheduling of our sessions or our touch points with them to ensure that we are including and accommodating everyone"*). The outcome of

technology business incubation is successful small businesses. Hence, the TBI must ensure that its incubatees can manage their enterprises successfully.

7.10.2.2 Financing the small business

Incubatees also need access to funding, which is essential for setting up businesses and providing resources for success (P2: "*access to funding"*). Therefore, soft skills encompass financial management skills (P1: *finance skills"*; P2: *Financial management"). The* TBIs are also instrumental in assisting the incubatees in accessing government funding, and their interventions result in expediting the process that usually takes longer (P10: *support such students who are entrepreneurial; the process of getting funding is not as laborious, through government agencies, it takes months, it doesn't take that long";* P13: *"assist most of our researchers' terms of securing funding that will assist them in technology or furthering their technologic development"*). Funding is an essential element of small business success, and the TBIs, through their networks and stakeholders, play a critical role in assisting the incubatee's access to finance.

7.10.2.3 Development and adherence to business plans

Small business owners are expected to own and understand their business plans and, most importantly, formulate actions to fruition through the enterprise (P9: "*recognised that there's a need to* have the business plan, *but we're not practicalising it"*). The business plan provides a framework against which the business operates.

7.10.2.4 Marketing and growth of small business

Marketing the business and increasing its clientele is another key characteristic for the growth of small businesses (P2: "*knowledge of marketing skills and how to market their businesses").* One of the most significant hurdles for small business owners is accessing the markets and claiming a stake in the market (P3: *access to the market in this country is a huge challenge for small businesses.*"). This challenge is also exacerbated by the new products or services that are developed and should be

supported from development through to commercialisation. At the same time, the business owners lack experience in taking products to the markets (P5: *students from different businesses, student business very good at developing things, but they do not have the skills and don't understand where the markets are"*). The marketing exercise that TBIs conduct include undertaking a technology licensing process on behalf of the incubatee (P13: *"facilitate licenced negotiation where we're licencing technology"*). The support provided by the TBI in facilitating access to markets and increased clientele for the incubatees accelerates the growth of the enterprise.

7.10.2.5 Communication skills and stakeholder engagement

Communication skills of the incubatees also need to be developed as it is an essential mode of engaging with potential clients and other stakeholders (P9: *"Never become a successful entrepreneur if you do not engage"*; P12: *"An understanding of how to engage with other peers")* The TBI experience should inculcate the culture of active participation within (P9: *"incubatees should also be allowed an opportunity to be active participants as key stakeholders in an organisation they are not getting involved"*). They are used to receiving and following instructions (P9: *"operate in an instructionist environment, they are all waiting for an instruction"*). The necessary communication will assist the incubatees in developing their voice and improving their ability to communicate their views, opinions and eventually innovative ideas (P9: *"the vocal nature and their ability to share their opinions elevated them"; "improving that communication and greater softer skills").* The prosperity of business also implies the need to secure human resources that will promote the growth and sustainability of the company; therefore, the small business owner needs to have sufficient human resources management skills to create jobs and benefit the small business (P2: *human resources management*). The incubatees, as small business owners, can only operate by engaging other stakeholders, clients and business employees.

7.10.2.6 Managing cents

TBIs aim to develop, support and grow small businesses, requiring them to acquire more clients (P9: *"Build a rapport; how do you manage the client").* They need to

develop skills to nurture these relationships and retain them for the long term to ensure growth and sustainability *(P9: "How do you go on your regular turn up and your follow through"; "do not have that mindset and that is destroying the opportunity to grow"*). The TBI management revealed that skills needed by the incubatees could be categorised into the following sub-categories. The first set relates to skills that are essential for running a successful small business, the second set relates to those skills that empower incubatees with the necessary technology for the prosperity of the small business, and the third category relates to personal attributes that are essential for an entrepreneur/innovator or a small business owner.

7.10.2.7 Networking skills

The incubatees joining the TBI programmes also need to develop networks by meeting new individuals and developing skills that create opportunities for their businesses (P9: *"practical things which talk to how you engage"; "understand how important it is, when you don't know anyone, take the attitude that you will always be the one who engages"*). Networking skills are considered necessary by the TBI management as the businesses need partnerships, financiers and experts to be successful. The TBIs are responsible for assisting the incubatees in enhancing their networking skills.

7.10.2.8 Technological mastery

The incubatees also need the skills that will equip them with technology-focused skills that will add value to the business and contribute to its success and sustainability. The findings of the study revealed that for the incubatees to be competent, they need to produce products that are within the specified quality standards (P1: *produce competent clients that can actually produce the best, no not the best, quality products in terms of the standards that are there in South Africa"*). The key to success lies in taking these products to the markets (P5: *how to actually take it to markets"*). The TBIs are responsible for addressing the technology gaps that affect incubatees and, therefore, limit their ability to take advantage of technology in developing their small businesses (P7: *"need to bring our population on board with digital skills*

programmes"). The technology transfer gap management requires bringing together the academia conducting research and the challenges currently experienced by the industry (P13: "There *is a huge gap in between academia. So, let me define the gap that we are trying to fill as the tech transfer. That will be your industry linkage, which is a gap that we are filling. So currently there is no relationship between academia and the industry.").* The TBIs are crucial in developing technology for and on behalf of incubatees.

7.10.2.9 Entrepreneur/innovator/small business owner attributes

The ultimate product that the TBIs generate is the graduate incubatee capable of managing a prosperous, growing and sustainable business (P3: *"SMMEs.That's the only product as an incubator that we have"*). The evaluation of the impact of TBI rests on the sustainability and growth of the graduate incubatee.

7.10.2.10 Entrepreneurial thinking

The TBIs provide the soft skills as indicated in Theme 2, which are those skills that relate to the capability to manage the business; however, incubatees appear to need other personality traits that will enhance their resilience as entrepreneurs (P1: *think more like entrepreneurs"*).

Such skills will also assist incubatees in surviving the hostile business environment (P8: *"skills of presenting their ideas in a hostile environment at times"; "When they get rejected, they have to believe in their product and they have to be sure that their product is well presented"*).

7.10.2.11 Innovative

The innovative abilities of incubatees need to be nurtured through opportunities to engage with various stakeholders to test their ideas and sharpen their creative capabilities (P9: *"Even their best ideas will not be put to the test because they are waiting to make you happy and that is so dangerous"; "then we'll never get innovative.*

"will not get innovative in a mindset like that"). Incubatees, therefore, need to assist with ideation or idea development (P12: *"assist in ideating and cleaning off the dirt and the debris and assist the innovator actually to see the real idea behind the idea"*). The TBI should support the incubatee to a point where there is agreement on the viability of the business idea (P12: *"get to a point where we both agree that look what you really thought was a good idea is actually not a good idea, probably a good idea but it's not viable").*

7.10.2.12 Entrepreneurial drive and passion for business

The incubatees need to focus on a single idea and allow sufficient time to develop it and lead to a successful launch of the business (P11: *"challenge that we face is commitment, commitment from the part of beneficiaries, they don't commit fully to our program, some are studying, some of them already have existing jobs within our province"*). The small business owner is responsible for driving the business's energy towards success (P3: *"Looking at if there is a drive and there is a passion for the business, someone who would be running the business on a daily basis"*). Incubatees should possess the sufficient drive to envisage a small business that is contributing towards the province's and country's economy (P4*: able to contribute more in this space of small businesses that are in the economy"*). Therefore, TBIs must introduce interventions that will assist incubatees with understanding the business world (P8: *"Understand the business world"*).

7.10.2.13 Skills to address cultural and business resilience gaps

Incubatees need to be assisted in developing skills to gauge the cultural setting in any organisation, and, based on their assessment (P9: *"have understood the client what type of environment, do you have a casual environment, or a formal environment")*; then adopt behaviours and attitudes congruent to the environment (P9: *"present yourself in that way, in that same manner so that it does not interfere with the cultural issues of that organisation"*).

One of the challenges facing new small business owners, innovators, and entrepreneurs is the ability to move forward despite the challenges and negative experiences (P9: "going to be happy with it, they’re going to be laughing at you"; "huge soft skill and limitation, we don’t have that thing to push through regardless, and that’s the capacity"). Cultural behaviours and attitudes need to align with the business world.

7.10.2.14 Skills for the future

The TBIs are also instrumental in helping the incubatees move to desirable skills (P6: skills for the future). The TBIs are involved in industrial areas the government targets for development (P6: “*skills development towards enabling the biotechnology sector.”*). This move is essential for businesses focused on technologies and should be aligned with the dynamic world of the fourth industrial revolution.

7.10.3 Discussion and conclusion: Theme 7

7.10.3.1 Discussion

The participants of the study confirmed that the success of a small business requires a skilled owner who, as an agent of change, is passionate and willing to devote the necessary energy to its success (Lukhele & Soumonni, 2021:829). The TBI interventions should respond to this need for skills development. Entrepreneurship abilities and spirit are essential for incubatees to survive hostile business management. The study also confirmed the need for incubatees to develop interpersonal skills that are aligned with the managerial requirements of the small business owner (Pillay & Kikasu, 2024:342). Such skills include the ability to network and build sustained relationships. Incubatees also need communication skills, including the ability to market their ideas and businesses to stakeholders. KZN has an added challenge of limited digital skills, and such competencies are essential for survival in the 4IR era. In addressing the low skill levels, the provincial government needs to address the digital divide gap and improve access to technologies, as digital skills provide a platform and act as catalysts to alleviate poverty in the province

(Aruleba & Jere, 2022:2). The province needs to explore options to address this challenge at the school level. Some incubatees can be regarded as illiterate, while others possess university degrees. This wide range of incubatees poses a challenge for TBIs when designing interventions to reach the levels of education of each incubatee. This wide skills gap is enforced by the reality that the province has rural and urban communities, and the levels of education and skills are lowest in rural areas (Jili *et al.*, 2017:5). The generic training programmes help the TBIs to address some of these challenges. Limited networks and connectivity are the provincial challenges impacting TBIs and their incubatees, especially in the province's rural and township areas. This challenge and lack of digital skills, which is typical of rural and underdeveloped areas, harm the drive to develop technology-focused small businesses in the province of KwaZulu-Natal. One of the challenges confronting small businesses is access to markets and digital technologies, which have been adopted globally by entrepreneurs (Entrepreneurship Monitor 2025, 2025:69).

TBIs generally support new enterprises based on novel ideas, and as such, the owners need more business understanding and knowledge of the business environment. Even academics and researchers who are competent in the field require additional business knowledge and understanding of the commercial environment. Incubatees are also driven by unemployment in the entrepreneurship space. Unemployment is one of the significant challenges in the province of KwaZulu-Natal, particularly youth unemployment, which also affects university graduates. Most young people have become either necessity entrepreneurs or small to medium-enterprise owners. (Lose, 2021:2)High unemployment also translates to incubatees requiring more resources and some being forced into entrepreneurship (Endris & Kassegn, 2022:6).

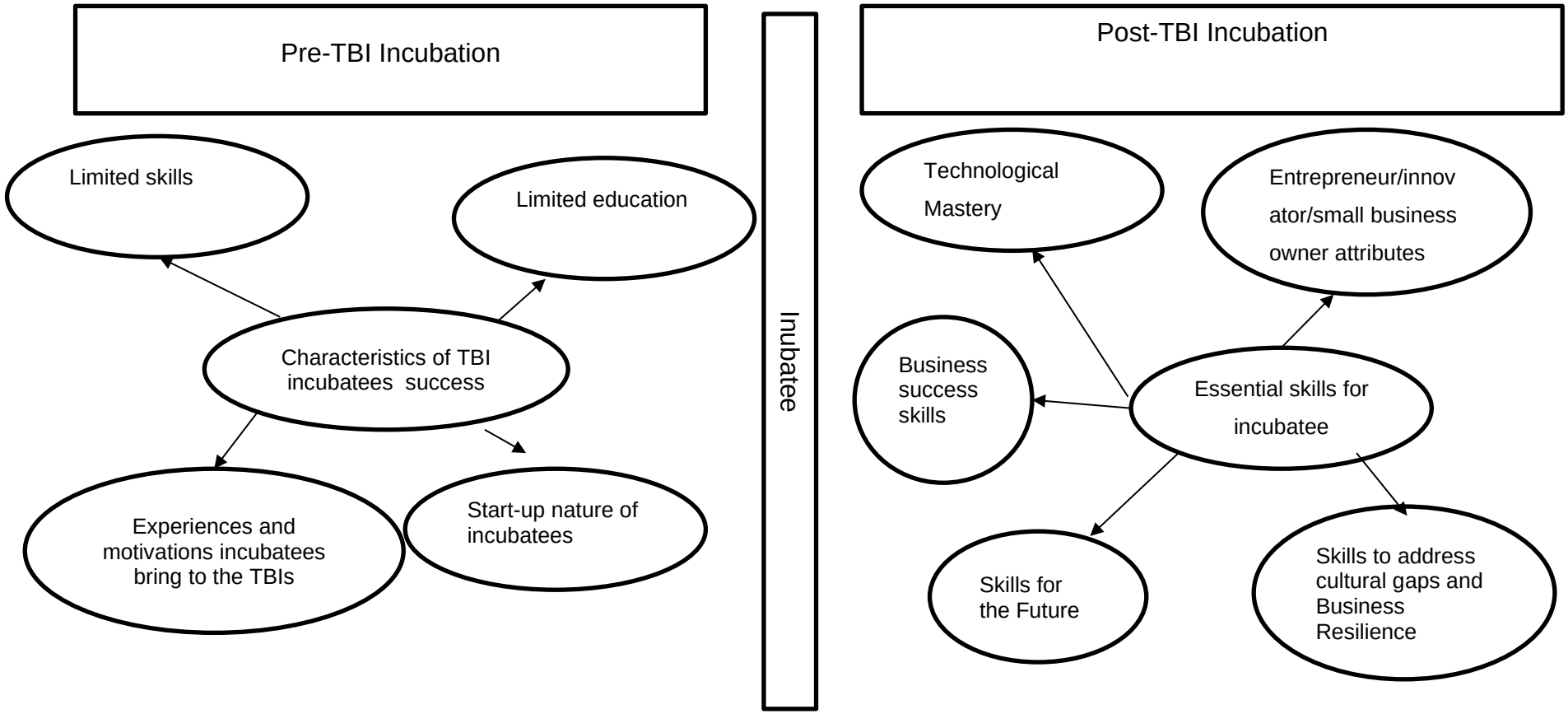
The incubatees are influenced by their cultural behaviours and attitudes toward TBIs. Some of these, as the findings revealed, are counterproductive to the development of the small business. The essential skills for incubatees incorporate managing successfully, mastering the technology necessary for businesses, entrepreneurs/innovators/small business owner attributes, skills to address cultural gaps, business resilience and skills for the future. Generally, these sets of skills are at the core of the design of the TBI interventions. Soft skills are essential for business

development, and technological skills are crucial to understanding and advancing businesses and ensuring they remain competitive. Businesses can only survive and grow with appropriate funding. Hence, business owners should develop financial management skills, identify funding sources, and be well-equipped to attract and acquire further funds. The highlighted importance of critical skills relates to the ability of the incubatees to absorb the knowledge and skills transferred to them and, therefore, are essential for the success of the TBIs and the potential for delivering the desirable impacts (Hassan, 2020:439). The success of small businesses also depends on the passion and resilience of the business owner; hence, incubatees need to work towards developing these essential personal traits. Small businesses have to grow and remain competitive; therefore, it is also the responsibility of the incubatee to keep abreast with developments in their specific industries and the technologies they are using.

7.10.3.2 Conclusion

Communication, networking competencies and an entrepreneurial spirit emerged as critical personal skills and traits required for business success and are supported by the literature review (Lyken-Segosebe, Montshiwa, Kenewang & Mogotsi , 2020:4). . Incubatees should develop the technology and the business simultaneously to ensure successful market entry. Regarding academic qualifications, incubatees range from those who can be considered illiterate to those who possess university degrees. The varying levels of education among incubatees bring an added challenge for designing TBI interventions. These factors are also exacerbated by high unemployment among the youth from rural areas that are considered as having lower education levels and among graduates who hold university degrees (Adetiba & Qwabe, 2020:167). The limitations in networks and connectivity add strain on the TBIs' ability to promote technology-focused small businesses. Small businesses need the finances to hire employees for various functions. Hence, it is the owner's responsibility to ensure that all aspects of conducting a business are sufficiently included and performed to assist the small business in achieving its goals. The disparities in the capabilities of the incubatees compared to those desired by the TBIs are schematically represented in Figure 7.10 below

Figure 7. 10: Schematic representation of Theme 7 Profile of TBI incubatees



Source: Researcher's creation

7.10.3.3 Alignment with the primary aim and secondary objectives of the study

The primary objective of this study is to develop a framework for incubating technology businesses in growing sustainable small companies in KwaZulu-Natal. The findings of Theme 7 seek to identify the characteristics of incubatees that join the TBIs and what the TBIs describe as the ideal profile of an incubatee. The incubatees add diverse backgrounds, cultures, experiences, and skills to the TBI. Their motivation for joining the TBI programmes also varies. On the other hand, the TBI management desires incubatees with skills that are congruent with managing a growing and sustainable technology-focused small business. Hence, the effectiveness of the TBI relies on the ability of the programmes to bridge the gap between the profile of the incoming incubatees and those deemed essential for small business success.

Table 7.25 presents the links with the secondary objectives of the study.

Table 7. 25: Theme 7: Links with the secondary objectives of the study

Research objective	
SO4: To explore and describe the mode of operation for technology business incubators.	Theme 7 revealed a mismatch between the required skills and those that the incubatees bring to the TBI. The TBIs should assist the incubatees in developing skills in managing their businesses and technologies and provide platforms to develop personal skills, communication, and networking abilities. .
SO5: To explore and describe the experiences of technology incubation programme managers/CEOS/directors	The TBI management is responsible for developing interventions that will bridge the skills gap between what the incubatees bring to the platform and what is desirable for a growing and sustainable small business.

Source: Researcher's creation

7.11 THEME 8:PROVINCIAL GOVERNMENT AND TECHNOLOGY BUSINESS INCUBATION

This theme focused on the role of provincial government within the TBI ecosystem in KZN. It also includes the role that the TBIs can play in advancing their benefits, TBIs within the province, and how collaborative work can maximise impact. Factors to increase the effectiveness of the TBIs in supporting small businesses in KwaZulu-Natal are also explored. A total of 276 codes were recognised in this theme, with P6, P7 and P8 contributing significantly to the codes. These codes generated two sub-themes presented as follows:

- Role of Provincial Government
- Role of the TBIs in KwaZulu-Natal

Table 50 presents sub-themes and categories for Theme 8.

Table 7. 26: Theme 8: Sub-themes and categories

Theme	Sub-themes	Categories
Government and Technology Business Incubation	Role of the Provincial Government	• Provincial Strategy on TBI • KZN Government Funding TBIs • Promoting Innovation in the Province • Developing Digital Skills for the Province • The rurality of KZN • TBI Ecosystem • Youth Unemployment and Related Challenges
	Role of TBIs in KZN	• The Important Role of TBIs in the Province of KwaZulu-Natal • New Economies Aligned to the Fourth Industrial Revolution • Contribution to economic development • Build a Relationship with the Provincial Government • Contribute to the Development of a Provincial TBI Ecosystem • Increase the Participation of Youth in the TBI programmes • Contribute to the Reduction of Unemployment • Contribution towards Skills Development

Source: Researcher's creation

The findings revealed that TBIs need to forge strong relationships with the provincial government, which will increase their effectiveness in growing sustainable small

businesses. The engagement categories are developing the provincial TBI strategy, creating the TBI ecosystem, and contributing to the province's economic development, unemployment and skills development. These factors will be discussed extensively in the following sections. Data and preliminary findings are presented in Table 7.27.

Table 7. 27: THEME 8: Provincial Government and TBI

	Role of the Provincial Government	Role of TBIs in KZN	Findings
1	*"providing them with a space that they can use to create their manufacturing facilities."* *"incubator ecosystem not only in the province but also nationally."*	*"incubators looking at various aspects of business operation betterment of their operations"* *"Forge relationships with other stakeholders and other units that can complement what we do, and that can do what we do, maybe on a bigger scale, by tapping into that network."*	The government is responsible for providing spaces for small business development, including assisting them with manufacturing facilities. An incubator ecosystem that is provincially and nationally based is also needed. The TBIs in KZN play a critical role in enabling small business success. They also possess a crucial network of stakeholders who support small businesses and increase their probability of success.
2	*"Grants that the governments, small businesses provide, because with banks, commercial banks is difficult";* *"very few employment opportunities for the youth"* *"South African Community more than fifty per cent of the population of South Africa is made up of youth, most of them roaming the streets looking for jobs."* *"others sitting at home with qualifications that they have obtained at universities, the focus was on being employed."*	*"role models to these young people, to these incubatees"* *"get these young people into the program."* *"networking".* *"We get them to talk to each other."* *"They share ideas; they share views, And this goes on as long as they are in the incubation program, even if they are out of the incubation program."* *"That's going to assist me in actually running my business."*	The other role of government is to provide financing for small businesses that struggle to get funds from traditional commercial banks. The TBIs are responsible for alleviating the high unemployment rates, particularly among the province's youth and graduates who come out of universities with skills for searching for employment rather than entrepreneurship. The TBIs need to provide role models for young people and assist them in shaping their ideas into fully functional small businesses.
3	*"The KwaZulu Natal provincial government is not, I mean is, not aligned to the incubators"* *"They are not on board. They are not part of that"*	*"Incubation program, in my view, is a well-thought and a good program that can and will assist SMMEs."* *"Be a problem solver to the provincial government, the solution to the provincial*	The TBI management believes that the Provincial government needs to be aligned with small business incubation. A provincial TBI model that fits the province's profile is needed, in spite of the fact that the government funds most incubators.

	“One needs to analyse to see whereas an incubator, where do you fit in the provincial” “government scope?” *"To work together for the development of SMMEs in that particular province."* *“KZN is a huge province. There are rural areas within the province; those areas are neglected; how do we access them? Water is not up to the same standard.”*	*government, the fourth industrial revolution, be on par with the current market. Keeping up with the current trends has a huge role for incubators in KZN. They contribute to the country's GDP.”* *"where they get to network with other businesses, "* *“Make them understand the program so that it can be a smooth ride moving forward. Almost all incubators in South Africa and various government institutions fund them.”*	The TBI management believes TBIs are an essential programme within the entrepreneurship development ecosystem. They are aligned with the fourth industrial revolution and global trends. The TBI programmes should also extend to rural areas of the province as this will also contribute to the provincial GDP
4	*“A lot of young people are there.”* *“Infrastructure is not available for technology businesses to operate.”* *“Improving the infrastructure would be one of the issues that need to be looked at so as to be able to support those kinds of businesses.”* *“KZN is predominantly rural. Now, since it is rural, there are technological challenges when it comes to the rural areas, and thus, there are issues of access to technology in the rural areas."* *"lack of information because of where they are placed."* *“Most of the technology business incubators are concentrated in towns, and they "need to reach that in the larger communities in order for that to benefit all.”*	*"To improve that is the skills of society, skills levels and then also improving that is the skills then be able to contribute meaningfully to the economy through that is the incubatees, qualified or graduated from the incubators"* *“Young people because they are the ones who become interested; young people that want to get involved in businesses”* *"Able to not eradicate but reduce unemployment, unemployment in our country because it is just way too much, the most affected are the young people.* *"If it is well managed and well channelled, it will make a huge impact job creation; being able to employ others improving that is the economy of the country"’* *"Getting people to start their businesses"creates more space and an environment where young people can start their own businesses, making an impact on the economy.”*	Poor infrastructure prevents young people from accessing technology support. Government intervention can help address the province's infrastructure challenges, which are also linked to the province's rurality and lack of adequate access to information. Without government interventions, TBIs will continue to be concentrated in urban areas. The TBIs are responsible for addressing the skills gaps for young people and graduates and captivating them for their positive contribution to the economy and reduction of unemployment. Young people who build successful small businesses can contribute to the eradication of poverty and reduce unemployment. TBIs create an environment where young people can explore their business ideas.

	"There is no proper link between the school curriculum, and that is what the small businesses."	*"Making information more accessible, mainly to young people."*	
5	*"If we want to grow the country and we want to grow Africa, and we want to really shine, we need to look at our context and not compare ourselves with Western countries and try to compete with them."* *"Let's see what we have and how we can help our communities and our businesses."* *"Our communities and our social structures grow SMMEs and compete internationally. Let's have our own South African brand."*	*"universities and how they can become."* *"entrepreneurial; businesses that were started by staff within the faculties creative ideas,"* *"Youth Innovation Challenge"* *"Students from different departments, so we have fashion; we have engineering, we have architecture."Youth Innovation Challenge*	The government is responsible for creating programmes focused on SA's unique challenges. Such programmes can assist communities in starting and developing small businesses that will grow and compete internationally. TBIs within the university are responsible for converting creative ideas into thriving businesses. They must take advantage of the various industries that can be promoted within the university.
6	*"Incubation support remains key and important for KZN, for South Africa", and "incubators are a national function."* *"provincial government needs to be enabled to also play an instrumental role in establishing new incubators within their segments."* *"Removes the responsibility from provincial or local government structures in that a defined key intervention is required for their challenges."* *"More authority is given to provincial or even municipalities to establish their incubators valuable intervention. Providing skills or know-how in developing new opportunities*	*"build new economies which will diversify the fiscus one but two the tax base of South Africa";* *"key policy think tanks guide in terms of how they formulate their own programmes"* *"responds to the SMME experience"; "focussed on technology incubation specifically to small businesses or SMME's".* *"skills development towards enabling that biotechnology sector"* *"incubators themselves form an ecosystem of key role players within the incubation space,"* *"incubation remains key and a valuable intervention."* *"especially for a developing country developing economy""*	The provincial government must recognise the importance of the TBIs and their role within the province. Most TBIs in the province are a product and intervention of the national government. The provincial government should lead the establishment of new TBIs and encourage the municipalities to develop their own, as this will allow for focused support at local and provincial levels. The government should realise TBIs' potential in creating new economies as they support innovators and provide high-tech infrastructure. The recognition of the role of TBIs should attract more resources and thus increase the impact of the TBIs. The TBIs are instrumental in building new economies to support the provincial and national economic and fiscal base. However, there is a need

	or new businesses using the knowledge or the scientific know-how." *"Lack of critical mass in researchers or innovators who are from a scientific background."* *"high-tech infrastructure with complimentary skills to enable innovators or entrepreneurs to access."* *"infrastructure for access by innovators."* *"innovators to be exposed to current and real-time equipment."* *"provide the support or even guide the innovators."* *"Government can provide more subsidy to incubators to enable more incubatees to come through; the government should consider funding, directly funding incubators, enable them to do what they are supposed to be doing."* *"Deploy more such interventions in the most rural part of KZN and South Africa. We do not have enough incubators, and we do not have enough spread around the country."* *" In South Africa, we've got less technology-based support for SMMEs and more business-based support.*	*"formulate themselves also into a formidable ecosystem."* *"One-stop shop for SMMEs allows access to networks of other incubators and networks of other funders."* *"incubator would have access to multiple funders or multiple opportunities for resource funding or multiple opportunities to engage other stakeholders."* *"access to not just local but national and sometimes an international aspect in certain fields"* *"minimal if any activity that focusses on early stage proof of concept type of interventions."* *"innovators to be exposed to current and real-time equipment use, especially in producing their products going forward; that is lack of such infrastructure or opportunities for rural citizens."* *"The challenge is you can have the correct equipment and be in the correct location, but if you do not have the correct skills and requirements, you need the incubator."* *"assists in fast-tracking the process of either confirming a product or a process or changing course."* *"lack of critical mass in researchers or innovators who are from a scientific background"* *"access to funding opportunities"*	to rethink how these programmes are formulated. There should be a strong focus on technology and skills for the future. The TBIs should also establish an ecosystem that will enable SMME development in respective industries. The networks that are possible. The TBIs should always ensure that they have the skills to match the high-end equipment that exists in the TBIs.

		“Most funding instruments, both private and public, focus on successful enterprises, or may I call them both proof of concept activities. You cannot prove a concept unless you’ve received support in the early stages.”	
7	*“Supporting you with an innovation platform because that’s what we also do to develop and grow your innovations.”* *"Bring in digital skills training and digital skills programmes at school level,"* *"Ensure that every child has access to technology."* *“Access to connectivity for schoolwork.”* *"learning material is all made digitally available.”* *"Different breed of students are going to be emerging students who won’t fear technology and technological, entrepreneurial activities. Technology-based entrepreneurial activity won’t be so difficult for them because it becomes then a part of their life, part of everything that they do, making it easy for them to think about doing programming and coding and embrace technical skills development and software development, you know,, because you’re in the system."* *"Doing something correctly at grassroots levels."*	*"think that firstly there has, we have to lobby government" lobby local bodies, municipalities, NPO’s, corporates.”* *“They are the future.”* *“Most SME’s don’t have, are not equitably served with internet especially once you move into the township and the rural areas”* *"KwaZulu Natal it’s obvious that there’s a serious lack of digital skills"* *"How do you build on technology when the communities are so lagging behind in terms of digital skills."* *"It’s difficult for them to compete now against other peers and their colleagues, maybe from the other provinces or even from the other regions."* *"The rural place would definitely be your local municipalities because for us to establish in any town, we have to have a partnership with them and a buy-in from them."*	The government has the role of supporting small businesses by providing innovation platforms. The government should also enable the fourth industrial revolution by championing access to digital skills at the school level and providing access and connectivity to breed a new generation of learners who can appreciate opportunities in the technology sector. Coding and programming should be embraced as skills necessary for all learners, thus empowering school learners to identify careers within the ICT. The government approach should target grassroots development. Youth can also identify career opportunities using social media technologies. TBIs have the responsibility to lobby local authorities for the adoption and support of TBI programmes. TBis are affected by the province's need for digital skills. The rural parts of KZN need to be supported. The economy of KZN has suffered under COVID-19, political unrest, and floods. TBIs can play an important role in capacitating youth, women, and people living with disabilities, thus creating employment, reducing inequality and balancing gender in the areas of iCT.

	“Need to bring our population on board with digital skills programmes.” *“Everybody needs to be digitally empowered, So we need to roll a lot of digital skills programmes.”* *"So we need to roll a lot of digital skills programmes."* *"More than just making calls and going on to social media, for actually using it to do work, it’s second nature."*		
8	*"it becomes expensive to do business, to get into business.”* *“At times, we don't even know which areas are lacking in our province or in our country, where we rely mostly on imports, and how we can improve our local production more.”* *“If there was a clearer strategy which was able to identify the impact that the government wants to make.”* *“Identify some businesses that would come up with something substantial, certain ideas and products were able to come up with an innovative idea.”* *“More business support is obtained from either the government or even the institutions that support small businesses.”* *"Be clued up with what business requires and what institutions should be providing."*	*“There has to be close working relationship between government, government departments, institutions that support small businesses”* *“Space that businesses find themselves in, it has to compete with so much foreign ready-made products."* *“A favourable exposure to resources, like the sea, the land and the climate.maybe so useful compared to other provinces.”* *“Promoting mostly rural areas. Such programs if they may also be applied in promoting businesses.”* *“Commercialising that has been a problem needs funders to produce it more cheaper rate where it would be affordable to any other person.”* *“Close relationship with the incubators, identify those businesses that need support, creating relevant programs that would support those businesses. earlier identification of some of the*	The government needs to provide a province profile that indicates areas and industries to be targeted for development. The government should also have a strategy for incubating technology businesses in the province so that all TBIs can adopt and support small businesses with innovative ideas. The government should also be instrumental in forging relationships with universities to provide holistic support that promotes innovation. These relationships are essential in creating a provincial support landscape and providing resources to support technology business incubation. The province can also take advantage of emerging opportunities in areas like traditional medicinal plants and indigenous knowledge systems. There are opportunities to link traditional knowledge to current technologies, thus increasing the number of locally made products, including connecting researchers at academic institutions with innovators that can be housed as incubatees in the TBIs. The

	“They do not have a clue, and they do not even have an idea of the type of support that needs to be provided to institutions like the incubator small businesses suffer.” *“Major challenges that I have looked at, and I find challenging even for the businesses' medicinal plants, are processing them to come up with new herbal products that have not been in the market before.”* *“Utilising the knowledge that one has but linking it up with the new technologies opens up new avenues for local businesses, coming up with even more locally made products.new ideas and it also promotes those businesses that are already in practice.”* *“Promote the culture of being creative,"* *"find those who will be good in technologies that are needed in the area and change from conservative or traditional ways of doing things and use the new avenues that may open up in their thinking.”* *“What I have taught them, incubatees is that you can always improve on the technology you have, and it has opened the eyes of so many that there is always a new way of doing things for business.”* *“Present their new technologies or their discoveries to the company incubatees; if they are really open-minded, they can learn*	*social challenges which have an impact on the ability for young people to perform”* *"Growing opinion in our country that people don’t appreciate things that are free but that’s not true"* *"Close the door again on thousands of young people who have nowhere else to go,"* *"You want to be an entrepreneur, yes, here’s the rules, play within these rules, and you perform"* *“Empower those who are working in the business space in any institution to empower them or to encourage coherent working programs between business and academic institutions, plus also government departments that support businesses, such as the Department of Science and Technology. I don’t know how far it works with businesses in the field.”* *."The more they work with the academic institutions, the more we would have better results for those who are aspiring to be innovative to get into new businesses accessing support good for those who are in business, those who are employed in those institutions or government.”* *“Students who come out of the university find a good space to implement the ideas and research that they have been learning about whether they are implementable or not."*	TBIs will then assist in developing businesses around novel technologies and supporting thriving and sustainable businesses. Clearly identified relationships between the provincial departments and the national government departments like the DSI can assist the programmes in aligning their interventions with the provincial and national imperatives. The TBIS should be instrumental in building an ecosystem to support technology business incubation. This should include profiling each institution based on the support it can provide to the incubatees. As a country, SA needs to catch up with the rest of the world on technology. The province also needs to catch up on commercialisation to ensure that the profits of new technologies accrue to all citizens. The TBIs can then rely on the government strategy to provide support to the youth.

	more, improve on their ideas, develop their businesses, and be encouraged to change when necessary." *"Opened up too early, we had not given ourselves time to be ready to understand; when we open up for the world, exposing ourselves to the tough competition when we have no time to catch up opens up new avenues for local business, coming up with even more products, locally made products."* *"Province with so many advantages".* *"Really struggled to sell the concept of a unified, strategic direction for X in the context of what business incubation is in the province."*		
9	*"The government has decided to do at SEDA in particular is that they've put together an industry body."* *"Organisations will then get together and look at what's happening across the industry."* *"which doesn't create a tight relationship between the various entities."* *"The province overall doesn't have a particular strategy for what it wants to achieve for incubation, which feeds into addressing youth unemployment and lethargy."*	*"A platform where, as government-funded incubators in the province, we are able to chart a way forward."* *"No incubator for the maritime sector, maritime province, Durban, Richards Bay and even potentially other small little towns that are along the coast."* *"Understanding the social challenges",* *"Major challenge insofar as the social challenges, cost of living,"* *" Young people come to our centre right, and they are hungry",*	The role of government is that of an enabler to assist the TBIs by providing a clear strategy to be followed in supporting and developing industries. This role should also extend to establishing relationships with all relevant institutions and creating links within the province that will ensure the implementation of the provincial strategy. The government strategy should be able to address the challenges of youth unemployment and lethargy amongst youth. The role of government should also be aligned with developmental opportunities that can be found throughout the province. These include developing the maritime sector, which takes advantage of the ports around the province. There is also a need for the government to improve access to TBI throughout

	“This is a valid argument for the government to pursue a provincial strategy for incubation.” *“Nothing substantial has come out in saying this is a vision we have for incubation for the province. These are the sectors that we want to pursue, and this is what we want to do.”* *“There isn’t a strategic view in terms of the impact that incubators can have or make to address youth unemployment and create new channels and avenues for youth to display their skills.”* *"Maybe we should have one incubator that deals with IT and technology and support."* *"ensure that it has a footprint around the province"*	*"the reality is that things are so expensive, and they are so impoverished."* *“Young people come to our centre right, and they are hungry; the reality is that things are so expensive and they are so impoverished; the unique challenge for our incubator, and we haven’t been able to position this in such a way that we are able to redirect the energies and efforts of the government to clarify the position for us dilutes the focus of government, dilutes the funding model that we want to achieve, competing for the same funds.”* *“I don’t think we quite understand some of the challenges that relate to business incubation in our country.”* *“We haven’t been able to position this in such a way that we are able to redirect the energies and efforts of the government to clarify the position for us.”*	the province. The efforts of the government should be towards providing a clear strategy for TBI and ensuring that resources are available for interventions to result in desirable impacts of sustainable small businesses that are focused on technologies. TBIs should also understand the social challenges prevalent in the province and ensure that interventions are mindful of these. Government support will be essential for the TBI to address these challenges.
10	*"Having a long-term view as opposed to a short-term view."* *"an integrated development plan together with the government agencies. "* *“Unemployment in South Africa is serious as it relates to the youth, including the graduates.”* *“Youth Development.”*	*Programmes that are aimed at helping youth entrepreneurs."* *“TBIs should participate in competitions and be able to gauge their strength against their peers in other institutions, inter-varsity competition programmes in Africa."*	The government should provide a long-term view that describes the integrated development plan, which will bring together all government agencies and result in interventions that address national imperatives. TBIs should be instrumental in implementing programmes to increase youth participation in technology development and build technology-focused small businesses.

11	*"Within current government structures, there was very limited ability for X to operate flexibly."* *"support provided to beneficiaries was limited due to the red tape and bureaucracy within local government."* *"We just leave it to the national government to set the policies around innovation and entrepreneurship and with very little input from KZN."* *"Province be a force to be reckoned with."*	*"ensure that we have inclusive or develop an inclusive innovation ecosystem here in KwaZulu-Natal."* *"Provide the tools and opportunities to those in need."* *"Promoting the tools of the fourth industrial revolution."* *"Within our province, being able to communicate more regularly plays a role in lobbying at a national level."* *"Policies and strategies being put in place, but send a collective response."*	The current government system does not enable the TBI to operate. Red tape and bureaucracy are some of the deterrents to small businesses access to the necessary support. More input from the KZN provincial government is needed. Legislation and policies only cascade from the national government. TBIs can also assist in developing innovators in the province. These programmes are key to addressing inequality. TBIs are also responsible for lobbying for provincial plans and strategies that will increase their impact in the province.
12	*"There ought to be a concerted effort to promote ideation and incubation of ideas in rural areas, in townships."* *"People who live in those places obviously experience challenges; they actually do have solutions on how to solve those problems (rural and township), but they do not necessarily have a mechanism, a qualitative mechanism, to move from a challenge to a solution."* *"Nationally, we believe it is an important emergent discipline or emergent what do you call this trend, an emergent trend like innovation, entrepreneurship, incubation."; "Don't put money behind these emerging trends."*	*"Grassroots, innovations and grass root businesses"* *"Some incubators cannot be like, you know, your university incubators or your typical SEDA incubators you find in big cities,"* *"Can, be micro-satellites, micro or satellite kind of little incubators, garage incubators, garage of someone's house."* *"an incubator that is more in line with the infrastructure where people are."* *"Satellite of idea generation and idea incubation rural areas, in townships"* *"An incubator with a degree of understanding how ideas are formed and how ideas are harvested will go a long way, being instituted amongst the people or the rural area people or in the townships";*	The government should devise a plan to capture innovative ideas throughout the province. This will increase the number of innovators in rural and township areas, and it will require policy intervention from the government. TBIs play a role in supporting grassroots innovation. These kinds of innovators do not need to take the form of well-established urban TBIs; they can start small and develop over time. They need to be aligned to the local challenges. The biggest challenge will be to resource these incubators with staff capable of identifying and supporting novelties that address challenges that people are experiencing in their areas. Such novelty will benefit the province and country.

	"we just become mediocre in terms of entrepreneurship or innovation." *“policy intervention";* *“ought to be realistic policies that speak to the actualities, our actualities."* *“serious investment department of small businesses need to have a very clear line of sight to the treasury isn’t proper communication treasury to fund these programmes.“* *"Running incubators sort of like not resourced incubators."* *“Scarcity in terms of money"isn’t really a financial focus on programmes like incubation. We had to reduce our finances. We are moving from, say, twelve million rand to just five million rand. We need to really scale down. Tick the box in terms of sustainability; it’s another matter. The policy needs to speak to finance.”*	*“New things could come up, novelties could come, the incubator has to have the capacity to spot those new inventions, and know what to do in terms of protecting those innovations."* *“The benefit of the incubatee is the benefit of the country.”* *“Another layer of administration, another layer of compliance, requires money; ignoring it is far costlier have legal know-how in house."* *“Budget for this for protection of intellectual property on behalf of their incubatees"* *"people who can talk to each other about the things that they are passionate about."* *"Commonly passionate about from an ideation point of view, from the technical perspective, peer to peer.’* *"Form a community of practice, can actually solve their problems."* *“Balanced incubatees or business owners share those with others and alleviate the understanding and the experience of the incubatees to the same level.”* *“ Community of practice is very important in the incubator; peer-to-peer engagement in a safe space, ideas and their technical staff.”*	
13	*“KZN might be regarded as a rural province.” "Most of our programmes are kind of not accessible to the rural areas of KZN, within the range of the CBD";*	*“Access to market, tough to take your product and make it into the market.”* *"Access of funds, that is also a major challenge”; "quite difficult to enter in that particular stream*	The KZN government has a role in improving the TBIs' geographic reach within the province. Commercialisation is still a challenge for the province. It is essential to involve public stakeholders

	“Say what are we doing for the people in maybe Nongoma or Ladysmith."; "What is it that those are programmes are doing for people in the deep rural ends of KZN."; *commercialisation within our province, various avenues, most especially in the public sector, where basically this technology is going to benefit them. It’s really hard; the private sector mostly consists of small and medium enterprises.”*	*when you’re trying to commercialise your technology."* *"Other than identifying and protecting on the commercialisation of Intellectual Property, raise awareness in terms of Intellectual Property and commercialisation.”* *“Assist most of our researchers in terms of securing funding that will assist them in technology or furthering their technological development."* *“Facilitate licenced negotiation where we’re licensing technology. We can’t really depend on yourselves; we need to network and collaborate as much as possible."* *“Wouldn’t say avoid competition, but at some point, we do need to collaborate."*	who can partner with SMEs, as these represent the private stakeholders regarding innovation.TBIs are inaccessible to the province's rural areas, which is challenging because KZN is predominantly rural. Most TBIs are in urban areas, specifically in the city of Durban. TBIs face resource limitations, including funding. Innovative products need funding to generate large enough quantities to enter new markets. This challenge limits the impacts of the commercialisation of new technologies. The TBIs assist incubatees through the licensing of technology. TBIs also have to raise awareness of IP and related legislation. A single entity cannot achieve the survival of TBIS; it will require networks of all stakeholders working together to provide solutions for the province.

Source: Researcher’s creation

7.11.1 Introduction

There should be a relationship between the provincial government and the TBIs within the province, premised on the collective responsibility to support small businesses and identify interventions that will result in the growth and sustainability of small businesses. The government's vital role is essential in providing an enabling environment that will improve the effectiveness of TBIs in generating sustainable small businesses in KwaZulu-Natal. However, the provincial government is expected to understand and appreciate the role of TBIs in the province and how these entities can assist the province in addressing its provincial imperatives of high unemployment, slow economic growth and high inequality. The TBIs are also responsible for helping the provincial government design strategies and implementation plans that will improve the effectiveness of these entities in promoting sustainability among the small businesses in KZN.

7.11.2 Role of the provincial government

This sub-theme related to the provincial government's role and responsibility in aiding the TBIs in improving their effectiveness in supporting the sustainable growth of small businesses in the province of KwaZulu-Natal.

7.11.2.1 Provincial strategy on TBI

Here, the issues related to the TBI strategy for the province of KwaZulu-Natal are expounded upon. The focus is on the challenges revealed in the findings and the need for a deliberate and engaging approach at the province and local government levels.

7.11.2.2 Provincial strategy and role of TBIs in KwaZulu-Natal

The development of SMMEs focused on establishing technology-focused small businesses in the province of KwaZulu-Natal will require collective efforts from the provincial government and the TBIs (P3: "*to work together for the development of SMMEs in that particular province"*). The experiences of TBI management relate to the

lack of direction, mandate and strategy chartered by the provincial government, which will assist in communication of how the government views the role and impact of the TBIs in KwaZulu-Natal (P3: "*The KwaZulu Natal provincial government is not, I mean is not aligned to the incubators"; "they are not on board.* They *are not part of that"*; P8: "*really struggled to sell the concept of a unified, strategic direction for X in the context of what business incubation is in the province"*). The misalignment of TBIs and their operations and those of the government results in ineffective support to small businesses (P11: *"within current government structures there was very limited ability for X to operate flexibly"; "support provided to beneficiaries was limited due to the red tape and bureaucracy within local government"*). The provincial government must provide a clear mandate and strategy for the incubators in the province. The lack of a clear provincial strategy leads to misalignment in terms of what small businesses need and the services provided by the TBIs (P8: *"be clued up with what business requires and what institutions should be providing"*). The direction and mandate that the provincial government can provide will assist TBIs in developing interventions that will benefit small businesses (P8: *"do not have a clue and they do not have even an idea of the type of support that needs to be provided to the institutions like the incubator small businesses suffer"*). Therefore, an analysis must be undertaken to locate the TBI programmes within the provincial agenda (P3: *"One needs to analyse to see where, as an incubator, where do you fit in the provincial government scope"*).

The much-needed provincial TBI strategy will then clarify the role of the TBIs in the province and identify what the provincial government considers to be the desirable impact of these programmes, thereby improving their effectiveness in growing sustainable small businesses (P8: *"If there was a clearer strategy that was able to identify the impact that the government wants to make, identify some businesses that would come up with something substantial, certain ideas and products"*). The provincial government will then play an even more significant role in establishing the TBIs and further provide an oversight function (P6: *"Provincial government needs to be enabled to also play an instrumental role in establishing new incubators within their segments"*). The provincial government strategy can also address pertinent matters for the province, like youth unemployment and skills development for young people, and assist the TBIs in aligning with desirable areas of impact (P9: *"There isn't a strategic view in terms of the impact that incubators can have or make to addressing youth*

unemployment and creating new channels and avenues for youth to display their skills"; P10: *Youth Development*). The appreciation of the role of the technology business incubators in the province will then assist the provincial government in developing a provincial strategy on TBIs (P9: a *valid argument for government to pursue a provincial strategy for incubation. They do not have such a strategy"*).

The provincial government need to develop an appreciation for the critical role that the TBIs play in growing sustainable small businesses in the KwaZulu-Natal and articulate a specific strategy that the TBIs need to respond to (P6: "Incubation *support remains key and important for KZN, for South Africa"*; P9: *I think that the province overall doesn't have a particular strategy on what it wants to achieve for incubation")*. The TBIs in the province of KwaZulu-Natal need to understand the priority industries or technological areas as identified by the provincial government (P8: *"at times we don't even know which areas are lacking in our province or our country";* P9: *these are the sectors that we want to pursue this is what we want to do"*). However, the TBIs are currently national programmes with little to no input from the province of KwaZulu-Natal (P6: *Incubators are a national function"*; P11: *"We just leave it national government to set the policies around innovation and entrepreneurship and with very little input from KZN."*). The provincial government, therefore, needs to provide leadership in the province by clarifying the provincial vision for the TBIs (P9: *nothing substantial has come out in saying this is a vision we have for incubation for the province"*).

7.11.2.3 KZN local government TBI strategies

Further to the establishment of the provincial strategy will be the cascading of the mandate to local governments and municipalities to ensure that relevant and industry-aligned strategies are formulated, implemented and monitored at these levels (P6: *"removes the responsibility from provincial or local government structures in that a defined key intervention they require for their challenges"*). Hence, there is a need to develop strategies that respond to local opportunities and challenges and avoid adopting strategies from countries with advanced economies and whose conditions are different from those prevalent in South Africa and the province of KwaZulu-Natal

(P5: *“if we want to grow the country and we want to grow Africa, and we want to really shine, we need to look at our context and not compare ourselves with Western countries and try to compete with them”)*. These local strategies will assist in identifying the technologies that are needed to address local challenges (P8: *"find those who will be good in technologies that are needed in the area"*).

The provincial government has the responsibility to provide interventions that target local challenges and assist local communities (P5: *Let’s see what we have got and how we can help our communities and our business, basically our communities and our social structures to grow SMMEs to be able to compete internationally and let’s have our own South African brand”*). In cascading the mandate to the local government structures and municipalities, the provincial government will also be enabling these institutions to establish their TBIs aligned to their strategies and addressing local challenges while supporting local entrepreneurs and innovators (P6: *"more authority is given to provincial or even municipalities to establish their incubators, a valuable intervention. Providing skills or know-how in developing new opportunities or new businesses using the knowledge or the scientific know-how.”*). An important consideration given that the TBIs are focused on some areas, mainly urban, and there is an evident absence in other locations like rural and township areas.

7.11.2.3.1 Localisation of the TBI programmes

There is also a view that the internationalisation of the country’s economy did not take into consideration the preparedness of the country, thus opening itself to unfair competition and the influx of imported products without the strategy to develop and promote local products (P8: *opened up too early, we had not given ourselves time to be ready to understand, when we open up for the world, exposing ourselves to tough competition when we have no time to catch up open up new avenues for local business, coming up with an even more products, locally made products. Province with so many advantages” (P12: “Policy intervention ought to be realistic policies that speak to the actualities, our actualities"*). The TBIs can achieve their objectives of supporting high-tech, growing, sustainable enterprises, provided they have access to reliable and sufficient financial support from the provincial government.

7.11.2.4 KZN government funding TBIs

The provincial government must actively support TBIs, thus promoting entrepreneurship and innovation (P12: *"We just become mediocre in terms of entrepreneurship or innovation")*. This support should be backed by the functional provincial strategy on the TBIs as indicated in (7.12.2.1). The uncertainty and fluctuations in funding have a direct negative impact on the TBIs, as minimal funding results in TBIs working towards achieving the bare minimum, which does not assist small businesses to grow and be sustainable (P12: *" We had to reduce our financial, our ask, we are moving down from say twelve million rands to just five million rands. We need to really scale down to tick the box. In terms of sustainability, it's another matter."*). The national government recognises the emerging technologies and industries; however, there is no effort to provide resources to ensure that the country can benefit from these (P12: *nationally, we believe is an important emergent discipline or emergent what do you call this trend, an emergent trend like innovation, entrepreneurship, incubation,"; "We don't put money behind these emerging trends"*). Given the scenario, the TBIs remain under-resourced and rely on the national department and their agencies for financial support, which then points to the need for these departments to engage the national treasury with a view of accessing resources for the TBIs (P12: "*serious investment department of small businesses need to have a very clear line of sight to the treasury isn't proper communication treasury to fund these programmes "running incubators sort of like not resourced incubators"*).

The TBI management believes that the provincial government should be providing financial support to the TBIs in KZN to assist them in increasing the intake of incubatees, thus improving access to these programmes (P6: *"government can provide more subsidy to incubators to enable more incubatees to come through";* P8: *"it becomes expensive to do business, to get into business"*). This view is also in the context that the province and the country need more technology-focused incubators, as the current situation indicates that most incubators are focused on business support (P6: *" Within the context of South Africa, we've got less technology-based support for SMMEs but more business-based support"*). The direct funding from the provincial

government will assist the TBIs in improving service delivery and realising the desired impact on incubatees (P6: *government should consider funding, directly funding incubators, to enable them to do what they're supposed to do"*).

The provincial government should also provide financial resources to the local TBIs to support their operations and contribute positively to achieving outcomes (P12: "*scarcity in terms of money*"*; No financial focus on programmes like incubation.* The provincial government policies should also address the matter of financing the TBIs (P12: *"The policy needs to speak to the finance."*). The TBIs can utilise the provincial funding to meet the needs of developing critical mass to undertake the necessary research and development on the technological needs of the province, translating these into technology to address these provincial needs (P6: *"lack of critical mass in researchers or innovators who are from a scientific background"*). The provincial government should be lobbying for support from the national government and its agencies in specific areas. The TBIs also present the province with an opportunity to develop high-tech skills and provide incubatees with high-tech infrastructure; such interventions require funding and input, which can be sourced from the province or nationally through the province (P6: *"high-tech infrastructure with complimentary skills to enable innovators or entrepreneurs to access")*. Access to high-tech and technologically relevant infrastructure will also encourage innovators to venture into challenging solutions to local challenges (P6*"infrastructure for access by innovators"; "innovators to be exposed to current and real-time equipment").* TBIs' guidance will ensure efficient use of resources invested in supporting entrepreneurship and promoting innovation (P6: *"provide the support or even guide the innovators"*).

7.11.2.4.1 Funding for incubatees

The provincial government is expected to provide grants and funding for small businesses as they face challenges of limited resources and struggle to meet the requirements of the commercial banking sector for business loans (P2: *"with commercial banks it is difficult"*). Technology-focused small businesses need specialised facilities to conduct their small business (P4: *Infrastructure is not available for technology businesses to operate"*). The TBI management believe that it is the KZN

government's responsibility to ensure that the province creates spaces where emerging small businesses in technology-focused areas can operate until they are fully fledged and financially stable enterprises (P1: *"providing them with a space that they can use to create their manufacturing facilities"*; P4: *"improving that the infrastructure would be one of the issues that need to be looked at, so as to be able to support that is those kinds of businesses"*).

7.11.2.5 Promoting innovation in the province

The TBIs are capable of promoting the culture of innovation and creativity in the province of KwaZulu-Natal (P8: *promote the culture of being creative"*). In supporting TBIs in the province, the provincial government will also be promoting innovation which will result in new businesses based on novel technologies (P7: *"supporting you with an innovation platform because that's what we also do to develop and grow your innovations";* P8: *Utilising the knowledge that one has, but linking it up with the new technologies open up new avenues for local business*"). The support that the TBIs can receive from the provincial government will enhance their ability to assist incubatees in developing innovative ideas (P8: *we are able to come up with an innovative idea, more business support that we get from either government or even the institutions that are supporting small business"*). The development of new products and services can also assist the country by minimising the number of imports and increasing local production, thus favouring local production, which will enhance the economy and generate jobs (P8: "*Where we rely mostly on imports and how we can improve our local production more").*

The TBIs can also play a role in promoting indigenous knowledge systems and, in turn, introducing new products in the markets and creating local industries (P8: "*major challenges that I have looked at and I find it challenging even for the businesses medicinal plants, processing them to come up with new, herbal products, which have not been in the market before"*). The development of local novel products will also increase economic activities in the province, allow for the growth of small businesses, thereby increasing the probability of their sustainability and position KwaZulu-Natal as a significant contributor to innovation (P8: *coming up with even more products locally*

made products, new ideas, and it is also just promoting those businesses that are already in practice"; P11: *"Province be a force to be reckoned with"*; P13: *commercialisation within our province, various avenues, most especially in the public sector who basically this technology is going to benefit them. It's really hard, the private sector mostly consists of small and medium enterprises."*). Improving innovation in the province will also require the incubatees to have sufficient digital skills aligned with the fourth industrial revolution.

7.11.2.6 Developing digital skills for the province

The province needs to support the development of a new breed of small businesses that can adapt to learning new technologies, be open to new ideas and approaches to conducting business (P8: *incubatees, if they are really open-minded they can learn more, improve on their ideas, develop their businesses, encouraged to change when necessary*"). However, this can be achieved if the small businesses are provided with tools and skills to adapt to new ways of doing business (P8: *change from conservative or traditional ways of doing things and using the new avenues that may open up in their thinking."*).

The government has the responsibility of empowering the entire population with digital skills, as these have become survival tools in the fourth industrial revolution era (P7: *"need to bring our population on board with digital skills programmes"; "Everybody needs to be digitally empowered"*). The general population of KZN should be able to make maximum use of the digital space over and above the social media access and extend these skills to enhance employment opportunities in the province (P7: "*So we need to roll a lot of digital skills programmes"; "more than just making calls and going on to social media, for actually using it to do work, it's second nature"*).

Developing digital skills at an early age assists the TBIs in building on existing skills in supporting incubatees (P7: *"easy then to think about doing programming and to do coding and to embrace technical skills development and software development you know because you are in the system"*). Therefore, the government of KwaZulu-Natal should consider addressing the digital skills challenges at grassroots levels (P7: *"doing*

something correctly at grassroots levels"). The challenge of limited digital skills is also associated with inadequate infrastructure, especially in the province's rural areas.

The province of KwaZulu-Natal can also address the challenge of inadequate digital skills in the population by supporting the TBIs. Small businesses need digital skills to ensure their enterprises benefit from and are aligned with the 4IR environment. These interventions require infrastructure and connectivity that the provincial government can facilitate. Digital skills are among the critical skills that have been identified as a means of fueling future economies.

7.11.2.7 The rurality of KZN

The province of KwaZulu-Natal is quite vast in terms of geographic spread and is further characterised by the considerable size of the rural areas that seem to be neglected, inaccessible and lack basic requirements like useable water sources (P3: *KZN is a huge province; there are rural areas within the province, and those areas are neglected; how do we access them? Water is not up to the same standard.";* P4: *KZN is predominantly rural."*; P13: *"KZN might be regarded as a rural kind of province"*). However, the TBIs are concentrated in towns and therefore inaccessible to the small businesses in rural areas (P4: *"Most of the technology business incubators are concentrated in towns"*; P13: *"Most of our programmes are kind of, are not accessible to the rural areas of KZN, within the range of the CBD"*). The provincial government can intervene positively by ensuring that there is sufficient and well-resourced support for rural and township innovators who have ideas that need to be nurtured and supported through the TBIs (P12: *"There ought to be a concerted effort to promote ideation and incubation of ideas in rural areas, in townships";* P13: *"say what are we doing for the people in maybe Nongoma, or Ladysmith."; "what is it that those are programmes are doing for people in the deep rural ends of KZN."*).

Rural areas also present challenges relating to lack of access to technology (P4: *Now, since it is rural, there are technological challenges when it comes to the rural areas, and thus, there are issues of access to technology in the rural areas"*). These challenges associated with rural areas also affect the possibility of developing rural

SMMEs; therefore, TBIs in these areas are relatively non-existent. The innovators and entrepreneurs in rural and township areas are capable of generating solutions to the problems associated with their geographic location; however, they will require support to develop these ideas into tangle solutions that improve their livelihoods (P12: *"people who live, the people who live in those places (rural and township)", obviously they experience challenges; they actually do have solutions on how to solve those problems but they do not necessarily have a mechanism, a qualitative mechanism to move from a challenge to a solution"*). Therefore, it is expected by the TBI management that the provincial government will intervene to ensure that the rural areas can also access the support and benefit from the TBI programmes. The TBI management, therefore, views it as the provincial government's responsibility to ensure that the TBIs' services are accessible to the entire province (P4: *"need to reach that is in the larger communities in order for that to be for the benefit of all"*). A strategy that seeks to increase the footprint of the TBIs throughout the province and identify the critical areas and skills that need to be developed and supported should be established (P9: *"Maybe we should have one incubator that deals with IT and technology and support"; "ensure that it has a footprint around the province")*. The presence of TBIs in rural areas can assist rural enterprises in addressing the lack of information and access to networks, thus improving their chances to grow and becoming sustainable (P3: *"where they get to network with other businesses ";* P4: *"lack of information because of where they are placed."*). The TBI support to rural areas can only be realised if there is a focused strategy and funding to provide the relevant infrastructure and support for rural small businesses.

7.11.2.7.1 Government funding to increase support in rural areas

Provincial government funding will address the scarcity of TBIs in rural areas (P6: *"deploy more such interventions in the most rural part of KZN and in South Africa, do not have enough incubators one, we don't have enough spread around the country"*). The benefits of the TBIs are currently focused in the cities and urban areas. There is a need to ensure that rural small businesses also get an opportunity to learn, develop skills and find ways in which they can grow and sustain their businesses through technology utilisation (P8: *what has taught incubatees is that you can always improve*

on the technology you have and its opened eyes for so many that there is always a new way of doing things for business"). Rural areas should be considered an integral part of the TBI KZN ecosystem.

7.11.2.8 TBI ecosystem

The province of KwaZulu-Natal requires a long-term perspective and an integrated plan development that will promote collaboration amongst the key TBI stakeholders (P10: *"having a long-term view as opposed to a short-term view"; "an integrated development plan together with the government agencies"*). The TBI management believes that the government's role as an enabler can be extended to initiating and supporting the establishment of a provincial TBI ecosystem that extends relationships to the national TBI ecosystem (P1: *"incubator ecosystem not only in the province but also nationally"*). The TBIs should also play a critical role in helping the provincial government understand their programmes, especially given that the government funds most incubators (P3: "*Make them understand the program so that now it can be a smooth ride moving forward." Almost all incubators in South Africa are funded by various government institutions"*). The TBI ecosystem is essential in bringing the key roleplayers together, creating synergies that will benefit incubatees, and these include private companies who can have an interest in the new ideas developed by the incubatees (P8: *present their new technologies or their discoveries to the companies"*).

The provincial ecosystem can find ways to collaborate with other provinces and national stakeholders, which will further benefit small businesses in the province. The establishment of the ecosystem will include taking advantage of the platforms and information related to such entities as the national government's industry bodies (P9: *"What the government has decided to do, and SEDA, in particular, is that they have put together an industry body"*). These organisations take an overview of the issues that concern industries (P9: *"Organisations will then get together and look at what is happening across the industry"*). However, even at national levels, there is no similar extension to other entities to ensure coherence and collective effort towards uplifting the scope and success of the industries (P9: *"does not create a tight relationship between the various entities.").* The TBI ecosystem can also assist the province in

addressing some of its serious challenges; key among these is the high unemployment, particularly youth unemployment.

7.11.2.9 Youth unemployment and related challenges

The province is challenged by youth unemployment (P2: “Youth, *most of them roaming the streets looking for jobs”*). There are few employment opportunities for youth in the Province of KwaZulu-Natal (P2: *very few employment opportunities for the youth”*). Unemployment among the youth also affects graduates (P2: *“Other sitting at home with qualifications that they have obtained at universities, the focus was on being employed”;* P10: *Unemployment in South Africa is serious as it relates to the youth, including the graduates”*). This is a concerning scenario, especially considering that the youth comprise the most significant portion of the provincial population and are the group most affected by the socio-economic challenges facing KwaZulu-Natal (P2: “South African Community, *more than fifty per cent of the population of South Africa is made up of youth"*; P4: *“A lot of young people are there.”*). The provincial government strategy on the TBIs will also assist in providing direction on how these entities can be instrumental in encouraging youth to participate in developmental programmes and subsequently alleviating youth unemployment (P9: *I think that the province overall does not have a particular strategy on what it wants to achieve for incubation feeding into addressing youth unemployment and lethargy in the youth”)*.

7.11.2.9.1 School curriculum improvement

The provincial government can assist in addressing the school curriculum challenge to prepare future technologically savvy entrepreneurs (P4: "*There is no proper link between the school curriculum and that is what the small businesses are."*). Changing the school curriculum to align with the fourth industrial revolution movement will equip students with digital skills to drive technology-focused entrepreneurship and increase the probability of developing ideas that can be translated into successful businesses (P7: *"different breed of student that’s going to be emerging students then who won’t fear the technology and the technological, entrepreneurial activities. Technology-based entrepreneurial activity, it won’t be so difficult for them because it becomes then*

a part of your life, part of everything that you do"; "P7: *"Bring in digital skills training and digital skills programmes at school level"*). Empowerment through digital skills will not be possible if school children do not have access to the infrastructure and tools that are necessary for digital skills development (P7: *"Ensure that every child has access to technology ", "access to connectivity for schoolwork"*; *"learning material is all made digitally available"*). Therefore, the provincial government strategy can empower the TBIs and improve their effectiveness in growing sustainable small businesses.

7.11.3 Role of TBIs in KZN

This section discusses the role of TBIs in the province and their relationship with the provincial government of KwaZulu-Natal.

7.11.3.1 The important role of TBIs in the province of KwaZulu-Natal

The TBIs have the responsibility to assist the government and other stakeholders in understanding and appreciating the role, operations and challenges of the TBIs in the province of KwaZulu-Natal (P9: *I do not think we entirely understand some of the challenges that relate to business incubation in our country"*). The incubation of SMMEs is an essential programme that seeks to support the development of the SMMEs in the province of KwaZulu-Natal (P3: *"incubation program, in my view, it is a well thought of and a good program that can and will assist SMME"*). Therefore, there is a need to clarify the government's position in a manner that will ensure alignment of the TBI operations with the province's strategic objectives (P9: "*We haven't been able to position this in such a way that we are able to redirect the energies and efforts of the government to clarify the position for us"*). The TBIs can assist the provincial government in designing the interventions that will alleviate the challenges of SMMEs and increase the impact of the TBIs and, therefore, the effectiveness of these support programmes in developing sustainable and growing small businesses in the province (P3: *be a problem solver to the provincial government"*). Among the critical roles of the TBIs that will also benefit the provincial government is the ability of the TBIs to develop

new economies and promote the participation of the TBIs in the fourth industrial revolution.

7.11.3.2 New Economies aligned to the fourth industrial revolution

The incubation of small business businesses remains an effective intervention for developing economies like South Africa (P6: *"Incubation remains key and a valuable intervention, especially for a developing country developing economy";* P11: *"promoting the tools of the fourth industrial revolution"*). The TBIs are essential for developing future industries (P7: *"They are the future"*). As the TBIs focus on developing and supporting technology-based enterprises, they assist the provincial government in developing and aligning with the fourth industrial revolution (P3: *The solution to the provincial government in the fourth industrial revolution was to be on par with the current market"*). Through their experts and networks, the TBIs assist the incubatees in keeping abreast with the current national and global trends in technology and entrepreneurship support(P3: *"Keep up with the current trends, huge role for incubator in KZN"*).

The TBIs can assist the province in building new economies that are focused on technology or aligned to the fourth industrial revolution that will help in improving the GDP of the province and the country (P6: *"build new economies which will diversify the fiscus one but two the tax base of South Africa"*). The TBIs also need to assist the government in inventing new technologies and creating small businesses that will be taking advantage of the natural resources that are available in the province, including access to the sea and vast land that is available in rural areas (P8: *"a favourable exposure to resources, like the sea, the land and the climate. maybe so useful compared to other provinces"*). These will include the entire establishment of the maritime industry to align with the Durban and Richards Bay ports and creating industry linkages that will benefit the small towns around these developing areas (P9: *no incubator for the maritime sector, maritime province, Durban, Richards Bay and even potentially other small little towns that are along the coast"*).

The TBI intervention at the proof of concept can assist the incubatee in determining if there is value in pursuing the particular technology idea or if there is a need to change course (P6: *"assists in fast-tracking the process of either confirming a product or a process or changing course"*). Technological support and funding are essential at this stage. The incubatee can benefit from TBI support and government subsidies (P6: *"Proof of concept activities, cannot prove a concept unless you've received support in early stages"*; P13: *"access to market, tough to take your product and make it into the market; "funding, access of funds, that is also a major challenge"*). In the province of KZN, there are limited interventions that assist incubatees with proof of concept, and this stage is critical for small businesses that seek to prove that their ideas are functional (P6: *"minimal if any activity that focusses on early stage proof of concept type of interventions"*). The commercialisation of ideas and products is a lengthy and costly process. It requires funding to ensure that the necessary initial quantities for the market entry can be manufactured (P8: *Commercialising that has been a problem needs funders to produce it at a cheaper rate where it would be affordable to any other person"*).

Accessing funding is another critical role to be played by the TBIs by providing early-stage support that can decide if the idea is worth investing in, and the outcome of this intervention can assist the incubatee in attracting investors (P6: *"access to funding opportunities"*; *"Most funding instruments both in private and public focus on successful enterprises"*; P13: *"quite difficult to enter in that particular stream when you're trying to commercialise your technology"*). The provincial government can also promote innovation by providing the finances for the protection of intellectual and making these funds accessible to TBIs (P12: *"budget for this for protection of intellectual property on behalf of their incubatees"*). Such investments will benefit the incubatee through the growth and prosperity of their businesses and will, in turn, help the country, and the provincial funding will sustain the extra functions that will be performed by the TBIs (P12: *"benefit of the incubatee; the benefit of the country, another layer of administration; another layer of compliance, requires money; ignoring it is far costlier have legal know-how in house"*). Promoting innovation can also assist the province in addressing the challenging economic outlook.

7.11.3.3 Contribution to economic development

The TBIs support incubatees in growing and becoming sustainable, thus positioning them well for a positive contribution to the province's economy (P3: "*They contribute to the country's GDP"*). This contribution is essential towards improving the current bleak economic situation in the province and the country (P4: *improving that is the economy of the country"*). The skill sets that are part of the outputs of the TBIs are also critical in sustaining the contribution of the graduate incubatees in the economy as they emerge as competent in their specific industry (P4: *improving that is the skills then be able to contribute meaningfully to the economy through that is the incubatees that would have qualified or graduated from the incubators")*. The TBIs, therefore, have the potential to positively impact the country's economy (P4: *making an impact in terms of the economy"*). The current scenario in South Africa is that small businesses have to compete with an influx of imports (P8: *"the space that businesses find themselves in, it has to compete with so much foreign readymade products"*). This reality exacerbates the challenge of creating jobs for local nationals and the related challenges of poverty and inequality.

The TBIs are mandated to provide a platform for small businesses to develop, grow and become sustainable. Access to the TBIs and their support encourages people to start working on their new small businesses (P4: "*getting people to start their businesses*"). Academic staff and researchers at universities can also develop their ideas into technology-focused small businesses (P5: *"Universities and how they can become entrepreneurial; businesses that were started by staff within the faculties creative ideas."*).

7.11.3.3.1 Increasing the participation of rural small businesses

The rural small businesses, entrepreneurs and innovators lack access to high-end technologically advanced equipment. These challenges can be addressed by increasing the footprint of TBIs (P6: *"innovators to be exposed to current and real-time equipment use, especially in producing their products going forward; that is lack of such infrastructure or opportunities for rural citizens"*). The TBIs in KZN should develop

interventions to address the challenges facing rural small businesses, thereby enhancing their participation and benefit from these programmes (P8: *promoting mostly rural areas."; "Such programmes, if they may also be applied in promoting businesses*.")

The TBIs can be instrumental in developing and supporting innovation at the grassroots level and nurturing these innovations into growing and sustainable businesses (P12: "*Grassroots, innovations and grass root businesses"*). To develop and benefit rural and township areas, the TBIs can assist government in understanding that the TBIs can also be organically grown and sustained to a point where they can compete with national establishments (P12: *"some incubators cannot be like, you know, your university incubators or your typical SEDA incubators you find in big cities,"; "can, be micro-satellites, micro or satellite kind of little incubators, garage incubators, garage of someone's house"*). The TBI staff should have the necessary expertise to harness innovations and nurture new ideas that need to developed, in particular provide more excellent targeted support for rural and township areas (P12: *"an incubator with a degree of understanding how ideas are formed and how ideas are harvested will go a long way, being instituted amongst the people or amongst the rural area people or in the townships"*). However, the TBIs should have expertise to assist the incubatees in protecting their IP (P12: *"know what to do in terms of protecting those new innovations"*). Given the high level of support expertise and specialised infrastructure, the greater output in terms of innovations an intellectual property will be realised (P12: *"new things could come up, novelties could come, incubator has to have the capacity and the capacity to spot those new inventions"*). These efforts will results in establishment of rural and township TBIs that are aligned to the available infrastructure and embedde within the greater provincial ecosystem (P12: *" an incubator that is more in line with the infrastructure where people are" satellite of idea generation and idea incubation rural areas, in townships"*). The TBIs can also contribute to the development of small businesses by creating awareness of the TBIs in the province.

7.11.3.4 Create awareness of TBIs

Therefore, the TBIs need to ensure that they are visible and that the more significant population of the province is aware of their existence. (P4: *making information more accessible that is mainly to young people"*). The awareness can also be extended to TBIs assisting the general population and other small businesses on matters of intellectual property and its protection (P13: *"other than identifying and protection on the commercialisation of Intellectual Property"raise awareness in terms of Intellectual Property and commercialisation"*). The TBIs can also assist these parties based on different routes of intellectual property management (P13: *"facilitate licensed negotiation where we are licensing technology"*). The more significant impact of the TBI awareness campaign will also depend on the relationship between the provincial government and the TBIs.

7.11.3.5 Build a sustainable relationship with the provincial government

The TBIs can advance their standing and relationship with the provincial government by identifying areas for improvement, thus enhancing their outputs and impact in the province (P1: *"Incubators looking at various aspects of business operation betterment of their operations"*). The TBIs should lobby for support from the provincial government (P7: *"think that firstly there has, we have to lobby government"*) and also incorporate all levels of government and entities that are active in SMME or entrepreneurship development, including Non-Profit Organisations (NPO) and the private sector (P7: *"lobby local bodies, municipalities, NPO's, corporates"*). These entities are important in the functioning and prosperity of the TBIs as they provide the essential infrastructure for the TBIs to operate (P7: *"The rural place would definitely be your local municipalities because for us to establish in any town, we have to have a partnership with them and a buy-in from them")*. The involvement of the TBIs in the government entities can also empower these organisations towards the development of coherent small business support interventions that can be funded by local, provincial and national government departments that are mandated to promote entrepreneurship, SMMEs and innovation (P8: *to empower them or to encourage coherent working*

programs between business and academic institutions plus also government department which supports businesses, Department of Science and Technology. I don't know how far it works with businesses in the field"). The TBIs, therefore, need to take an active role in positioning these programmes within the province and the SMME sector; this will also assist the government in providing targeted funding, influencing the model of operation for TBIs and reducing the competition amongst these entities in favour of collaborations (P9: "*we haven't been able to position this in such a way that we can redirect the energies and efforts of the government to clarify the position for us dilutes the focus of government, dilutes the funding model that we want to achieve, competing for the same funds"*). The TBIs can also contribute positively towards developing a provincial TBI strategy.

7.11.3.6 Contribute to the development of a provincial TBI ecosystem

The TBIs in KZN enable small business success and have access to networks of key stakeholders who are capable of increasing the probability of small business success, which can assist the government in forging a provincial ecosystem (P1: *"Forge relationships with other stakeholders and other units that can either complement what we do, that can do what we do maybe on a bigger scale tap into that network";* P8: *"close relationship with the incubators, identify those businesses that need support, creating relevant programs that would support those businesses"*; P11: *"within our province, with being able to communicate more regularly play a role in lobbying at a national level,";* P13: *"cannot really depend on yourselves, need to network and collaborate as much as possible"; "would not say avoid competition but at some point, we do need to collaborate"*). Forging relationships with local institutions can also empower other entrepreneurship or small business support entities active in the province (P8: *empower those who are working in the business space in any institution*). The provincial academic institutions will also benefit from an increase in the number of small businesses that emerge from the intellectual property produced by these institutions (P8: *"Students who come out of the university find the good space to implement the ideas, researches that they have been learning about whether they are implementable or not"*).

The TBIs can also work on formulating the provincial technology business incubation ecosystem by identifying key roleplayers and building mutually beneficial relationships (; P6: *"formulate themselves also into a formidable ecosystem"*; *"incubators themselves form an ecosystem of key roleplayers within the incubation space";* P9: *"a platform where, as government-funded incubators in the province, we are able to chart a way forward"*; P11: *"ensure that we have inclusive or develop an inclusive innovation ecosystem here in KwaZulu-Natal"*).

Academic institutions in the province are a critical element of the provincial TBI ecosystem as the collective capabilities can drive innovation and establishment of new small businesses while enhancing the expertise of individuals in these institutions (P8: *more they work with the academic institutions, the more we would have better results for those who are aspiring to be innovative to get into new businesses accessing support good for those who are in business those who are employed in those institutions or government"*). The TBIs can also assist the government by adding value to the strategy and plans for the TBIs in the province of KZN (P6: *"Key policy think tanks guide in terms of how they formulate their programmes"*; P11: *"Policies and strategies being put in place, but send a collective response"*). The TBIs are instrumental in responding to the needs of the technology-focused SMMEs, and based on their experience with the incubatees, they can provide invaluable information to support the province of KwaZulu-Natal (P6: *"responds to the SMME experience, focussed on technology incubation specifically to small businesses or SME's"*). The TBIs can also assist the provincial government by designing programmes that will attract youth to participate in developing technology-focused enterprises and encourage innovations that will solve local challenges.

7.11.3.7 Increase the participation of youth in the TBI programmes

Young people in the province of KwaZulu-Natal are interested in entrepreneurship and technology-focused businesses; hence, they require the support of the TBIs (P4: *"Young people because they are the ones who become interested; young people that want to get involved in businesses"*). The TBIs have a role to play towards increasing the number of young incubatees in the TBI programmes. Therefore, the TBI is

responsible for designing programmes that attract youth to the TBIs (P2: *“get these young people into the program”;* P10: *"programmes that are aimed at helping youth entrepreneurs"*). The TBIs' youth programmes designed to increase youth participation include running innovation-related challenges for young people with technology-based innovative solutions to local challenges (P5: *“youth innovation challenge”;* P10: *TBIs should able to participate in competitions"; “able to gauge their strength against their peers in other institutions"inter-varsity competition programme in Africa”*).

The TBIs can also be instrumental in identifying the socio-economic challenges that hamper the maximum participation of the youth in the programmes and creating interventions to address these and improve the success of small businesses (P8: *“close relationship with the incubators, identify those businesses that need support, creating relevant programs that would support those businesses”*).

To assist the young people of the province, the TBIs should re-consider their processes of engaging incubatees and should find strategies to improve commitment and performance, which will lead to success for both the incubatees and the TBIs (P8*: you want to be an entrepreneur, yes, here’s the rules, play within these rules and you perform"*). Such engagement plans will also address the challenge of believing that people do not appreciate the support that is freely provided by the different programmes (P8: *"growing opinion in our country that people don’t appreciate things that are free but that’s not true"; "close the door again on thousands of young people who have nowhere else to go”*). The engagement processes should also be capable of identifying the socio-economic baggage that the young people bring to the TBI as incubatees (P8: *earlier identification of some of the social challenges which have an impact on the ability for young people to perform”*; P9: *“Understanding the social challenges”*). These socio-economic challenges will impact the success of the TBIs and may compromise the full benefit of the programme for the incubatees (P9: *"major challenge insofar as the social challenges, cost of living,"; "young people come to our centre right and they are hungry";* P9: *"the reality is that things are so expensive and they are so impoverished, unique challenge for our incubator”*).

7.11.3.8 Maximising on the role models for young people - Community of Practice

The youth of the province need to access and be inspired by successful (P2: *“role models to these young people, to these incubatees”*). The incubatees can benefit from these engagements as they test their ideas with individuals who share the same passion for technology and innovation (P12: *"people who can talk to each other about the things that they are passionate about.”*). The TBI can employ various strategies to encourage engagement among incubatees, current and graduated incubatees, to develop a community that can further the mandate of the TBIs and assist them in improving their effectiveness in supporting small business (P12: *"commonly passionate about from an ideation point of view, from the technical perspective, peer to peer."'; "form a community of practice, can actually solve their problems" balanced incubatees or business owners, share those with others, alleviate the understanding and the experience of the incubatees to a same level community of practice is very important in the incubator, peer to peer engagement in a safe space, ideas and their technical stuff.”*). The TBIs can also assist the youth and graduates by exposing them to their networks.

7.11.3.9 Access to TBI Networks

Given the high levels of unemployment among youth and graduates, they will then not have access to networks that will work with them in developing and sustaining their small businesses; hence the TBIs can assist the young incubatees with access to their networks (P2: *"networking. we get them to talk to each other”*). The networks are part of the support systems of the TBIs and, therefore, essential as platforms for sharing ideas and views that will enhance the successes of their businesses and these relationships can go beyond the incubation period (P2: *“They share ideas, they share views,"; "that’s going to assist them in actually running my business"*; P2: *this goes on as long as they are in the incubation program, even if they are out of the incubation program”*). The TBIs, therefore, act as a one-stop shop for the incubatees to engage with stakeholders and roleplayers who are critical to their development and prosperity (*“one-stop shop for SMMEs allows for access to, also networks of other incubators*

networks of other funders"). Over and above the business networks, the incubatees get access to potential funding agencies that can invest in the small business and increase the probability of success (P6: *"incubator would have access to multiple funders or multiple opportunities for resource funding or multiple opportunities to engage other stakeholders"*). The expertise that is available to incubatees through the TBIs is not limited to local but can stretch to national and international, thus increasing the knowledge base and skills base within the province (P6: *"access to not just local but national and sometimes an international aspect in certain fields"*). The TBIs can also assist the provincial government in addressing the provincial challenges, particularly youth unemployment.

7.11.3.10 Contribute to the reduction of unemployment

The TBIs are not in a position to eradicate unemployment solely but can positively contribute to employment (P4: *"able to not eradicate but reduce unemployment").* The knock-on effect of assisting small businesses to grow and become sustainable is the potential of these entities to employ others (P4: "*being able to employ others"*). The TBI management is responsible for effectively managing the TBIs and allowing these programmes to deliver maximum benefit to incubatees, including a positive impact on job creation (P4: *"it is well managed and well channelled, it would make a huge impact job creation"*). Therefore, the provincial government can benefit from programmes addressing youth unemployment.

7.11.3.10.1 Addressing youth unemployment

The province of KwaZulu-Natal and the country of South Africa are facing the challenge of high unemployment, especially among the youth (P4) *unemployment in our country, because it is just too much. The most affected are the young people."*).

Entrepreneurship is currently a career option for young people who cannot find employment and are looking at alternatives. The TBIs can play an enabling role by providing a platform where these young people can safely and with support test their ideas (P4: *"create more space and an environment where that is young people can be*

able to start their businesses"). University-based TBIs can intentionally extend their support and services to students and rely on the diversity of the various academic programmes accessible through universities (P5: *"Students from different departments so we have fashion, we have engineering, we have architecture.").* The shortage of skills, mainly digital skills, will also have to be addressed to maximise the benefit of the TBIs.

7.11.3.10.2 Contribution towards skills development

The TBIs are contributing to the skills development of the KZN population (P4: *"to improve that is the skills of society*"; P11: *"provide the tools and opportunities to those in need"*). This support will include the transfer of skills in emerging technologies, thus assisting in diversifying industries in which SMMEs are active (P6: *"skills development towards enabling that biotechnology sector"*). This support includes ensuring that they have access to appropriately qualified and experienced technical expertise to add value to the incubatees (P6: *"lack of critical mass in researchers or innovators who are from a scientific background"*; P13: *"assist most of our researchers in terms of securing funding that will assist them in technology or furthering their technologic development."*). Therefore, the TBIs have the responsibility to enhance their skill base so that their interventions can transfer the current and relevant skills to the incubatees (P6: *"The challenge: You can have the correct equipment and be in the correct location, but if you do not have the correct skills requirements, you need the incubator"*).

7.11.3.10.3 Digital skills development and support

The TBIs have to acknowledge the reality of limited digital skills in the province of KwaZulu-Natal, as these challenges affect the small businesses in technology-focused industries that they seek to support (P7: *"KwaZulu Natal it's obvious that there's a serious lack of digital skills"*). The lack or limitation of digital skills will have a direct impact on the ability of the incubatees to assimilate and, therefore, benefit from the TBI interventions (P7: *"How do you build on technology when the communities are so lagging in terms of digital skills.")*.

The incubatees need to be prepared to work in a digitally challenging business world and be able to compete and succeed against their national and international peers (P7: *"It is difficult for them to compete now against other peers, their colleagues, maybe from the other provinces or even from the other regions as well."*). TBIs have to develop interventions that will address the challenges of rural and township small businesses that are potential incubatees, including access to internet and connectivity (P7: *most SMMEs don't have, are not equitably served with internet, especially once you move into the township and into the rural areas").*

The summary of the roles of the provincial government and the TBIs is presented in Table 7.28.

Table 7. 28 Areas of intervention to improve the effectiveness of TBIs in KZN

Area of intervention	Role of KZN Provincial Government	Role of KZN TBIs
Provincial Strategy for the TBI	• Provide the vision for the technology-focused small businesses in the province. Identify priority sectors to stipulate a clear mandate for the TBIs. • Cascade the provincial strategy to local strategies aligned with opportunities. • Provide infrastructure and internet connectivity throughout the province • Localisation of programmes	• New Economies Aligned to the Fourth Industrial Revolution • Contribution to economic development • Create Awareness of TBIs
Funding	• Provide funding for TBIs	• Increase the number of incubatees that access TBI services • Increase access to experts, equipment and facilities
	• Provide start-up funding for incubatees	• Advise on appropriate equipment and facilities needs for the incubatees • Provide training and technology demonstration of new facilities and equipment • Provide TBI support
	• Oversight on the perfomance of the TBIs	• Increase outputs
Innovation	• Promote innovation through support to TBIs and incubatees	• Identify novel technology and provide commercialisation support • Increase the number of intellectual outputs for the province • Introduce new products and services to the markets
Digital Skills for the Province	• Programs to enhance digital skills in the province	• Support the development of digital skills in the province
Rural areas of KZN	• Improve infrastructure and internet connectivity • Focused funding for rural small businesses	• Increase access to TBI services for rural small businesses through satellite platforms. • Increase the visibility and information on TBIs • Tailored interventions for rural small businesses

TBI Ecosystem	• Facilitate the development of a provincial TBI ecosystem • Provide resources and guidelines • Inter-provincial collaborations • Engagements with the national government • Monitoring and evaluation	• Identification of stakeholders through TBI networks • Information support • Active participation • Build and maintain relationships with the provincial government
Youth Unemployment	• Increase access to TBI services for youth through funding instruments and local strategies. • Link with digital skills development programs in the province • Enhance the school curriculum to provide digital skills at an early age	• Provide tailored programmes that target youth with low levels of skills (introductory programmes) • Mentorship and coaching

Source: Researcher's creation

7.11.4 Theme 8: Discussion and conclusion

This section presents the discussions and conclusion on Theme 8.

7.11.4.1 Discussion

Chapter 2 of this study discussed the importance of identifying an appropriate location for a business and highlighted the inadequacy of the infrastructure to support business development (Section 2.3.1). An ideal location for the business provides a supportive and nurturing environment that promotes development and growth (Entrepreneurship Monitor 2025, 2025:81). The empirical study revealed that the TBIs are located in urban areas, particularly around eThekwini, Umgungundlovu, and a few other parts of the province. The study revealed that the KZN challenges of poor infrastructure and lack of access to water, energy, and internet connectivity limit the growth and development of rural and small-town SMMEs. It further emerged that the development and support of technology-focused entrepreneurs in KwaZulu-Natal are further hampered by the urban-rural divide, which manifests itself in the unfair distribution of internet and broadband infrastructure. The cost of being connected to the internet and relevant mobile and other technology-enabled devices is relatively high for rural communities, which limits their ability to access updated information (Aruleba & Jere, 2022:2).

The provincial TBI strategy should articulate how the provincial government plans to increase innovation in the province, what role the TBIs should play, and what funding avenues will be available to sustain them (Jakovljevic, 2018:110). Hence, the collective effort of the provincial government and the TBIs will advance the course of technology-focused small businesses in the province of KwaZulu-Natal. The study revealed that the provincial government requires a more comprehensive strategic direction for supporting technology-focused small businesses. The provincial mandate will assist the TBIs in aligning their interventions towards realising the provincial objectives. The provincial government can also assist by providing an oversight function to improve the effectiveness of the TBIs.

The provincial government needs to understand and appreciate the role of TBIs in the province and the potential impact of developing technology-focused small businesses. The study revealed that the matter of a provincial strategy on TBI is non-existent and should be the focus of the provincial government. The provincial strategy will also indicate the priority industries for the province (Tang *et al.*, 2021:3). The current scenario, as revealed in the study, is that TBIs rely on the national government and its agencies, and input from the provincial government is needed. This outcome is also articulated in Chapter 3, where a comprehensive analysis of the legislation and the regulations for TBIs was undertaken. The benefits of having a provincial strategy for promoting technology-focused SMMEs will only be realised by cascading it to the lower levels of government. Implementation of the provincial strategy requires understanding and buy-in from local government structures and municipalities. The added advantage of involving lower levels of government will ensure the alignment with local industries and enhanced monitoring of the programmes. Local opportunities will be exploited early and supported through the local TBIs. The government's involvement also assists with delivering measures that will address the local challenges, mainly infrastructure and internet connectivity limitations.

The provincial government's involvement should also be extended to providing policy-regulated financial support to the TBIs, increasing access to TBIs for small businesses in the province. The current policy landscape (Chapter 3) focuses on developing enterprises to address the challenges of poverty, inequality, and unemployment. However, there is an argument for moving from these policies to those focused on enterprise growth and stimulation of innovation (Anwana & Anwana, 2020:4).
This requires the development of provincial policies that will support the implementation of the provincial strategy. Access to sufficient funding also assists the TBIs in improving the service offered to small businesses. Resource-constrained small businesses will also benefit from the TBI services through improved subsidies. Funding will also help the TBIs to extend their support to developing technologies in industries that have been identified as emerging and future industries. Funding the provincial TBIs will also give the provincial government an edge in focusing on provincial industry development objectives. Provincial government funding should also address the development of a critical mass of researchers and technology development experts in the province, thus improving the intellectual property outputs

of the province of KwaZulu-Natal. The province can also use its strength to lobby for increased financial support from the national government. Government funding and support should also be extended to incubatees who need finances to start small businesses, including technology development and facilities funding (Schutte, 2019:8). Technology-focused industries need specialised equipment and suitable infrastructure that the incubatees cannot afford independently. Access to expertise and relevant high-tech infrastructure will assist the TBI in driving the innovation agenda in the province of KZN. The presence of TBIs and their services can also promote innovation in the province and improve the number of new products that enter the local markets, which can be further developed for export markets. Local products generate employment opportunities across the value chain.

The province of KwaZulu-Natal is largely rural in terms of geographic spread; however, TBIs are located in cities and towns. The digital divide between the rural and local communities further restricts the flow of information and contributes to the widening gap between urban, which are regarded as affluent and rural entrepreneurs, who represent the poor in the province (Aruleba & Jere, 2022:1). There is evidence of a lack of TBI support in rural areas, depriving rural small businesses of the needed support. Challenges relating to poor infrastructure and internet connectivity are some of the issues that prevent the accessibility of TBIs to small companies that need them the most. The innovators and entrepreneurs in rural areas need access to support. The provincial government's role is to provide an enabling environment for small businesses to flourish. It can provide the necessary infrastructure, facilities and equipment for technology-focused enterprises.

The province of KwaZulu-Natal also faces the challenges of high youth unemployment, including university graduates and TVET Colleges. SMMEs are desirable for addressing unemployment based on their labour-intensive mode of operation (Endris & Kassegn, 2022:7). The provincial strategy and corresponding funding instruments will assist in indicating how the government will support the development of youth technology-focused small businesses through TBIs. The long-term view of the provincial strategy should incorporate the development of critical skills early in the province. Skills development will require government interventions through

collaborations amongst provincial government departments that will drive the change in curriculum to embrace digital skills and other skills for the future.

7.11.4.2 Conclusion

The lack of direction and mandate from the provincial government is a concern for TBI management. It should be the provincial government's responsibility, as it will require regulation.(Tang *et al*., 2021:25). The provincial mandate will drive the success and impact of the TBIs in the province. However, an analysis must be undertaken to locate the TBI programmes within the provincial agenda. The provincial government will also identify the priority industries for the province. The provincial strategy needs to be cascaded to lower levels of government through local strategies that respond to local opportunities and address local challenges. This provincial policy directive should also address the unemployment challenge and how the TBIs will play a role in curbing the increase (Department of Trade, Industry and Competition, 2024:86). The TBIs will then create employment, reduce poverty, and minimise the inequality gap. The collective efforts between the national and provincial government and the KZN TBIs will accelerate the creation of jobs, the development of successful technology-based products, and the growth of sustainable small businesses.

7.11.4.3 Alignment with the primary aim and secondary objectives of the study

The primary objective of this study is to develop a framework for incubating technology businesses in growing sustainable small companies in KwaZulu-Natal. The findings of Theme 8 identified the relationship between the provincial government and the local TBIs and how these entities can work together towards improving the effectiveness of TBIs in the province. The study findings revealed that there needs to be more comprehensive engagement between the TBIs and the provincial government, with support from the national government. The participants acknowledged this gap, which needs to be addressed from both the provincial government's perspective and that of the TBIs. The provincial government is responsible for defining the long-term vision for the technology business in the province and, therefore, the mandate for the TBIs. Identifying the key industries associated with development in the province will assist

the TBIs in aligning their operations toward developing interventions that will deliver on the set strategic objectives.

Table 7.29 presents the links with the secondary objectives of the study.

Table 7. 29: Theme 8: Links with the secondary objectives of the study

Research objective	
SO4: To explore and describe the mode of operation for technology business incubators.	Theme 8 revealed the minimal working relationship between the TBIs in the province of KwaZulu-Natal and the provincial government.
SO5: To explore and describe the experiences of technology incubation programme managers/CEOS/directors	The TBI management acknowledged that the provincial government's inputs on the TBIs' strategy and mandate will assist in improving their effectiveness in growing sustainable technology-focused small businesses. This collaboration will also enhance the support of small businesses in the industrial sectors relevant to the province and allow for novelty and economic growth.

Source: Researcher's creation

7.12 CONCLUSION

Chapter 7 presented the study's empirical findings, which contributed towards developing a framework for the technology business incubation of small businesses in KwaZulu-Natal, presented in Chapter 8. Eight (8) themes emerged from the study's empirical findings and were analysed individually and aligned with the objectives of the research study. The analysis included a discussion on the contribution of each theme towards achieving technology business incubation that will generate growing and sustainable small businesses in KwaZulu-Natal. The individual theme discussion and conclusion were also presented, as well as their alignment with the primary and secondary objectives of the study. The framework for the technology business incubation of small businesses in KwaZulu-Natal, the study's overall summary and conclusion, and the recommendations are presented in Chapter 8.

CHAPTER 8: SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

8.1 INTRODUCTION

This last chapter presents this study's summary, conclusions, and recommendations. The primary aim was to develop a framework for technology business incubation for the sustainable growth of small businesses in KwaZulu-Natal. The chapter will summarise the findings, conclusions, recommendations, and the resultant framework. It concludes with a discussion of the study's limitations and suggestions for future research.

8.2 ACHIEVEMENT OF RESEARCH OBJECTIVES

The primary objective is to develop a framework for technology business incubation for the sustainable growth of small businesses in KwaZulu-Natal. To realise the primary objective, the following secondary objectives (SO) were devised:

Table 8. 1: Achievement of the research objectives

Research Objectives	Findings from Primary Data	Findings from Secondary Data	Research Findings
SO[1]: Examine the landscape of technology-focused SMMEs in the province of KZN in South Africa.	Theme 1 – Profile of TBIs in KZN Theme 4 – Challenges Theme 7 – Profile of Incubatees	Chapter 2	The literature review established the profile of small businesses in KZN and provided an overview of their challenges. The profile of TBIs in the province was presented in Theme 1, followed by the challenges of technology-focused small businesses (incubatees) in Theme 4 and the profile of incubatees in Theme 7.
SO[2]: To identify government interventions to support SMMEs incubation and impact on technology and innovation.	Theme 8 – Provincial Government and Technology Business Incubation Theme 1 – TBI Profile	Chapter 3	The literature review presented government interventions, context, policy direction, and relevant departments. Theme 8 presented the participants' description of the role of government in technology business incubation. Theme 1 presents the government and its departments and agencies as primary owners or funding partners of the TBIs in KwaZulu-Natal.
SO[3]: To describe technology business incubation as an enabler for SMME development and the role of SMMEs in technology development and innovation.	Theme 2 – TBI Interventions Theme 3 – Uniqueness of the TBIs Theme 6 – Mode of Operation	Chapter 2 Chapter 4	Chapter 2 presented an overview of technology business incubation in KwaZulu-Natal, followed by an in-depth discussion of the phenomenon in Chapter 4. Theme 2 revealed the interventions of the TBIs, and their uniqueness was elaborated upon in Theme 3, along with how they contribute to technology development and innovation in the province.
SO[4]: To explore and describe the mode of operation for technology business incubators.	Theme 2 – TBI Interventions Theme 6 – Mode of Operation	Chapter 4	Chapter 4 elaborated on the enabling role of TBIs and their processes. Theme 6 provided the mode of operation of these entities. Themes 2 and 3 presented the interventions of TBIs, Theme 3 presented the unique TBI service offerings and support to small businesses, and Theme 6 described how these entities operate.
SO[5]: To explore and describe the experiences of technology incubation programme managers.	All themes	Chapter 4	Chapter 4 presented an overview of the TBIs based on a literature review. The primary data revealed the experiences of the TBI managers/CEOs/directors in KwaZulu-Natal.

SO^6: To conclude, the strategies that can be utilised to enhance the positive impact of TBIs on technology-focused SMMEs.	Theme 5: Strategies for improving the effectiveness of TBIs Theme 8 – Provincial government and technology business incubation	Chapter 3 Chapter 4	Chapters 3 and 4 presented the government's role in promoting and supporting TBIs and possible strategies for improving their positive impact. Theme 5 presented the strategies for improving the effectiveness of TBIs, with Theme 8 elaborating on the role of government in promoting TBIs in the province. Chapter 8 presents the framework for TBI in KZN.
SO^7: To recommend the action plans and policy interventions that can be implemented to ensure the success of TBI.	Theme 8 – Provincial government and technology business incubation	Chapter 3	Chapter 3 presents the relevant policy directives based on the literature review. Theme 8 discussed the provincial government's role in enhancing the positive impact of TBIs in KwaZulu-Natal.
SO^8: Develop a framework for the TBI in the KwaZulu-Natal province in South Africa.	Theme 1 to Theme 8	Chapter 8	Chapter 8 presents the framework for improving the effectiveness of TBIs in developing and growing sustainable small businesses in KZN.

Methodological Objectives		
MO^1: To conduct a literature review on technology business incubation in KwaZulu-Natal	Chapter 2 Chapter 4	Chapter 2 presents the landscape of SMMEs in the province of KZN, and Chapter 4 discusses the concept of technology business incubation.
MO^2: To conduct a literature review on the government interventions that promote and support technology business incubation in South Africa, particularly KwaZulu-Natal.	Chapter 3	The government interventions geared towards supporting technology-focused SMMEs are discussed in Chapter 3.
MO^3: To conduct a literature review on the experiences of managers/CEOs/Directors of technology business incubators.	Chapter 4	Technology business incubation is described in Chapter 4
MO^4: To develop a conceptual framework to guide and define the study's adoption of a research design and methodology.	Chapter 5	A conceptual framework for the study was defined and presented in Chapter 5.
MO^5: To identify and select the most appropriate research methods to address the primary and secondary research objectives.	Chapter 5	Chapter 5 adopted phenomenology as the methodological analysis of choice for this qualitative research study.

MO[6]: To undertake an empirical investigation that will provide insight into the technology business incubation of small businesses in KwaZulu-Natal.	Chapter 6	The research methods adopted and the processes followed in undertaking the empirical study are presented in Chapter 6.
MO[7]: To present recommendations, based on the findings of the empirical investigation, for effective technology business incubation for sustainable growth of small businesses in KwaZulu-Natal and make a proposition on the areas of future research in KwaZulu-Natal and South Africa.	Chapter 8	Chapter 8 presents a summary, conclusions, and recommendations from this research study, including opportunities for further research in the future.

Source: Researcher's creation

As indicated in Table 8.1, all the research objectives were achieved.

The following section summarises the empirical research findings.

8.3 SUMMARY OF FINDINGS AND AREAS OF IMPROVEMENTS

The study findings revealed eighteen (18) areas of improvement that the TBI management should consider. These areas and their corresponding effects on improving the effectiveness of the TBIs' support will facilitate the growth of sustainable small businesses in KwaZulu-Natal.

8.3.1 Theme 1: Profile of TBIs

This Theme revealed that the national government generally funds the TBIs in KZN through its various agencies, and the local universities support others. These entities generally operate in Durban and other developing towns of KZN, with minimal visibility in rural and township areas. The target beneficiaries are the small technology-focused businesses that require technological and business support to develop and improve their products or services and venture into new markets. A detailed discussion and conclusion are presented in Chapter 7, Section 7.4.7.

The areas of improvement that emerged from the research findings for Theme 1 are presented in Table 8.2.

Table 8. 2: Areas of improvement for Theme 1

	Areas of Improvement	**Improvements in the effectiveness of TBIs**	**Recommendations**
1	**Ownership** The national government and its agencies predominantly fund the current KZN TBIs. The involvement of the provincial government will provide clarity on the following critical matters: • mandate, strategy and strategic goals. • Long term-commitment	• Improve the provincial technology development and intellectual property outputs. • Increase the number of high-technology small businesses that can compete nationally and globally	TBIs must reduce their overreliance on government funding to improve their effectiveness in sustaining small business growth. Engaging the local government and improving this sector's support level is also valuable. The provincial government should take an active role in

	• Targeted industry sectors • Targeted Beneficiaries • Involvement of the provincial government • Alignment with local government opportunities and economic development plans.	• Ensure continuous, uninterrupted operations of the TBIs Contribute to the local economic development of the local municipalities	funding and ownership of the KZN TBIs.
2	**Targeted Beneficiaries** The provincial government should engage TBIs through strategic, mandated, and financial instruments to support resource-constrained small businesses and provide financial support for high-tech enterprises.	The provincial government will benefit through: • enhanced support for rural, impoverished small businesses in high-tech scientific projects with the potential to enter new markets. • Increase the probability of IP • New markets in rural and township areas • Reduction of unemployment, poverty and inequality • Inclusion of all small businesses in the province.	The provincial government should provide specific funding instruments to promote access to TBIs for resource-constrained, technology-focused small businesses in KZN.
3	**Impact** The areas of impact are identified as follows: • High-tech small businesses • Promotion of innovation and technology development for the industry • Job creation, • Contribution to economic development, • Reduction in poverty, • Reduction in inequality • Inclusion • Increased provincial GDP	The TBIs will gain clarity on the desirable impacts, and the availability of resources will assist in delivering these. In collaboration with funding agencies, the TBIs will adjust their M&E tools to allow for measuring impact.	Job creation, poverty and inequality, and Inclusion—With the government's assistance, TBIs can increase the number of beneficiaries, thus contributing to job creation at two levels: self-employment and secondary employment. Increase employment**:** Employment also helps reduce poverty and inequality. Contribution to economic development, promotion of innovation and technology development for industry**:** TBIs first contribute to economic growth by developing small businesses. Secondly, through the development of high-tech small businesses, they also contribute to new industries and the development of IP with the potential for further exploitation for economic growth.
4	**Environment/ Community/ Ecosystem considerations** An environmental scan is essential for TBIs to understand the provincial	The TBI intervention will align with the needs of the local environment and be informed by the local	Environment/Community—The TBIs should invest in and plan for periodic environmental scans and

	environment of technology-focused small businesses. Community- The TBIs need to understand the needs of the local communities the available opportunities and the challenges Ecosystem: to establish a functional TBI ecosystem in the province	opportunities and challenges. Establishing a formal provincial ecosystem will allow for partnerships and collaborations among the relevant stakeholders.	community engagement to inform their interventions. Ecosystem – The provincial government and the TBIs need to initiate and develop the technology business ecosystem in the province.

Source: Researcher's creation

- **Diverse goals and impacts for the TBIs**

Some researchers regard the incubation programmes as both economic and social programmes (Lose, 2021:3; Manzoor Wei & Sahito, 2021:1). These requirements lead to expectations to achieve goals that will benefit both economic development and social relief. This study confirmed that TBIs are expected to achieve technology development, innovation, growth, and sustainability goals coupled with employment creation, poverty, and inequality reduction (Jili *et al.*, 2017:). These goals are considered diverse in that technology development and innovation may not translate into employment and poverty reduction, especially at an early stage of business development, where TBIs are focusing.

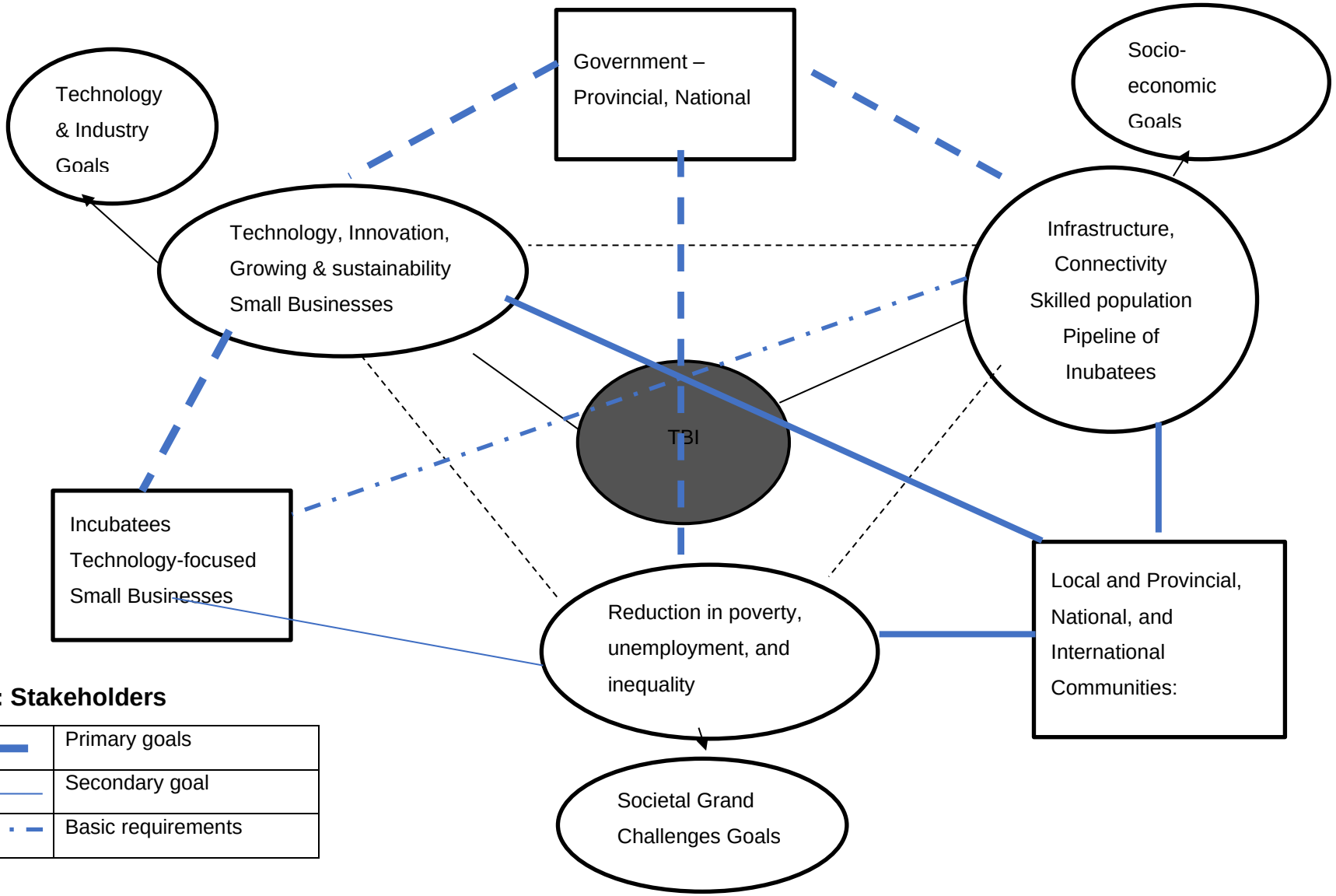
This study also revealed that the diversity of goals is linked to the multiplicity of the TBI stakeholders. These stakeholders include the funding agencies, the government, local communities and the incubatees. The diversity and complexity of goals is presented in Figure 8.1 below. This diagram depicts the following:

- Local and provincial communities: expect TBIs to assist incubatees (who are part of these communities) to develop and grow sustainable businesses that will provide jobs and reduce poverty
- Local and provincial government: expect TBIs to assist incubatees (communities) in developing technologies, increasing innovation in the province, creating employment opportunities and contributing to the provincial GDP
- Industry: expect technology development, innovation and growing sustainable small businesses

- Incubatees expect assistance with the development of their technologies and access to funding, markets, and facilities for their operations.
- The study also revealed that the TBIs currently require more resources. The solution to these challenges is engaging several potential funders for financial relief. The funding contracts include further mandates and expected outcomes. These engagements result in the TBIs responding to multiple goals that may be in conflict.

However, socio-economic goals cannot be achieved without the support of the local and provincial governments. The TBIs need consistent and reliable funding, infrastructure that supports technology development and exploitation, and a technologically skilled workforce This study revealed that such local and provincial government support is lacking (Theme 8) and there is a skills mismatch between the required and available competencies, education and akills levels (Theme 4), which renders TBI unable to fully respond to these goals.

Figure 8. 1: Overview of the diverse goals for the TBIs in KZN



	Goals expected from TBIs
	Primary Stakeholders

Source: Researcher’s creation

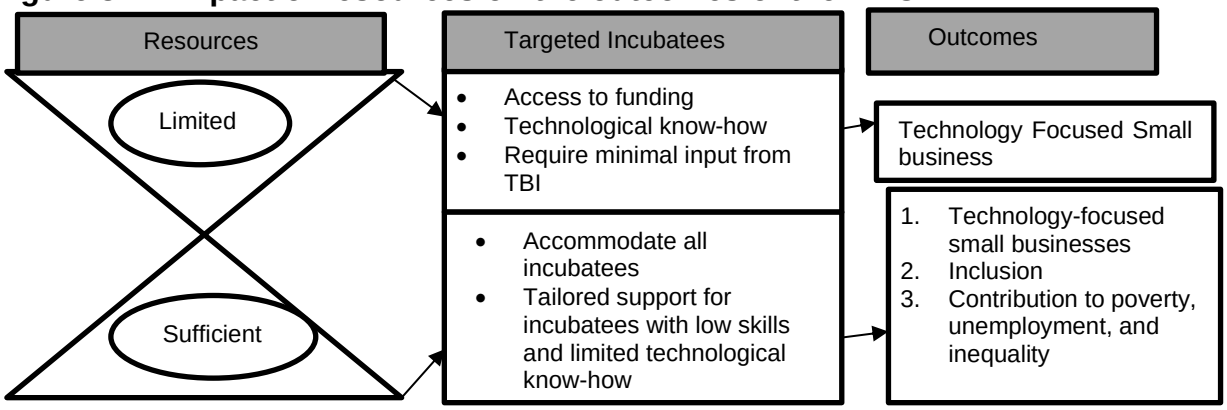
The findings of the study revealed that TBIs require assistance in achieving the diverse goals of addressing societal challenges and delivering technologically focused SMMEs. These positive impacts can only be achieved through collaboration with the provincial government. The TBIs' management also experienced challenges related to receiving grants from various government sectors, which may also require a change of scope and focus. In some instances, the change of scope results in a skills mismatch between the programme requirements and the TBI staff. The multiplicity of goals for the TBI can also emanate from the interests of the HEI or university that is hosting the TBIs (Ngubane & van der Merwe, 2023:102). This scenario presents a challenge of balancing host and funder objectives. It may be argued that, in essence, the HEI and the funder are providing resources to the TBI and, therefore, have expectations regarding its performance.

- **Impact of Ownership and Resources on the Outcomes of the TBIs:**

The study revealed that different national government departments and agencies fund TBIs with minimal support from the local or KZN provincial government. The TBIs find it challenging to respond to increasing the effectiveness of small businesses in technology-focused areas while contributing to employment creation, poverty and inequality reduction, and inclusion. Limited resources imply that TBIs must be selective regarding their services by targeting incubatees with high potential for success and those that can contribute to developing their technologies. This approach then excludes those incubatees with limited resources and technological understanding. This challenge of limited resources is depicted in Figure 8.2 below.

The impact of resources on the TBI outcomes is presented in Figure 8.2

Figure 8. 2: Impact of resources on the outcomes of the TBIs



Source: Researcher's creation

The provincial government should definitively support TBIs, exploiting the programmes' potential to alleviate the major societal challenges in KwaZulu-Natal.

The impact of the environment/community/ Ecosystem considerations

The participants asserted the importance of considering issues of different cultures and the impact of rurality on the possible behaviour that the incubatees may project. This study confirmed the assertion by Jili *et al.* (2017:6) that SMMEs, and in particular rural SMMEs, also require personal development, including self-confidence and the ability to pitch to the business.

8.3.2 Theme 2: TBI interventions

The study revealed that the TBIs in KZN provide technological and business management support to technology-focused small businesses. It also revealed the specific interventions of these entities in the province, thus contributing to the body of knowledge on small business incubation and entrepreneurship support.
The detailed discussion and conclusion are presented in Chapter 7, Section 7.5.5.
The areas of improvement for Theme 2 are presented in Table 8.3:

Table 8. 3: Areas of improvement for Theme 2

	Areas of Improvement	Improvements in the effectiveness of TBIs	Recommendations
5	Business and Technological Support	• Enhance the impact of the TBI interventions by properly identifying gaps and designing tailored programmes to address the identified challenges within the small business. • Increase the value of investments in supporting incubatees with the potential and determination to succeed. • To enhance the ability of the TBI to take the small business from the point of struggle to growth and sustainability To contribute towards establishing the impact of the TBIs in the province.	Improving the impact of TBI intervention • Pre-incubation assessment (for both business and technological support) • To strengthen M&E to eliminate the small businesses that are not putting sufficient effort and invest in those that show improvements • TBI incubation duration is to be reviewed to ensure that it is long enough to give the desired impact • Post-incubation assessment
6	Technological Support	• The TBIs will have the infrastructure, facilities and access to expertise to support technology development and improvement towards commercialisation. Reinforcement of provincial economic development drive.	Improving access to TBIs for small businesses • Investments by the provincial government for the TBIs to develop infrastructure and maintain high-end technological equipment • Alignment of the TBI programme with priority industrial sectors identified by the provincial government

Source: Researcher's creation

TBI Programme Improvements

The TBIs' primary objective is to grow and sustain small businesses and continuously monitor the outcomes and impact of their interventions on incubatees. These findings align with the need for incubators that develop SMMEs for long-term economic growth (Lukhele & Soumonni, 2021:829). Ultimately, the TBI needs to produce a product or service that meets the market's requirements and a graduate incubatee capable of functioning independently in the business world.

Recommendations: The TBIs should prioritise interventions tailored to the needs of the individual incubatees. These will be more effective in meeting the particular needs of the incubatees, while the generic support will complement the skills and knowledge levels of the incubatees. The design of tailored-made interventions requires a pre-

incubation assessment of the incubatees, which can be achieved through an ecosystem that allows for sharing of information between the provincial TBIs (Kansheba & Wald, 2020:944). Through the KZN ecosystem, the TBIs can also agree on the parameters to be assessed, thus allowing for a single entry point to the TBIs. This process will eliminate incubatees moving from one TBI to another, facilitate referral among TBIs, and improve overall monitoring and evaluation of the interventions of the TBIs. This exercise will increase efficiency in the utilisation of the TBI resources.

8.3.3 Theme 3: Uniqueness of TBIs

The findings revealed that the TBIs in KZN seek to provide holistic support to small businesses by incorporating solutions to their technological and business management needs. These findings support previous research on the support required by small businesses in South Africa (Pillay & Kikasu, 2024:342; Malebana, 2017:75) The focus on technology differentiates these entities from other incubation programmes. Chapter 7, Section 7.6.3 presented a detailed discussion and conclusion.

The areas of improvement for Theme 3 are presented in Table 8.4:

Table 8. 4: Areas of improvement for Theme 3

	Areas of Improvement	**Improvements in the effectiveness of TBIs**	**Recommendations**
7	Benefits of being an incubatee compared to those not in the programme	• The poverty and unemployment levels in the province are staggeringly high; hence, small businesses with the potential for growth and sustainability may need more funding to start their enterprises or the necessary collateral to approach commercial banks.	• Provincial government should improve funding for TBIs and incubatees • Subsidised Services: Provincial government providing funding for start-up small businesses that the TBIs have identified as having the potential to grow and be sustainable • Improvement in recruitment processes, as reflected in the Framework. This intervention will attract potential incubatees in less-serviced rural and township areas. However, the recruitment strategy should be supplemented by a pre-incubation intervention to assist in the identification of potential and skills gaps. The pre-incubation support will improve the possibility of successful graduation and increase efficiencies in TBIs through efficient resource utilisation and tailored support for incubatees.

Source: Researcher's creation

- **Increase access to TBI benefits for technology-focused small businesses in KZN.**

Small businesses continue to rely on the government for business support and funding programmes .(Du Toit *et al.*, 2020:3).This study revealed that the TBI interventions provide the essential support to develop the business and access to equipment and facilities for technology-focused small businesses that lack the finances to fund their operations (Kansheba & Wald, 2020:950; (Malebana, 2017:76). The interventions also assist the incubatees with information on grants and support with grant applications. This support is essential for resource-constrained small businesses that cannot acquire funding through traditional commercial routes.

- **Recording and sharing best practices**

TBI management can benefit the province by documenting their experiences and sharing these with other pertinent stakeholders. This will assist in improving the delivery of TBI services to the incubatees and benefit small businesses in KZN. These engagements are possible through the establishment of the TBI ecosystem, facilitated by the provincial government and sustained through the community of practice for TBI practitioners (Audretsch *et al.*, 2019:314).

- **University Contribution of research to TBI effectiveness**

Researchers and universities play a critical role in the TBI ecosystem. However, the challenge is to increase the cohort of researchers who will commit to translating their ideas into the market space. Interventions should also be directed to capacitate researchers in technology commercialisation.

8.3.4 Theme 4: Challenges

Resource constraints emerged as the major challenge facing both the TBIs and the incubatees in KZN. While this challenge is common for South African SMMEs, the technology-intensive nature of the TBIs and their incubated small businesses require

substantial investments (Lose, 2021:1). The need to also develop technology-specific skills for incubatees to grow and sustain their businesses compounds the resource challenge.

The detailed discussion and conclusion are presented in Chapter 7, Section 7.7.3.

The areas of improvement for Theme 4 are presented in Table 8.5:

Table 8. 5 Areas of improvement for Theme 4

	Areas of Improvement	**Improvements in the effectiveness of TBIs**	**Recommendations**
8	Incubatee Challenges TBIs are currently located in urban areas, with a notable absence in rural areas.	Inclusion – opportunities for rural and township small businesses. Lack of collaboration and partnerships that will alleviate the challenge of limited resources.	Improving infrastructure and connectivity in rural areas will assist the TBIs in expanding their support to rural areas, thus ensuring that benefits also accrue to rural SMMEs.
8.1	Rural and township technology-focused SMME challenges: • Improvements in infrastructure and connectivity • Government funding for TBIs and Incubatees		
8.2	Lack of synergies among TBIs in KZN:		Establish and formalise the province's TBI ecosystem.
	TBI Challenges Diversity of the desired Impact: Grand challenges vs Technological and Innovation impact:	• TBIs assist the government in promoting TBI and technological innovations in the province. • Procedure for emergencies	• Improve resource availability and grant management. • Lessons learnt from COVID-19 and the July 2021 unrests to assist in establishing the benchmark for emergency procedures

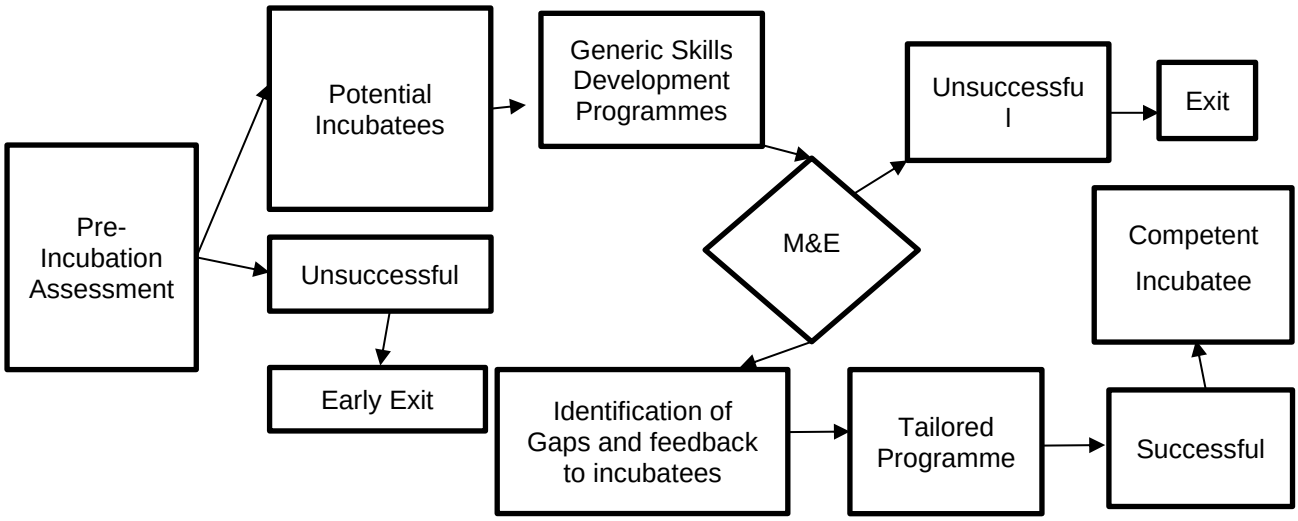
Source: Researcher's creation

- **The challenge of increasing access to TBIs**

Small businesses joining the TBIs are often motivated by brilliant technological ideas, having identified a gap in the market, or entrepreneurial or innovative drive. The challenge of high unemployment forces some individuals to consider entrepreneurship a career choice (Endris & Kassegn, 2022). This study also showed that other incubatees start businesses because of their technological ideas but are not interested in managing a small business; academics and researchers are sometimes only willing to venture into small businesses and are not prepared to invest the necessary energy

and time into developing their technologies to the commercialisation stage. The challenge affects Themes 2 (TBI Interventions), 7 (Profile of incubatees), and 8 (Provincial Government and TBIs).

Figure 8. 3: Improving effectiveness for increasing access to the TBI



Source: Researcher's creation

Maximising investment through targeting passionate and determined small businesses and enhancing internal and monitoring systems to eliminate those who are not performing will increase the impact of the TBIs and the sustainability of small businesses.

- **Strategies for financial sustainability**

The findings also highlighted that TBIs need to access sufficient funding to meet the demand for TBI services by the clients. The TBIs need to reduce their financial overreliance on the government while increasing support from the local government, industry, and partnerships. The study revealed possibilities for addressing this issue, including strategies for ensuring the sustainability of TBIs through the creation of an independent entity that will drive the funding strategy for the TBI through the exploitation of emerging technologies (Naidu, 2023:1).Incubatees are also a source of income for the TBIs through their contributions to services provided. Hence, there is a need to ensure the relevance of programmes, which will assist in increasing the number of incubatees in the programme. Collaborations with industry, the provincial

government and among the TBIs themselves will eliminate the inefficient use of their financial resources. Benefit: TBIs will be aligned with the local industry needs and can work collaboratively with the provincial government to address local infrastructure challenges, improve the participation of local small businesses, and increase the number of innovators and entrepreneurs.

- **Challenges specific to technology business incubators**

The study revealed that TBIs face additional challenges related to high-end equipment, staff expertise, prototype development and upscaling funding, and compliance (testing and analysis) (Cannavacciuolo *et al.*, 2023:124).

8.3.5 Theme 5: Strategies for improving the effectiveness of TBIs

The findings revealed the need for the TIBs to improve the effectiveness of their programmes, thus confirming earlier studies . These strategies include continuously reviewing the services to ensure relevance to the local industries and ensuring best practices that position incubatees for national and global competition. The pre-incubation intervention will assist in increasing access while ensuring efficient resource utilisation. Post-incubation support will improve the sustainability and growth of small businesses. The detailed discussion and conclusion are presented in Chapter 7, Section 7.8.3.

The areas of improvement for Theme 5 are presented in Table 8.6:

Table 8. 6: Areas of improvement for Theme 5

	Areas of Improvement	**Improvements in the effectiveness of TBIs**	**Recommendations**
9	**Continuous Improvement Strategies**	• Stakeholder Management is critical to addressing the TBI's resource needs, encompassing financial and technological experts, mentors, and coaches for incubatees. • TBIs should collaborate to increase efficiencies within the system.	• Stakeholder Management also assists with diversified income streams. • Programme improvements in response to the needs of incubatees and in exploring future technological possibilities

10	**Lessons Learnt and Advice For Future TBI Managers**	• TBIs will always be prepared for emergencies. • The programme will always be relevant and address the immediate needs of the incubatee • Improve the success of incubatees as entrepreneurs and innovators.	• Development for emergencies and natural or man-made disasters • Review programme duration, including Pre- and post-incubation assessment. • Improve personal development interventions that will strengthen the entrepreneurial and innovative abilities of the incubatee

Source: Researcher's creation

- **Sustained support**

This study revealed that the duration of TBI varies from 12 months to a maximum of three years (Theme 6). During this period, incubatees receive support from being supported and motivated by actions, success, and networking with other incubates. Post-incubation is characterised by the immediate removal of resources that the company enjoyed during incubation and the lack of buzzing activities from other incubatees, which may lead to discouragement and despair and, eventually, closure of the business(S. A. . Mian *et al.*, 2021)(Endris & Kassegn, 2022:6). Hence, post-incubation can alleviate the challenges of high failure rates amongst SMMEs, as presented in Chapter 2.

Recommendation: The TBIs should consider adjusting the incubation duration to incorporate pre- and post-incubation support. The pre-incubation will assist the TBIs in the early stage of identifying projects or small businesses with potential for success, thus saving time and resources for both the TBI and the entrepreneurs. The post-incubation period will sustain the graduate incubatee until it gains independence, which is essential in improving the impact of TBIs (Mian *et al.*, 2021:524). This approach will also address the challenge of duplication reporting: where incubatees leave one programme and enrol for another one, and, in essence, they do not leave the incubation space, and two or more incubators report on them (Theme 5). This incubator hopping distorts the actual number of clients being supported, potentially affecting the quality and effectiveness of the incubation process. Sharing of SMME databases among the TBIs will also eliminate this challenge.

- **Strategies for improvement: post-TBI programme/plan**

The study revealed that post-incubation is a critical factor for the success of small businesses and the probability of achieving the long-term impact of the TBI programme. This is vital for the sustainable growth of small businesses, their ability to grow, create jobs, contribute to the GDP, and all the other outcomes and impacts that are the basis for the government to support TBIs, thus requiring a supportive ecosystem as a conducive landing space (Abrahams, 2020:12). Hence, the TBI must have strategies in place to assist the enterprise post-incubation life. The study revealed that there is a working relationship between the one TBI at the university and the SEDA as the graduates are handed over to the SEDA. This approach is critical in the future, considering that SEDA has merged with the SEFA to provide business and financial support. Still, there is no evidence of monitoring that relationship. The TBIs should also consider offering complementing this support remotely, as indicated in the lessons learnt from COVID-19, as this approach will also require minimal resources.

- **Emergency response**

It was evident from the results that the TBIs had access to tools that assisted in emergencies. This reality was evident from their ability to continue supporting SMMEs during COVID-19. The restrictions associated with COVID-19 prevented the usual and constant physical engagements, thus forcing TBIs to operate remotely. The government focused on health and related issues, thus leaving small businesses without appropriate support (Dladla, 2021:65) The TBIs modified the existing operational tools to ensure they continued supporting their clients. During COVID-19, different strategies for survival included increasing reliance on online platforms.

Recommendation: The TBIs should consider a remote support system developed during COVID-19 as one of the strategies to ensure sustained support for incubatees. This will invariably also increase the TBIs' footprint in the province.

8.3.6 Theme 6: Mode of operation of TBIs

The findings revealed that TBI's operations depend on its capabilities, technology equipment, staff, and networks. They also revealed that compliance is an essential component of TBI operations. Chapter 7, Section 7.9.5 presents a detailed discussion and conclusion.

The areas of improvement for Theme 6 are presented in Table 8.7:

Table 8. 7: Areas of improvement for modes of operation

	Areas of Improvement	**Improvements in the effectiveness of TBIs**	**Recommendations**
11	TBI Networks	• Increasing the pipeline of incubatees • Access complementary services • Access to new technologies	• Improve TBI networks • Improve stakeholder engagement
12	Profile of TBI Staff	• Improve the skills and expertise of the TBI staff. • Ensuring the supply of relevant skills	• TBI Staff development and TBI Leadership development
13	Importance of Compliance within the TBI space	• Improve the probability of successful entry into the markets	• Create awareness of the importance of compliance in the TBI space
14	Monitoring and Evaluation	• Inclusivity	• Improvement in the outcomes of the TBI.

Source: Researcher's creation

Networks

There is evidence that TBIs' success in KZN depends on the ability of all entities to work collaboratively, thus highlighting their reliance on the local entrepreneurship ecosystem. Establishing a functional ecosystem of all stakeholders and role players in promoting and supporting technology-focused small businesses further facilitates networking (Kansheba & Wald, 2020:944).

Recommendation: Establishing the KZN technology incubation ecosystem should be a priority for the provincial government to improve the effectiveness of TBIs in the province.

8.3.7 Theme 7: Profile of incubatees

The findings revealed that the incubatees require skills development interventions to improve their probability of success in managing technology-focused small businesses, which is also supported byJili *et al.*, (2017:7). The detailed discussion and conclusion are presented in Chapter 7, Section 7.10.3.

The areas of improvement for Theme 7 are presented in Table 8.8:

Table 8. 8: Areas of improvement for Theme 7

	Areas of Improvement	Improvements in the effectiveness of TBIs	Recommendations
15	**Characteristics of TBI incubatees**	• Ensure the continued relevance of the TBIs through managing access. • Contribute to technology development and innovation in the province of KwaZulu-Natal by increasing access to TBIs.	• Improving the skills of the incubatees by increasing access and exposure to generic programmes, and M&E is used to determine promotion to complete incubation.
16	**Essential skills for incubatee success**	• Focused support to technology-focused SMMEs	• Programme improvement to reinforce the desirable characteristics • Entrepreneur/innovator development • Identify skills for the future

Source: Researcher's creation

Pre Incubation support - Selection

There is a need for a facility that provides pre-incubation support by refining ideas and assisting the entrepreneur with further development of the business models. The impact will also benefit the entrepreneurs' individual development and will assist in bridging the gap between the academic/knowledge base and the industry knowledge or requirements. This first step is essential in increasing access while ensuring efficient utilisation of resources to accommodate the low education and skill levels in the province (Department of Higher Education &Training, 2019:128). The aspects of developing the individual will assist in shaping innovators and small business owners to an entrepreneurial mindset. There is also space for the management of TBIs to assist incubatees who need refinement of their ideas.

8.3.8 Theme 8: Provincial government and technology business incubation

The findings revealed the need for the provincial government to dictate the strategic direction for technology business incubation in the KZN. This mandate should cascade through local governments, municipalities, and the provincial TBIs. Provincial government interventions are also necessary to drive innovation and establish a provincial ecosystem that will support technology-focused small businesses (Du Toit *et al.*, 2020:3). The detailed discussion and conclusion are presented in Chapter 7, Section 7.11.4.

The areas of improvement for Theme 8 are presented in Table 8.5:

Table 8. 9: Areas of improvement for Theme 8

	Areas of Improvement	**Improvements in the effectiveness of TBIs**	**Recommendations**
17	**Role of Provincial Government**	• Focused support to technology-focused SMMEs • Increased the probability of developing high-impact TBIs. • Identification of priority industrial sectors linked to the unique features of the province	• In collaboration with the KZN provincial government, develop a strategy for the TBIs in the province. • Develop skills for the incubatees • in collaboration with the province of KZN to develop the KZN TBI ecosystem. • Rurality and youth challenges are to be addressed through the provincial strategy.
18	**Role of the TBIs in KwaZulu-Natal**	• Identification of roles of the TBIs and other stakeholders • Identification of priority industrial sectors • TBI interventions focused on strategic industry priorities for the province of KZN • Develop interventions to explore new technologies and innovative industries for KZN.	• Contribute to the development and implementation of the Provincial Strategy • Contribute to the development and operationalisation of the provincial TBI ecosystem.

Source: Researcher's creation

The TBI management's experience is that the provincial government should provide a policy vision for the TBIs in the province. They also maintain that the government should take a long-term view in developing the high-tech SMMEs in the province. Government involvement in high-tech or tech-enabled enterprise development is critical for providing resources (Schutte, 2019:1). These interventions should capitalise

on such industries as maritime, which are presented by this province's geographical location (Chapter 2).

- **Managing the KZN environment**

The study findings revealed that understanding the environment is crucial as it equips the TBI with comprehension of the challenges faced by small businesses, thus placing them in a better position to address them (Chapter 2; Theme 8). They affirmed that the environment is vital to designing programmes that are responsive and innovative (Dladla, 2021:63). In the globalised era, the unique solutions and innovative approaches to business development will benefit the incubatees, the province and the country in positioning small businesses among the best in the world. Hence, this study recommends an environmental scan that will help identify areas where TBI services are required. This responsiveness of the TBIs to the actual needs of small businesses also depends on their appreciation of environmental factors, such as infrastructure development, level of connectivity and skill sets of potential incubatees (Schutte, 2019:5)The TBIs reaffirmed the necessity of understanding small businesses' needs and devising mechanisms to respond to those requirements.

Impact of Funding on the scope and mandate of TBIs

This study's findings revealed severe movement or shift in the scope and mandate of TBIs based on the availability or unavailability of funding. TBIs are sometimes expected to change scope to align with current funding opportunities. The major challenge with these shifts is the compromise on the quality of outputs and outcomes, as there is a possible mismatch between the available and required resources, especially human resources. The provincial government's involvement will assist in providing strategic funding for TBIs and supporting them with necessary infrastructure development (Malebana, 2017:76).This study revealed that this support is currently available to TBIs through the national government and its agencies. Chapter 3 also revealed that the current policies and interventions that seek to advance the course of technology-focused small businesses reside with the national government.

8.4 CONTRIBUTION OF THE STUDY - FRAMEWORK

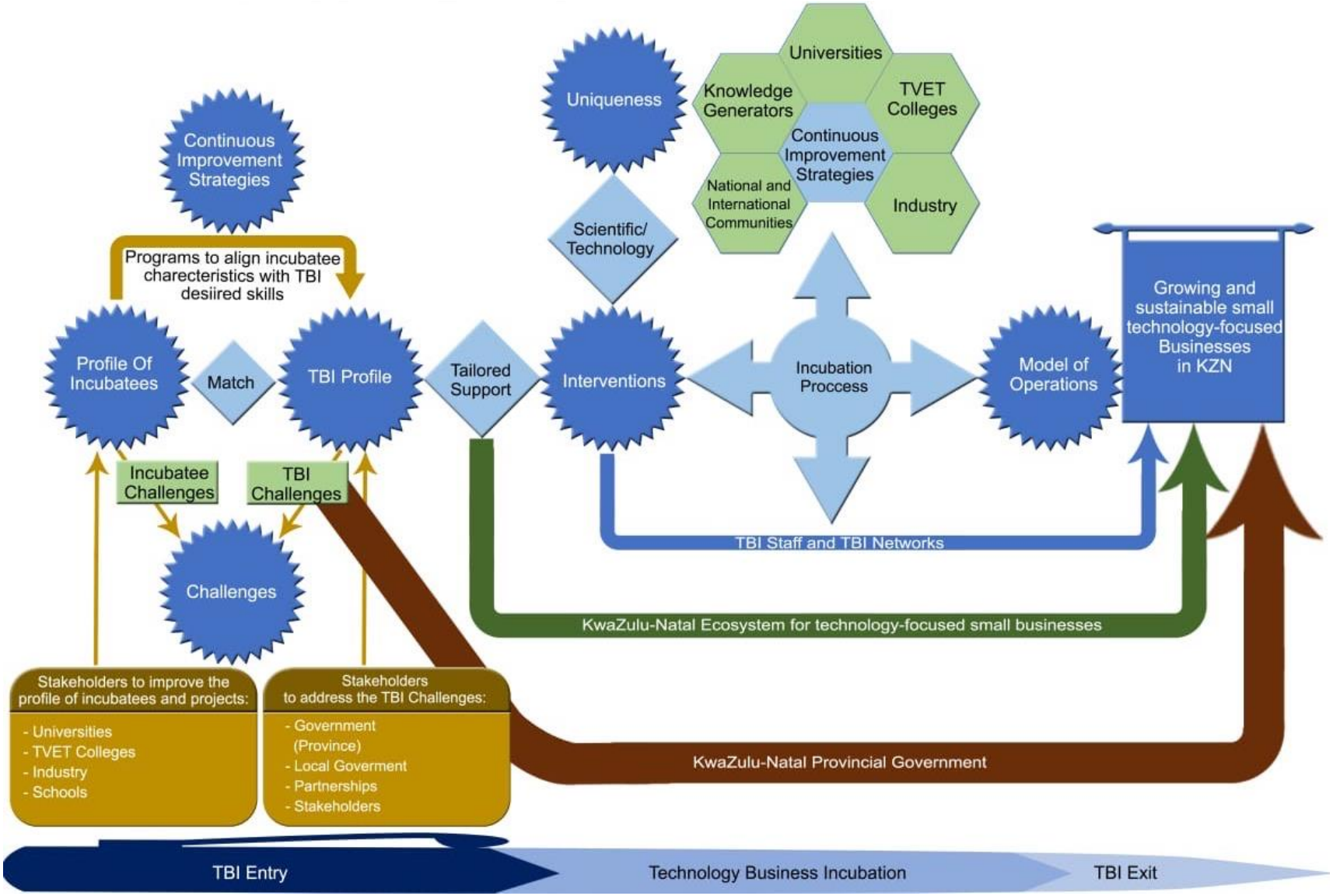
The study's primary contribution is the development of a framework for technology business incubation for the sustainable growth of small businesses in KwaZulu-Natal, depicted in Figure 8.3.

The framework components are informed by the study's findings and embedded in the research study objectives. The presented framework identified the following:

- contributing factors to the success of technology business incubation in KwaZulu-Natal,
- the critical interventions that are essential for the success of the technology-focused small businesses,
- the essential stakeholders,
- the challenges and the corresponding strategies for improvement, and,
- the recommendations.

Adopting the framework will assist the KZN technology business incubators and provincial government in appreciating the role of technology business incubation in developing growing and sustainable technology-focused SMMEs in the province.

Figure 8. 4: Framework for technology business incubation for growing sustainable small businesses in KwaZulu-Natal



8.4.1 Conceptual Framework vs Proposed Framework

A conceptual framework was used in this study (Chapter 5) to express the knowledge on the phenomenon of technology business incubation as collated through the literature review. Generally, the conceptual framework presents the researcher's views and how the various concepts are arranged within the study(Varpio *et al.*, 2020:990).The proposed framework also addresses some of the misalignments that emerged between the conceptual framework derived from the literature review and the proposed framework emanating from this research study's findings. The identified issues are presented in Table 8.10 below.

Table 8. 10: Comparison Conceptual Framework vs Proposed Framework

Incubatees			
Incubatees	**Conceptual Framework**	**Research Findings**	**Framework based on Research findings**
Ideas	Incubatees bring technological ideas that require assistance.		
Financial input	The province of KZN has high unemployment and poverty rates; hence, some incubatees may not have sufficient financial capital to contribute to developing their ideas and promoting businesses.	Findings confirmed that the incubatees could not afford the services of the incubatees (Theme 7). However, the extent of the challenge is severe, resulting in some incubatees not being assisted by those TBIs that require a contribution	It proposes a two-step process for accessing the services of the TBIs. The first step involves a pre-assessment, which will filter out ideas or technologies with the potential to develop sustainable businesses. The second step involves bargaining for financial support from national government agencies in collaboration with local and provincial governments.
Knowledge/expertise/t technical know-how	The potential incubatees are expected to have the necessary combination of technical knowledge, skills and experience.	The education and literacy levels of the province's incubatees are not sufficient (Theme 7). The success of small businesses relies on extensive input from TBI staff and experts, who are available through their networks.	In addressing the skills and knowledge gaps, the framework proposes that the ideas that are successful at the pre-assessment stage receive support from the TBI ecosystem, which should comprise universities, local government interventions, and all TBIs. Secondly, the framework suggests the need for extensive involvement of the private as the targeted end users or collaborators.

Networks	The incubatees are expected to have some networks that are essential for technology-focused businesses.	The study revealed that the province, with a large rural population, has infrastructure challenges that limit the availability of information and, hence, inadequate access to relevant networks.	The framework proposes that the local and provincial government should strengthen the necessary infrastructure for the development and sustainability of technology-focused small businesses. It also expects the TBIs to strengthen their networks, which will benefit the incubatees. It also proposes an establishment of the TBI ecosystem that will ensure that the available networks are shared among the TBIs and benefit all small businesses in the province. Lastly, it proposes that the provincial government should develop a provincial technology business incubation strategy that will communicate the support for the technology-focused small businesses. This provincial strategy is essential in ensuring that the technology-focused SMMEs receive support that is not dependent on the political leadership in the province.
TBI Management			
TBI Management	**Conceptual Framework**	**Research Findings**	**Framework based on Research findings**
Innovative, flexibility, Growth orientation	The TBIs are flexible institutions that allow for innovative approaches to small business development. They are focused on ensuring the growth and sustainability of small businesses.	The support provided to small businesses is dependent on the resources available to the TBIs (Theme 6). These include human and physical resources. This practice limits flexibility and innovation. The programmes also have a fixed duration, which is used to determine exit from the	This framework proposes the pre-assessment. This stage has the advantage of improving access to the TBIs while also allowing them to invest in small businesses with potential for growth. This process will also increase the probability of identifying and supporting innovative ideas towards sustainability. The framework also proposes the establishment of the TBI ecosystem in the province of KZN. This ecosystem of critical stakeholders will allow for flexibility in supporting and improving innovation through access to the provincial pool of skills, facilities, and innovation platforms.

		programme. Factors like growth and sustainability of the enterprise are not part of the exit strategy.	
Specific Technical or business expertise	The TBI staff bring experience, skills, and qualifications that are essential in supporting the incubatees	The TBI staff and management do not have the necessary skills, qualifications, and experience.	The approach to TBI staff development should be two-pronged. The first aspect is developing skills among the existing TBI staff, and the second is supplementing these skills with networks that include universities, industry, and other TBIs. The new framework also considers that future staff appointments should be based on the skills, experience and innovative attitude essential to developing technology-focused small businesses and support for innovation.
Provincial Ecosystem	The TBIs and other relevant stakeholders provide an ecosystem that supports technology-focused small businesses.	The TBIs do not actively collaborate among themselves. However, working relationships exist with universities, especially when TBIs are hosted or located within universities. Relationship building is done on an ad hoc basis without fundamental guidance and the intention to collaborate.	This framework suggests that the provincial ecosystem is essential for developing an ecosystem supporting and nurturing technology-focused small businesses. It also proposes that this ecosystem will assist the provincial government in generating and sustaining the mandate and vision for TBIs in the province.

KwaZulu-Natal provincial government			
Provincial government	**Conceptual Framework**	**Research Findings**	**Framework based on Research findings**
Infrastructure, legal framework, policies, economic climate	The provincial government provides the legal and regulatory framework to support technology-focused small businesses. The provincial economic climate is conducive to nurturing technology-focused small businesses.	The Provincial infrastructure is inadequate to support the technology-focused SMMEs (Theme 4, Theme 8). Small businesses lack access to the necessary infrastructure, including the Internet and communications networks, to support their technological ideas. TBI managers believe the provincial government should develop a strategy for technology-focused small businesses and the TBI.	Develop a provincial strategy to support technology-focused small businesses. This strategy should also incorporate government plans and support to alleviate the challenges of inadequate infrastructure. It should also address establishing the provincial ecosystem to support technology-focused small businesses and innovation in the province. The TBIs are instrumental in supporting the government in creating the provincial strategy. The provincial government should play an active role in cultivating the culture of collaboration among the TBIs and ensuring the establishment of a formal platform for all TBIs to share resources and best practices.

Source: Researcher's creation

8.4.2 Resource-Based Theory vs proposed framework

The theoretical foundations of research lead to the development of the conceptual framework and assist in justifying the theoretical contribution of the study (Naeem, Ozuem, Howell, Ranfagni, 2023:13). The findings of this research study supported the adoption of the RBT (Chapter 5). This view is also supported by the researchers who argue that business resources are key to the attainment and sustenance of the competitiveness advantage (Lose, 2021:2). This research study supported this view as follows:

- **TBI interventions**

The strength and uniqueness of the TBI emanates from its ability to support technology-focused small businesses through relevant technological infrastructure and expertise (Theme 3). The lack of funding that incubatees experience (Theme 7) prevents them from accessing the relevant equipment and technical expertise to grow and sustain their businesses.

- **Inadequate infrastructure**

The challenges experienced by both the TBIs and the incubatees relate to poor infrastructure in the province (Theme 4). This challenge also relates to infrastructure, which is essential for accessing information and benefitting from the 4IR.

- **Inadequate and inconsistent funding from the national government and its agencies**

This challenge relates to inadequate resources for the TBIs, which renders them unable to fulfil their mandate (Theme 4)

8.4.3 Contribution of the study

Theme	Practical Contribution	Contribution to the TBIs	Contribution to the legislators	Contribution to Small Businesses	Contribution to community
Theme 1- Profile of TBIs	Small technology-focused businesses need technological and business support to develop their ideas and migrate their projects from concepts to fully-fledged enterprises. Given the country's current economic conditions, small businesses will continue to need support to grow sustainably and contribute to the grand challenges of slow economic growth, inequality, poverty, and unemployment.	The overreliance on government funding threatens the sustainability of the TBIs. The KZN TBIs are concentrated in towns and cities, with limited presence in the province's rural and township areas.	The support of the TBIs should be a shared responsibility between the national and provincial governments. This responsibility should also be gradually cascaded to local governments to ensure the alignment of local economic development initiatives.	There are opportunities to develop technology-focused small businesses, and TBIs are essential resources for providing holistic support.	The absence of TBIs in rural areas hinders small businesses' participation as entrepreneurs and innovators in the fourth industrial revolution.
Theme 2 – TBI Interventions	The empirical study findings revealed the TBIs' service offerings in KwaZulu-Natal.	The TBI's interventions need to be continuously monitored for areas of improvement, particularly to ensure alignment with national and global technological developments.	The TBIs need consistent financial support to deliver to small businesses that lack sufficient resources or are from rural areas.	Small businesses need to consider both the technological and business needs of their technology-focused businesses. Small businesses' sustainability and growth depend on	The TBIs should be accessible to provide the community with ideation and IP management support.

				the technology's viability and the owners' ability to navigate the business environment.	
Theme 3 – Uniqueness of the TBIs	TBIs offer unique services that target technology-focused small businesses.	The TBIs should maintain their focus on supporting technology-focused small businesses and ensure that incubatees have access to the necessary facilities, experts, and infrastructure.	The uniqueness of the TBIs should align with the government's vision for technology development and innovation in the province and also respond to the opportunities available in local municipalities.	There is value for technology-focused small businesses in approaching the TBIs and being hosted as an incubatee. The incubation ensures access to physical, human, and financial resources that will assist small businesses in growing and becoming sustainable.	Entrepreneurs and innovators in predominantly rural communities should have sufficient information and access to the TBIs to explore innovations that address local challenges.
Theme 4 – Challenges	The study revealed that both the TBIs and the incubatees experience challenges of limited resources. The provincial government can address this challenge through reliable and consistent funding and by providing support and grants for impoverished small businesses.	Through this study, the TBIs have a bank of challenges facing small businesses and are, therefore, in a position to design interventions that will address these challenges.	This study has provided the provincial government with access to the challenges facing both the incubatees and the TBIs and possible strategies for addressing these shortcomings. The improvement strategies also include the long-term goals of empowering school children through exposure to technology and encouragement to pursue	The study revealed small businesses' challenges as they ventured into technology-focused enterprises and provided strategies to address them.	By helping communities understand the challenges in the technology business sector, the study also empowers communities to seek opportunities and start businesses with sufficient information to mitigate and, where necessary, avoid the hurdles to developing sustainable

			ideas and innovations that can address local challenges.		technology-focused small businesses.
Theme 5: Strategies for improving the effectiveness of TBIs	The study presented practical strategies for the sustainability of the incubatees and the TBIs in a resource-constrained environment.	The TBIs need to adopt and implement the suggested strategies to ensure their sustainability and enhance their impact in the province.	The provincial government should adopt the strategies emerging from the study to ensure that the province's population enjoys the benefits of TBIs.	The TBIs are an essential element of the KZN technology business ecosystem.	The study revealed that the communities can benefit from the TBIS and from developing the necessary infrastructure and connectivity.
Improved Theme 6 – Mode of Operation	The study identified a comprehensive list of stakeholders who are essential for the effective functioning of the TBIs in the province of KwaZulu-Natal.	This study will also benefit TBI management, as it will give them a provincial overview of the operational challenges and best practices in the technology business environment.	The provincial government will benefit from the study by understanding how TBIs operate and, therefore, equipping government officials with information on possible points of engagement.	The study will benefit small businesses in KwaZulu-Natal by helping them understand the role and operations of the TBIs in the province.	The study will promote engagement between communities and the TBIs based on their service offerings and operations.
Theme 7- Profile of incubatees	The study revealed that innovations emerge from all low- to high-skilled individuals. It also revealed that TBIs should assist incubatees through personal development programmes to enhance their entrepreneurial and innovative character.	This study's profile of the incubatees should inform the TBI interventions and assist in designing tailor-made services that will enhance their effectiveness.	The study revealed the profile of incubatees that are technology-focused small businesses in the province. This information will assist the provincial government in designing interventions to increase technology development and innovation in the country.	The study revealed that TBIs are essential for all incubatees in the technology business space, irrespective of qualification and skill levels.	The study also revealed that innovations and technological solutions could merge from all sectors of society, thus encouraging the community to pursue ideas that could solve local problems.

Theme 8 – Provincial government and technology business incubation	The study revealed that the provincial government has minimal involvement with the TBIs.	The TBIs will understand the critical role of government in the provincial TBIs and appreciate its role in promoting a technology business ecosystem in the province.	The study revealed the need for provincial and local government involvement in promoting and supporting technology-focused businesses. It also identified the policy gap that is essential in driving the technology business agenda in the province.	The study also revealed the role of small businesses as potential incubatees in the provincial and local technology business ecosystems.	The study should assist communities in appreciating the roles the government and the TBIs play in promoting technology development in the province.

Source: Researcher's creation

8.5 WHAT IS NEW IN THE STUDY

This research study contributed by presenting knowledge through the following key components.

8.5.1 Comprehensive list of technology business incubation services.

The study revealed the services provided by the TBIs in the province of KwaZulu-Natal, as detailed in Theme 2: TBI Interventions. The first set presented in Table 8.11 relates to generic business support, marketing and sales, and support for new businesses. Small businesses require market access and increased sales to grow and sustain themselves. TBIs also provide services that assist incubates in attending to marketing and sales challenges as they work towards developing their businesses.

Table 8. 11: Business support

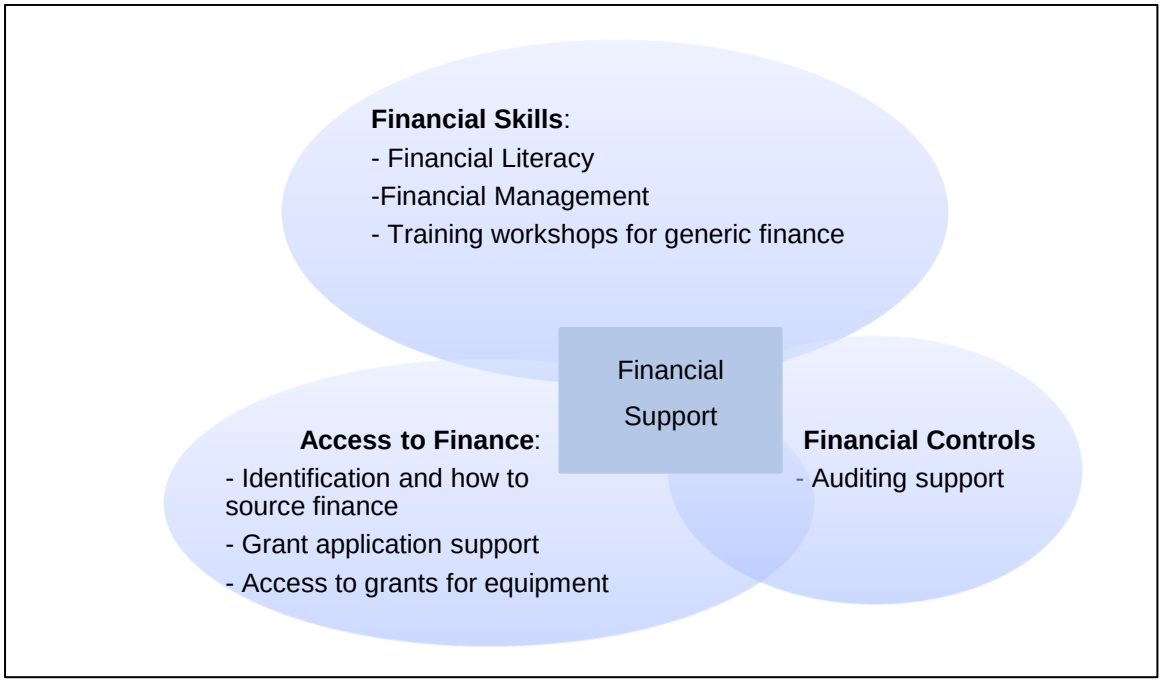
Generic Business Support	Marketing and Sales	Support for new businesses
Managing the business Skills training: Soft skills development, Skills development	Marketing Digital marketing; e-commerce platforms; Brand building	Idea development and support; Workshops for researchers to explore possibilities; CIPC compliance
Navigating the business environment and Advice	Develop Sales plan	Start-up training
Provide Tools and opportunities for small businesses	Market penetration	Spin-off creation
Advanced programmes for clients already in business	Market assessment	Commercialisation Licensing technology Seed funding
Business assessment	Market access	Business Registration
Business skills; Human resources management	Linking business to markets	
Proposal writing; Business plan development; Developing a business plan	Business development Competition	

Source: Researcher's creation

The study also confirmed that limited access or inadequate funding is one of the significant challenges confronting incubatees (Madlala, 2018:47) . However, it further

highlighted the importance of the other aspects of finance, incorporating financial skills, management, and control, as depicted in Figure 8.5 below.

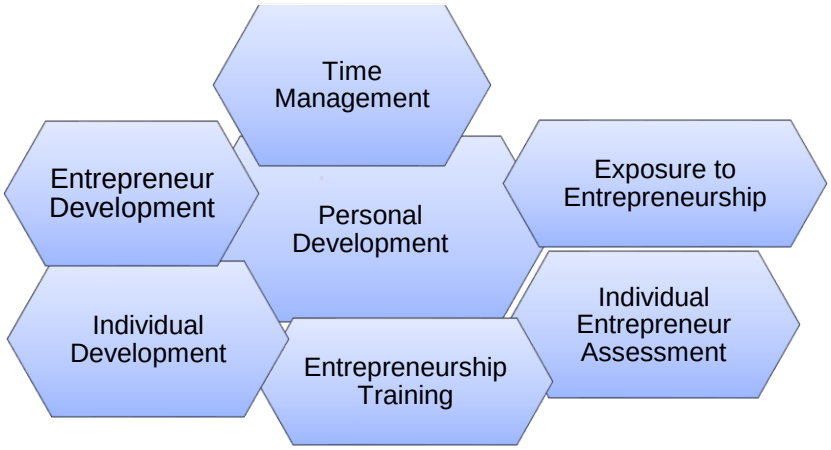
Figure 8. 5: Financial services



Source: Researcher's creation

Theme 7: Profile of Incubatees revealed the need for personal development and growth for KZN incubatees. The TBI support interventions that address these are summarised in Figure 8.6.

Figure 8. 6: Entrepreneur/innovator development



Source: Researcher's Creation

The second aspect provided by the TBIs in KZN is technological support (Table 8.12 below). Their offerings (Theme 3) include technology provision, access to equipment, facilities, and experts, training and technology demonstration support, production, testing, and analysis. These offerings complement the business support list presented in Table 8.11, thus providing a comprehensive list of services provided by the TBIs in KZN.

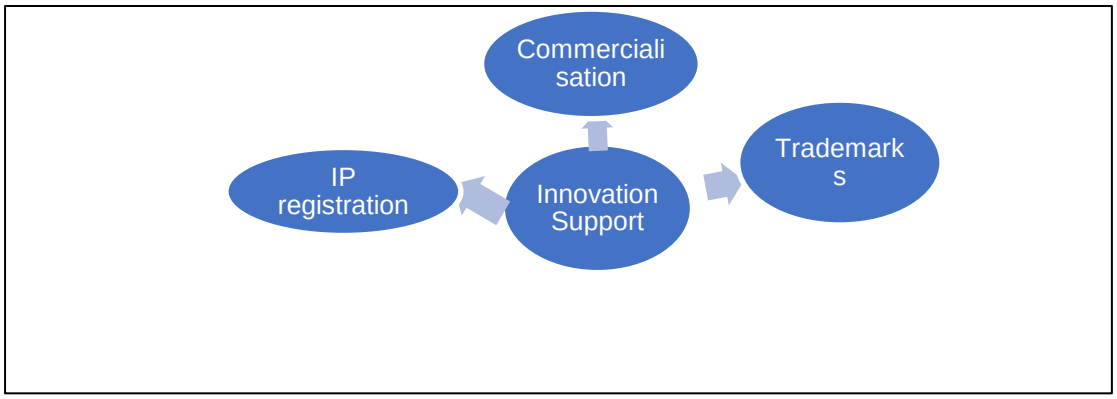
Table 8. 12: Technological support

Technology development	Equipment	Facilities	Experts	Training/technology demonstration	Production	Testing and analysis
Technological support: Technology development (to higher technology readiness levels)	Relevant Equipment	Infrastructure	Knowledge of technology in the sector	Technical skills	Technical services that are discipline-specific Supporting production	Analytical services
Technology Transfer	Buy equipment or ensure that the existing equipment functions optimally	Shared facilities	Innovation support	Transfer of skills	Manufacturing	Diagnostics
Development of specific industries: Product development; App development		Access to advanced facilities	Consulting	Comprehensive understanding of the product	Output and efficiency improvement	Product Testing
Technical aspects of the business		Working spaces (co-shares)	Knowledge transfer	Specialised technical support	Digitally enabled support and processes.	
Technological support		Premises			Productivity improvement and support	

Source: Researcher's creation

The TBIs also provide innovation support to incubatees, which is essential for KZN innovators who have developed or have access to new technologies. These are presented in Figure 8.7. This support is considered relevant in the province that is lagging behind Gauteng and Western Cape in terms of innovation and support of high-technology start-up businesses (Abrahams, 2020:3).

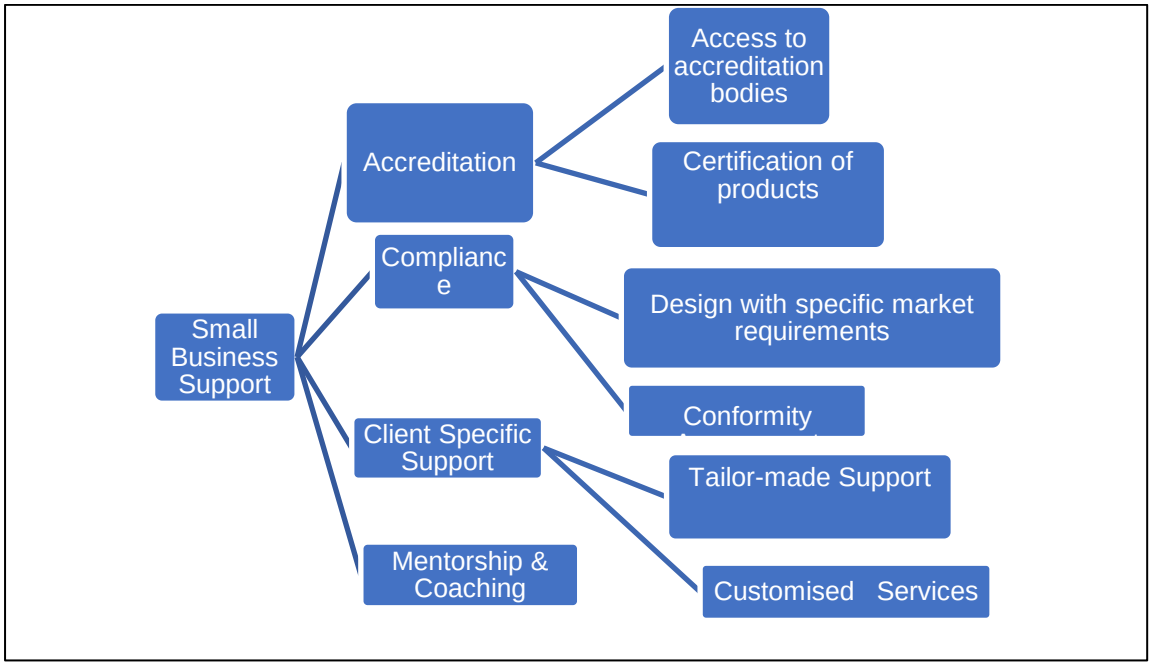
Figure 8. 7: Innovation Support



Source: Researcher's creation

The TBIs also provide support that sustains business and technological development. These matters are presented in Figure 8.8:

Figure 8. 8: Supporting both technological and business management aspects



Source: Researcher's creation

8.5.2 TBI stakeholders

The study findings revealed specific stakeholders relevant to the TBIs in KwaZulu-Natal. These stakeholders are critical in assisting the TBIs in improving their effectiveness in supporting growing sustainable businesses in the province. The Categories of the stakeholders are presented: Academic Institutions: Universities, Technical and Vocational Education and Training Colleges; Schools; Government Departments and their Agencies; Private Sector; Local businesses; Municipalities, local government; Chambers of Commerce; Provincial Economic Development department; Other incubators; Incubatees – Current and graduated and Financial service providers, public and private.

The list of stakeholders is presented in Table 8.12, as identified by the study participants:

Table 8. 13: TBI stakeholders

	Stakeholders
1	*"Government; government departments, universities or in higher education institutions; industry; bring together, all these different stakeholders; government; task team; University, SEDA, InvoTech"*
2	*Department of Science and Technology; Technology Innovation Agency; SEDA; CHEMIN; Mangosuthu University of Technology Technology Station in Chemicals*
3	*"KwaZulu Natal provincial government" SABS, Department of Labour, SARS"*
4	*"schools;TVET colleges; Industries; SETAs;technicians, artisans"*
5	*"SEDA; DUT- Durban University of Technology; Department of Small Business Development;X, which is based in Cape Town, UMlazi, Mega City; TIA, Moses Kotane, Y; Z; FNB; Ithala. SEFA; eThekwini Municipality"*
6	*"Technology Innovation Agency; Department of Science and Innovation; Bioprocessing Platform; Government; society at large; SABS; other government departments; municipalities, provincial departments like the Department of Economic Development; SEDA; Mangosuthu University of Technology; University of KZN; DUT; other institutions beyond KZN; Science Councils; CSIR; Minktek"*
7	*"SEDA; Fintech; Chemin; TVET Colleges; Chamber of Commerce both in Durban and in Port Shepstone; SEFA; eThekwini Municipality; Raynkonyeni Municipality; Technology Innovation Agency; Department of Science and Innovation"*
8	*"Has to be a close working relationship between the government, government departments, institutions that support small businesses, the banks. DUT ; MUT; Mangosuthu University of Technology; University of Zululand; University of KwaZulu-Natal; Local government, Municipalities; Department of Science and Technology; the corporates; companies; SEDA; TIA"*
9	*"Innovation Technology Business Incubator; eThekwini municipality; InvoTech; Smart Exchange; Bizfarm; in Umkhumbane at the business centre there, eThekwini Business Centre."*
10	*"TVET colleges; universities, government agencies; SEDA; SRC; NYDA; provincial economic development committee, I mean the department; Department of Development and Tourism in KwaZulu Natal; South African Revenue Services, CIPC; eThekwini Municipality; local government; business development role players or agencies; support on the innovation developments as well as the business development; City, EThekwini."*
11	*"stakeholder forum; Technology Innovation Agency, DUT; UKZN; Durban Chamber of Commerce industry"*
12	*"DSI, Department of Science and Innovation, TIA; SEDA; SEFA, small business department, business chamber"*
13	*"existing partnerships with the government, also looking at your private sector private sector being one of the essential partners, academics, clients, I think also is an essential partner SMMEs."*

Source: Researcher's creation

8.6 LIMITATIONS AND RECOMMENDATIONS FOR FURTHER RESEARCH

This research study was conducted in KwaZulu-Natal, a province of South Africa, with all participants from the province. This geographic demarcation is the first limitation of this study, as it is confined to the KwaZulu-Natal context and limited in extrapolation

to other contexts. However, this restriction presents an opportunity for replication in all eight provinces.

Secondly, the participants manage specific incubators that provide technology and business support to small businesses premised on technology. Therefore, findings are specific to this incubation and may not be fully extrapolated to those offering business support to some SMMEs. Hence, further research can be undertaken to develop parallels between the TBIs and general business incubators, thus allowing for some generalisation.

The study can also be enriched by the experiences of all other stakeholders within the province, thus offering a comprehensive understanding of stakeholders' effectiveness within the province. This may include examining the experiences of the small companies incubated in these technology business incubators. The TBI space can also benefit from studies focusing on the policy and government interventions with specific reference to the provincial government, as well as the monitoring and evaluation strategies for improving the effectiveness of these entities.

Future research studies can also test the framework generated from this study to enhance the understanding of TBIs in KwaZulu-Natal further. Further research in this area and a longitudinal investigation will assist in generating data that will allow for incremental advances in technology business incubation in the province.

8.7 REFLECTIONS OF THE RESEARCHER

The researcher considered the importance of reflexivity in relation to the underlying personal beliefs and values that influenced the choice and justification of the research approach and the preferred methodology (Reid *et al.*, 2018:2). Hence, my positionality as a researcher is informed by my identity as a Black female middle-class practitioner in the technology transfer space in KwaZulu-Natal. These combined identities and their connections inform my understanding and engagement with the world. It also influences my knowledge, perspectives and professional practice. This PhD study challenged my professional position as I am involved in technology transfer and

assisting SMMEs keen on pursuing technology-focused businesses. The general populace's need for more innovative ideas and the cost associated with developing, maintaining and exploiting innovation was a consistent concern. The lack of progress in this area is disconcerting as the government of South Africa has demonstrated its support for the development of technology-focused SMMEs and businesses premised on innovation through the promulgation of the Technology Innovation Act of 2008 and the corresponding Intellectual Property Act of 2007 (IPRPFR Act). The need for more progress in the emergence of increasing interest in technology-focused or innovation-based SMMEs became a grave concern.

During my PhD journey, my mother’s health deteriorated and required close caregiving support and monitoring. This created a significant impact on the writing routine. Invariably, I had to balance work, caregiving and focusing on my studies. In the last phase of the study, I endured multiple fractures on my right ankle, which left me immobile for eight weeks and with limited movement. Again, further adjustments needed to be made to pain management and maintain a writing routine. Although a PhD journey is expected to be peppered with challenges, creating a balance was a challenge.

My educational background is in chemistry, and I have limited experience with mixed methods; I nonetheless opted to pursue qualitative study. This was clearly a learning curve, and the necessary support from the supervisor and other resources was helpful. Exposure to the intricate complexities of the phenomenological approach and exploring the experiences of the study participants afforded further learning. It has contributed to my confidence in pursuing further studies on qualitative methodologies and expanded my knowledge in this area of technology business incubation.

In particular, my exposure to conducting the interviews, listening to the audio recording, and subsequently analysing the data was a deeply immersive process. Although this process was time-consuming, it helped expand my knowledge of qualitative analysis. Moreover, finding the synergy between all chapters added to a coherent study.

On a professional level, I began to understand the complexities confronting the management of the technology business incubators in the province of KwaZulu-Natal. In addition, I was impressed by the establishment of possible strategies and solutions to these challenges offered by participants. These informed the framework, which is one of the outcomes of this study. The opportunities offered by the technology business incubators strengthened my resolve to contribute to making these a reality for the prosperity of the communities and economic development in the province of KwaZulu-Natal.

8.8 SUMMARY

SMMEs are generally regarded as the vehicle for economic growth and the reduction of poverty and inequality in the province of KwaZulu-Natal in South Africa. Technology-focused small businesses are essential in exploiting technology development for industry growth and expansion. These small businesses also assist in increasing the province's innovation output. The study's primary objective was to develop a framework for technology business incubation for the sustainable growth of small businesses in KwaZulu-Natal. This primary aim was realised together with the secondary objectives.

This chapter presented the summary and recommendations and concluded the study. The framework was developed, illuminated, and justified. The recommendations and the study’s contribution to knowledge were discussed. The chapter also included the researcher's reflections on the study’s journey and recommendations for future studies.

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ANNEXURE A -INTERVIEW SCHEDULE

NORTH-WEST UNIVERSITY

PhD Research Project

Researcher: Veronica Xolile Ngubane (082 312 4640)

Supervisor: Prof S. van der Merwe

TITLE: Framework for technology business incubation for sustainable growth of small businesses in KZN-South Africa

INTERVIEW SCHEDULE: ENTREPRENEURS

i. Introduction

This study seeks to establish a framework for business technology incubation for sustainable growth in the province of KwaZulu-Natal. Understanding technology business incubation programmes requires engaging the SMMEs who are incubatees (or beneficiaries) as well as the practitioners who implement them. The results of this study will inform the future strategies to be employed by incubators to increase the success of the programmes.

ii. Participants:

- Entrepreneurs/incubatees of technology business incubation programme

iii. Interview Process

OPENING

- Introductions: I am Veronica Xolile Ngubane. Welcome to the interview. Thank you for taking the time to be part of this study.
- Outline the purpose of the interview and provide motivation to explain why the interview is essential: The objective of the study is to develop a framework for technology business incubation in KZN–SA. I would like to get your experience as an entrepreneur/incubatee hosted by the incubator. To assist in this regard, I will ask you a few questions as probes to our discussion.
- Timeline: This interview will not take longer than 1hour of your time (60 minutes)

Interview Questions

1. Firstly, I would like your demographic information, as this will assist me in creating a profile of incubatees in the province.

Probe: What is your age, location of business and incubator and highest education level?

2. What were your reasons for joining the incubator?

Probe: What challenges were you facing in your business?

Probe: What were your expectations when you first joined the incubator?

Probe: Was access to technology one of your key challenges or reasons for joining the incubator?

Probe: Would you rate your business idea or services as innovative and requiring high-end technology, or would you describe it as low-technology based and requiring minimal innovation?

3. What made you decide on this specific incubator?

Probe: What information did you have about the incubator?

Probe: What were the main objectives of this program?

Probe: Which services or support offered by the programme appealed to you the most?

Probe: What were the factors that made you select this specific incubation program?

For the next few questions, I would like for you to reflect on your experiences during incubation

4. How would you describe your experience of the services that are offered by the incubator?

Probe: Would you consider these services to help address the challenges your business experienced before joining the programme?

Probe: How did these services equip your business in technology development?

Probe: How did these activities prepare your business for your targeted market?

Probe: Which service or services benefitted your business the most?

Probe: Would you say your education gave you leverage in maximising the benefits of incubation? If so, how?

Probe: Would you say your previous work experience gave you leverage in maximising the benefits of incubation? If so, how?

Probe: Do you have some examples of services that you feel didn't add value or didn't assist you in developing your business?

5. Pondering on the incubation programme and activities that you have discussed, what is your perception of how the overall program is managed?

Probe: What would you describe as the most rewarding experience based on how the programme is managed? How did this experience affect your business?

Probe: What would you describe as the most challenging experiences or frustrations due to how the program is managed? How did this experience affect your business?

Let us talk about your experiences with the other incubatees in the programme.

6. How would you describe your experiences with other incubatees of the programme?

Probe: How would you describe your experiences with other incubatees in the programme?

Probe: Would you describe the presence of other incubatees within the programme as beneficial to your business? If so, how?

Probe: How would you rate your experiences with other incubatees in so far as they benefit your business in comparison to the benefits from experiences with the programme managers?

Let us discuss your experiences with the other partners, stakeholders, and role-players who participated in the incubation programme.

7. How would you describe your experiences with other partners or stakeholders/role-players you interacted with during the incubation programme?

Probe: Would you describe the presence of other partners or stakeholders/role-players within the programme as beneficial to your business? If so, how?

Probe: How would you rate your experiences with other partners or stakeholders/role-players in so far as they benefit your business in comparison to the benefits from experiences with the programme managers?

For the next questions, I would like for you to reflect on the challenges you have experienced in the business environment.

8. In your perspective, how did the incubation programme prepare you for the business environment?

- Probe: What concerns did you have about the South African business environment?
- Probe: How did the incubation program assist you in addressing these concerns?

- Probe: Is there any concern that is not addressed by the program? Can you please explain?

9. What are the challenges you are experiencing in the business environment?

Probe: How would you describe the impact of the incubation programme on your approach to dealing with business challenges?

Probe: Would you consider your business better prepared than those that are not part of the incubation programme to deal with these challenges? Yes/No: can you kindly elaborate on your response?

Considering what we have discussed, and in concluding the interview, I would like to hear your overall perceptions of the incubation programme and also hear your suggestions for improving it.

10. In short, what is your overall perception of the incubation programme?

Probe: What impact has the incubation programme made on your business?

Probe: Would you recommend the incubation programme to other entrepreneurs? If yes, what aspect of your experience will you use to support your recommendation?

11. If you were allowed to manage an incubation programme, what would you do differently and why?

Probe: Based on your experiences of the services, support, and management of the incubation programme, what will you do differently?

12. Do you have any other comments besides what we discussed?

13. Do you have any questions that you would like to ask me?

v. CLOSING

- Action to be taken

The interviewees will be advised that the results will be published in the PhD thesis and how they can access these if they wish to do so.

- Thanking the interviewee for his/her time.

ANNEXURE B – INFORMED CONSENT FORM

NWU Business School
North-West University
Private Bag x6001
Potchefstroom, 2520
http://commerce.nwu.ac.za/business-school

To whom it may concern

INFORMED CONSENT TO PARTICIPATE IN AN INTERVIEW

19 June 2025

Date: 16 August 2022

Participant code: __P006_____

My name is Veronica Xolile Ngubane, and I am a PhD student at the North-West University Business School. This study seeks to establish a framework for business technology incubation in the province of KwaZulu-Natal- South Africa. It will be submitted in fulfilment of the degree: PhD: Business Administration at the North-West University, which is an internationally accredited qualification and therefore complies with the strict ethical standards necessary for conducting credible research.

Thank you for your willingness to participate in the interview. Your participation is voluntary. You are under no obligation to respond to any questions you do not wish to answer. Should you, at any time, feel like not continuing with the interview, you may decline. Your time and involvement are highly appreciated. The entire interview will take between 60 to 90 minutes. Information will be recorded to maintain the integrity of your words for the research. The recording will be made available to you should you, at any time, request to see or hear the collected information. Even though the interview will be voice-recorded, your name will not be part of the recording. I will also be taking notes as the interviewer for data analysis. Confidentiality will also be maintained during transcribing of the recording and the information will be password-protected. All transcripts and recordings will be destroyed after a period of three years.

Your identification will be excluded from the hard copy of the transcript. Coding procedures will be used to conceal participant identity and to maintain confidentiality. Excerpts from the interview may be included in the final thesis report or possibly in other publications. However, your name or distinguishing characteristic will, under no circumstances, be associated with these writings.

I will also collect limited demographic information to form a profile of the participants, but such information will not be used for evaluations among groups or further statistical analyses. The approval for this study was granted by the Scientific Committee of the NWU Business School, chaired by Prof Christoff Botha, who can be reached at 018 299 1672 or through his email address: christoff.botha@nwu.ac.za.

The Faculty of Economic and Management Sciences Ethics Committee (EMS-REC) issued ethical clearance, with the ethical clearance number [NWU-01301-21-A4:] allocated to this study. The Chair of the Ethical Committee is Mark Rathbone. He can be reached at 018 299 1356 or mark.rathbone@nwu.ac.za.

Professor Stephan Van der Merwe is the supervisor of the thesis. For further questions or concerns about the research project, he can be reached at 018 299 1414 (Email address: stephan.vandermerwe@nwu.ac.za).

Your input is of great value to this research, and I appreciate your help in providing this information.

Sincerely,

DocuSigned by:

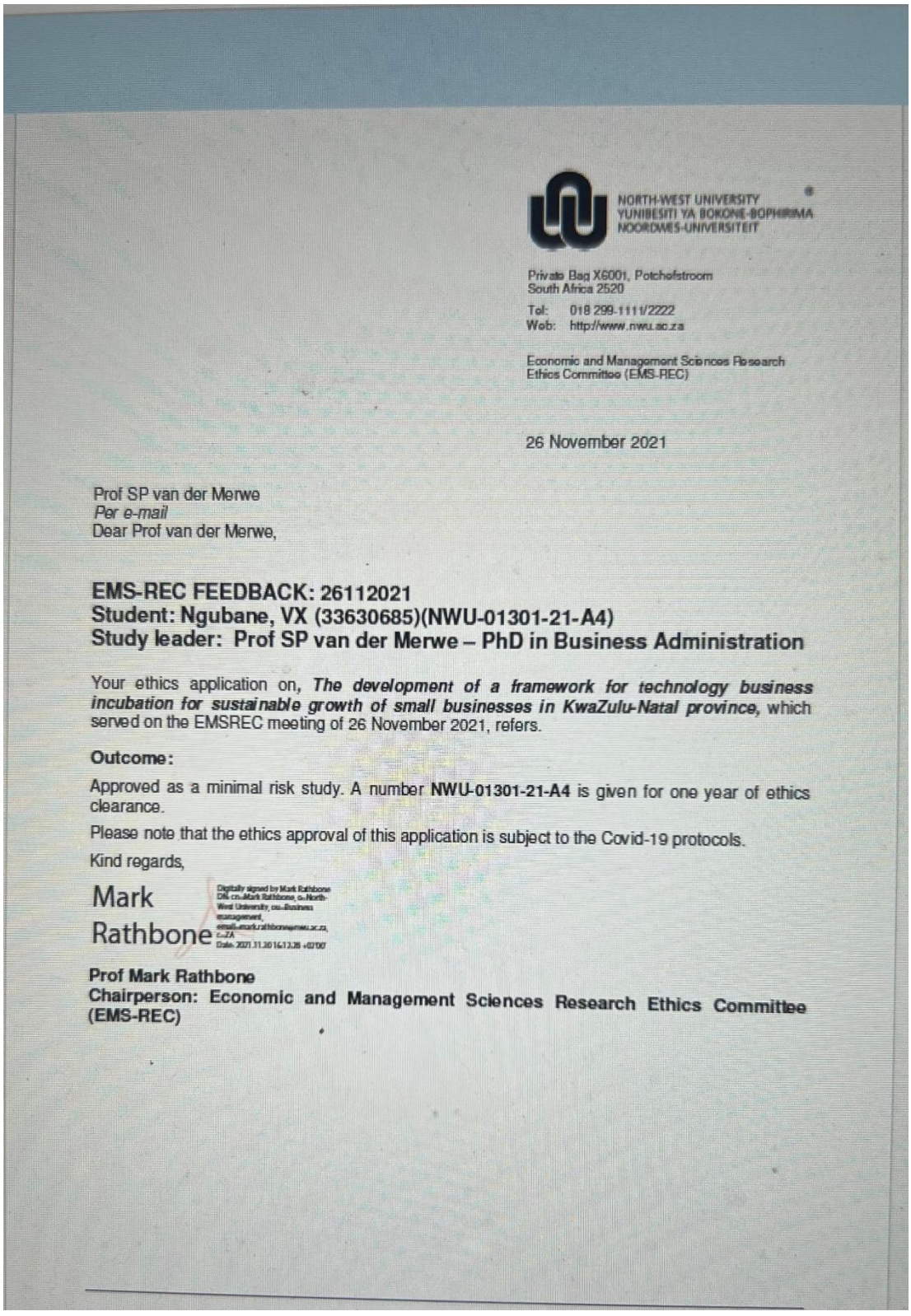
Xolile Ngubane

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VERONICA XOLILE NGUBANE 082 312 4640

NWU Business School North-West University, Potchefstroom

ANNEXURE C - ETHICAL CLEARANCE



NORTH-WEST UNIVERSITY
YUNIBESITI YA BOKONE-BOPHIRIMA
NOORDWES-UNIVERSITEIT

Private Bag X6001, Potchefstroom
South Africa 2520
Tel: 018 299-1111/2222
Web: http://www.nwu.ac.za

Economic and Management Sciences Research
Ethics Committee (EMS-REC)

26 November 2021

Prof SP van der Merwe
Per e-mail
Dear Prof van der Merwe,

EMS-REC FEEDBACK: 26112021
Student: Ngubane, VX (33630685)(NWU-01301-21-A4)
Study leader: Prof SP van der Merwe – PhD in Business Administration

Your ethics application on, ***The development of a framework for technology business incubation for sustainable growth of small businesses in KwaZulu-Natal province,*** which served on the EMSREC meeting of 26 November 2021, refers.

Outcome:

Approved as a minimal risk study. A number **NWU-01301-21-A4** is given for one year of ethics clearance.

Please note that the ethics approval of this application is subject to the Covid-19 protocols.

Kind regards,

Mark Rathbone

Digitally signed by Mark Rathbone
DN: cn=Mark Rathbone, o=North-West University, ou=Business management, email=mark.rathbone@nwu.ac.za, c=ZA
Date: 2021.11.30 16:12:28 +02'00'

Prof Mark Rathbone
Chairperson: Economic and Management Sciences Research Ethics Committee (EMS-REC)

ANNEXURE D – INTERVIEW EXTRACT

Interviewer: Researcher Interviewee: Participant 3 Pages: 8 Recording time: 48.35 Minutes			
Notes	**Transcription**	**Phrases**	**Codes**
	Notes This interview was conducted online using the MS Teams virtual platform 2022 at 14h00. The participant is male, and he is a manager of the technology business incubator located at X that caters to SMMEs (small and medium micro enterprises) in and around Durban, including the rural areas of the eThekwini municipality.		
	Interviewer: Registered for a PhD with the University of North West. My PhD is on technology business incubation. The plan is to understand how we do technology business incubation as a province of KwaZulu Natal. This study is supposedly going to inform future strategies in terms of technology business incubation in the province. I have also sent you the consent form as we have agreed to participate in this particular study.		

	The timeline for this interview is forty-five minutes, a maximum of one hour, but I am convinced that we can do it in a shorter time. Are you ready for us to proceed?		
	Participant: Yes, we can proceed.		
	Interviewer: Thank you very much, Mr. X. The first question that I want to ask you is if you could tell me about your organisation or institution. How did it start, and what exactly does it seek to achieve?		
	Participant: Okay, I think X was formed in 2002. Back then in Port Elizabeth with the idea of assisting the small medium business, that are operating in a chemical sector in the country.	assisting the small medium business, that are operating in a chemical sector in the country	Mission, Vision,
	Interviewer: And what does it seek to achieve?		
	Participant: Okay, basically the institution was looking at growing or stimulating the small businesses that are operating in the chemical sector, so that they can be the role players in the sector because the idea was, if you look at this sector, the chemical industry is dominated by white, then that's where the idea came in to say that the are other people which is black previously disadvantaged that are interested and they are knowledgeable. So we need to bring them on board as well, so that we nurture them, so that at some point they become role players, job creators. They contribute to the country's GDP. So that's the whole purpose and that's what the company seeks to achieve.	growing or stimulating the small businesses growing or stimulating the small businesses can be the role players in the sector chemical industry is dominated by white,	Motivation to start the programme Goals and objectives

		black previously disadvantaged that are interested and they are knowledgeable small businesses that are operating in the chemical sector, is dominated by white, black previously disadvantaged that are interested and they are knowledgeable they become role players, job creators contribute to the country's GDP contribute to the country's GDP They contribute to the country's GDP.	Focus /Focus industries Addressing the imbalances of the Apartheid system Impact TBIs having a national role to play Reasons for the selected targeted population

		chemical industry is is dominated by white, black previously disadvantaged that are interested and they are knowledgeable	
	Interviewer: Thank you. What would you say around the scope of operations and how success is measured within your organisation.		
	Participant: Okay I think the way we've measured our success, it's through the input that we've made to the small companies, because as we nurture and develop them, there are tools that we use as part of the operations. For instance, now there is a tool that we use as a growth wheel where we diagnose each business. We had to do the business needs analysis first so that we can be able to identify gaps in that business. For us to be able to say how do we work together as X and the SMME to close those gaps because if the SMME comes in and we see there are holes in between then we need to find a solution to close those gaps so that the company can be able to operate smoothly and be successful in the future.	nurture and develop there are tools that we use as part of the operations growth wheel where we diagnose each business do the business needs analysis first identify gaps in that business	Mission, Vision Tools used for operations Develop strategy for intervention with the SMME. Success factors

		we work together as X and the SMME to close those gaps operate smoothly and be successful in the future.	
	Interviewer: Thank you very much. My second question to you is in your opinion how would you describe the role of your incubation program in preparing SMMEs for the business environment?		
	Participant: Okay, I think first of all the incubation program in my view it is a well thought and a good program that can and will assist SMMEs in the country because why I am saying this, if you look at the incubation program it's tailor made per sector to focus solely on the sector so that you can be able to fully develop and support those SMMEs that operates within those sectors. So that's my view when it comes to the incubation program you see. Because for instance, if I were to talk about ours which is X, it's sector specific, it's chemicals you see, so we are not mixing what we are doing. We are sector specific but as much as we know chemical it is highly broad but we also looking in the downstream chemical.	incubation program in my view it is a well thought and a good program that can and will assist SMME incubation program in my view it is a well thought and a good program that can and will assist SMMEs in the country incubation program it's tailor made per	Role of TBIs in KZN TBIs having a national role to play Targeted Clients

		sector to focus solely on the sector it's sector specific, it's chemicals incubation program it's tailor made per sector to focus solely on the sector can be able to fully develop We are sector specific but as much as we know chemical it is highly broad but we also looking in the downstream chemical.	Focus /Focus industries Success factors Limitations of expertise among TBI staff and available infrastructure
	Interviewer: Okay. Thank you for that. Now maybe the question that I want to look at now is based on your experiences of this program, what are the challenges that technology business incubators in KwaZulu Natal are facing?		
	Participant: Okay, what I will say is that, first of all, we are a one-year-old as this branch in KZN, but in the research that I have made so far, like speaking with other people that are	the KwaZulu Natal provincial government is not, I	Non alignment or Lack of synergies between

	also in this incubation program in different sectors, I have realised that the KwaZulu Natal provincial government is not, I mean is not aligned to the incubators, meaning they are not on board. So as much as there are incubators situated in their province, but they are not part of that. I feel that that is the challenge that as incubators we are facing in the province of KZN.	mean is not aligned to the incubators, they are not on board. they are not part of that KwaZulu Natal provincial government the KwaZulu Natal provincial government is not, I mean is not aligned	provincial government and incubators Stakeholders/Role-players Challenges
	Interviewer: Okay thank you for that. And maybe if I can extend this, in your opinion what can be done to address these challenges?		
	Participant: I think first of all, for any incubator that were to expand to KZN, I think first of all one needs to do an analysis to see where as an incubator, where do you fit in the provincial government scope. So that as an incubator you can be able to approach them and be a problem solver to the provincial government. I think that would be a starting point for me. Get to know what are the challenges in that province, especially facing SMME, because we are operating in that sector. Then be a problem solver, so come up with a solution to the provincial government and make them understand the	one needs to do an analysis to see where as an incubator, where do you fit in the provincial government scope one needs to do an analysis to see where as an	Non alignment or Lack of synergies between provincial government and incubators - TBI interrelationship

	program so that now it can be a smooth ride moving forward. Why I am saying that because almost all incubators in South Africa they are funded by various government institutions you see. So hence I am saying now, if the provincial government gets to understand the incubation program then I think in my view it becomes easy now to be able to work together for the development of SMMEs in that particular province.	incubator, where do you fit in the provincial government scope solution to the provincial government make them understand the program so that now it can be a smooth ride moving forward almost all incubators in South Africa they are funded by various government institutions to work together for the development of SMMEs in that particular province Get to know what are the challenges in that province, especially facing	Role of TBIs in KZN Potential strategies for improving effectiveness of TBIs; Continuous improvement strategies Ownership

		SMME, because we are operating in that sector funded by various government institutions be a problem solver to the provincial government. solution to the provincial government make them understand the program provincial government gets to understand the incubation program it becomes easy now to be able to work together an incubator, where do you fit in the	Role of provincial government Non alignment or Lack of synergies between provincial government and incubators

		provincial government scope	
	Interviewer: Thank you Sam. My next question then is what would you say is the impact of your technology incubator with incubatees?		
	Participant: I think because I have mentioned earlier on that first of all we do the diagnosis of the businesses. But the impact because at the end of it all we should be measure the impact that we have on the incubatees. I think the impact of it all, one is to see them being self-sustainable. How? Because remember when they came into the program, the X incubation program it is a three-year program. So that means whatever they are doing in that program it should be engagement that will lead to them being self-sustainable. After graduating from the program. Then that's where we can say we can be able to measure the impact. Even prior the graduation, we should be able to have the postgrad support, where we know it's once in six months or it's once in twelve months. We get to visit them and see how their business is doing. Is there any particular engagement that we can have, or where we can assist? Because in the three-year program that are within the program, we should be able to make sure that all the financial aspect of business would cover that. So that one, when you leave the program you can be able to implement that. All the business aspects. The marketing aspect, should have been covered and then lastly we need to make sure that when they leave the incubator they've got	being self-sustainable three-year program After graduating from the program.. Then that's where we can say we can be able to measure the impact see them being self-sustainable. postgrad support where we know it's once in six months or it's once in twelve months visit them any particular engagement that we	Success factors Incubation Programme Duration Impact Potential strategies for improving effectiveness of TBIs; Continuous improvement strategies Benefits of being an incubatee compared to those who are not in the programme

	their own infrastructure because on that three year program they were dependent on the incubators infrastructure.	can have, or where we can assist financial aspect marketing aspect own infrastructure financial aspect marketing aspect	Business support Technological support Client Support/Services
	Interviewer: Thank you. Can you just kindly elaborate on the unique opportunities that you provide to your incubatees?		
	Participant: Okay some of the opportunities that we provide to them, it's linked to the market, because we know that the access to market in this country it's a huge challenge for small businesses. Then it becomes important as an incubator to make sure that now, whilst you still have these SMMEs in your program, all the compliance issues they have to adhere to them. So meaning that we have to teach them at an early stage with the part of compliance. Because now most of the time when they always complain about this issue of access to markets. But it goes back to the issue of compliance, but we look it if one then gets to meet all these regulations then you know that the compliance part have been solved. So that means now you can be able now to compete with the other businesses in the market. So I think the access to market at the linkages that's another role that the incubators are playing. The compliance part because I mean we are	linked to the market access to market in this country it's a huge challenge for small businesses. access to market in this country it's a huge challenge for small businesses. all the compliance issues they have to adhere to them	Unique opportunities enjoyed by incubatees Challenges

	partnered with other institutions like the South African Bureau of Standards, where they assist you with product testing. Partnered with them and the other institution like your Small Enterprise Development Agency which is SEDA. Where also their role is to accelerate in the small medium businesses in the country. So basically those are the opportunities that we try by all means that we create for these SMMEs, as well as getting the right equipment for the right product.	all the compliance issues meet all these regulations can be able now to compete with the other businesses in the market partnered with other institution right equipment for the right product. where they assist you with product testing.	Importance of Compliance within the SMME sector TBI interrelationship Technological support the product testing
	Interviewer: Okay, thank you. I thought you were going to elaborate on the equipment and product.		
	Participant: Okay it is fine I can even elaborate more on that because if you look at on the equipment part, there are grants available for the SMMEs. Which is good because it is a small business and you want to see this business prosper in the	equipment part, there are grants	Support with equipment grant/funding

	market. So there is grants available for them. Meaning that now as an incubator we need to prepare them to meet the requirements to access that grant and we know that when it comes to this equipment grant it is something that is there every year. So we know that you just have to wait for the window period for that, then you apply. Hence it's important now to prepare them, so that when that window opens then you know that we have these pool of SMMEs that will affect. And the very same pool of SMMEs is the very same pool that we are preparing for them to exit the program so that we can be able to have an intake from the others and then also if you look at on the product, the product testing, it give them the competitive edge in the market because they know it has been tested at the highest board in the country which is SABS. So it gives them that competitive edge in the market.	available for the SMMEs. prepare them to meet the requirements to access that grant equipment part, there are grants available for the SMMEs. Which is good because it is a small business and you want to see this business prosper in the market prepare them to meet the requirements to access that grant prepare them to meet the requirements to access that grant equipment part, there are grants available for the SMMEs	Technological support Benefits of being an incubatee compared to those who are not in the programme Support with equipment grant/funding the product testing Stakeholders/Role-players

		the product testing, it give them the competitive edge in the market SABS	
	Interviewer: Thank you very much Mr X, just one question on what are the monitoring systems that the incubator is using?		
`	Participant: Okay what we are doing, there are templates that have been designed by our business development officers, for every SMMEs that we are working with. We get to report, we get to share, with the SMMEs. All the engagement that we had in a month then we get to record that because they become the feeder into the report that we will be combined and submitted. And then another thing is within the incubator internally there is a specialist like someone specialising in accounting then who oversees with all the financial aspects of the SMMEs to prepare management accounts if need be for them to prepare, like the book keepings. So that you can be able to have the whole year's management account in a situation where some they will be needing the funding. So that becomes part of the tools that we are using because I know that some of these SMMEs they don't have money to pay the auditing firms to audit their accounts come end of the financial year. So hence we also have specialist on those fields to make sure that now they assist these SMMEs.	All the engagement feeder into the report templates someone specialising in accounting templates specialist like someone specialising in accounting book keepings whole year's management account in a situation where	Monitoring & Evaluation Tools used for operations Essential skills for TBI staff Benefits of being an incubatee compared to those who are not in the programme

		some they will be needing the funding part of the tools that we are using because I know that some of these SMMEs they don't have money to pay the auditing firms to audit their account audit their accounts come end of the financial year audit their accounts come end of the financial year SMMEs they don't have money to pay the auditing firms	Tools used for operations Business support Client Support/Services offered Challenges
	Interviewer: Thank you very much for that. Can I just take you to the aspect of monitoring and evaluation within the program?		
	Participant: Yes. When it comes to that I think we using also this growth wheel tool that helps us to monitor and track the progress of our SMME. And also it makes I think the life easy for the BDOs as well when you don't have to	growth wheel tool	Tools used for operations

	sometimes meet physically. So you can just do things online, share what needs to be done via this growth wheel tool and then also share the activities that you want the SMMEs to perform and then you know that later on you will sit down and discuss what has transpired or is there any improvement that has to be done. So I think this growth wheel tool it is helping us a lot on that to minimise of meeting each other like physical and then it also feeds into the reporting because now all the engagement that one had, had been gathered and saved in that growth wheel. Then you know that now when it comes to the reporting time, it is easy to simply pull out from the growth wheel online so you know that you've met with this particular SMME when and what has been discussed and agreed and achieved because it's all return and can be tracked there online. So it becomes part of the reporting process and it just makes the life easy for everyone.	us to monitor and track the progress of our SMME feeds into the reporting makes the life easy for everyone you don't have to sometimes meet physically this growth wheel tool it is helping us a lot on that to minimise of meeting each other like physical this growth wheel tool it is helping us a lot on that to minimise of meeting each other like physical	Online/remote interventions Post-Covid19 survival lessons Monitoring & Evaluation

		what has been discussed and agreed and achieved	
	Interviewer: Okay thank you very much for that. My next question is actually on the interrelationships that are necessary for effective incubation of SMMEs. Find out what does interrelationship affect the perfecting about why and why the incubator functions as it does?		
	Participant: I think in my field that's very important because as a incubator we cannot operate in silos. We have to partner with other institutions that we think will also add value to our SMMEs, because for instance, now even the institutions like your Department of Labour at some point form part of that because remember these are the businesses that we are incubating. So it means now their companies has to be registered with the Department of Labour where they have to comply with all those necessary requirements with the department, same as SARS. As well as the business chamber in the province where they get to network with other businesses, because I always say that as an incubator X, we don't have the product, the product that we have to show is our SMMEs. That's the only product as an incubator that we have. So I think it is important to have these relations with other institutions in the province where we are operating. For the benefit of our SMMEs. Not for the incubator, for the benefit of our SMMEs. Because whatever opportunities that comes with the relations that we have with this other	. We have to partner with other institutions cannot operate in silos will also add value to our SMMEs Department of Labour SARS. companies has to be registered with the Department of Labour comply with all those necessary	TBI interrelationship Reliance of TBI on the local entrepreneurship ecosystem Stakeholders/Role-players - Unique opportunities enjoyed by incubatees Importance of Compliance within the SMME sector

	institution it is not for the incubator but it's for SMMEs to benefit on that for the growth of their business.	requirements with the department companies has to be registered with the Department of Labour SMMEs.That's the only product as an incubator that we have SMME as product of the incubator SMME as product of the incubator it is important to have these relations with other institutions in the province where we are operating. for SMMEs to benefit on that for the growth of their business	SMME as product of the incubator SMME Focus Targeted Clients Reliance of TBI on the local entrepreneurship ecosystem Unique opportunities enjoyed by incubatees : Network within the ecosystem

		where they get to network with other businesses	
	Interviewer: Thank you for that. Is there maybe something more that you want to say on this issue of stakeholders? I thought you took a pause.		
	Participant: On the issue of stakeholders because it's important to have these relations for the benefit of these SMMEs because at some point we are the one who are the leaders and who should be able doors for these SMMEs. So on these stakeholder engagement, we get to know what is it that they are doing. Is there any low hanging fruits that they do have within them where our SMMEs can tap into? So it is highly important to have these relations with these other institutions.	who should be able doors for these SMMEs. that they are doing. Is there any low hanging fruits that they do have within them where our SMMEs can tap into? is highly important to have these relations with these other institutions	Benefits of being an incubatee compared to those who are not in the programme Stakeholders/Role-players
	Interviewer: Can I just ask you to elaborate in terms of the incubator, what in the entrepreneurship ecosystem maybe just succinctly identify the gap, the incubator is addressing?		

	Participant: Okay I think as an incubator, the gap that we are addressing first of all is that now some of our SMMEs I don't want to use maybe the word to say they are illiterate. It would be wrong of me to say. But let me put it this way some of them the don't have a degree or recognised university qualification but they have a drive and the passion for the business, and they have a know-how of the business. So, I think that's where we also we have to come in, we don't discriminate them based on the level of qualifications but what we looking at is that if there is a drive and there is a passion for the business and we know that there is someone who would be running the business on a daily basis. That's the gap we are trying to close because now we know now, some to say now because I don't have a chemical background then I am on the disadvantaged side. That's where we come in because we are saying no. You might not have a chemical background, but you may have some other qualification or something else. You do have an understanding of the business and there is a drive and there is a passion that is where we also come in now because we are able to close that gap. To nurture this SMME to realise his or her dream. That's what we seek to achieve for these SMMEs.	some of our SMMEs I don't want to use maybe the word to say they are illiterate don't have a degree or recognised university qualification some of our SMMEs I don't want to use maybe the word to say they are illiterate don't have a degree or recognised university qualification drive and the passion for the business have a know-how of the business. don't discriminate them based on the	Factor/Impact of Education Characteristics of incubatees Factor/Impact of Education

		level of qualifications looking at is that if there is a drive and there is a passion for the business someone who would be running the business on a daily basis don't have a chemical background To nurture this SMME to realise his or her dream.	Incubator requirements from potential incubatees Limitations of expertise among TBI staff and available infrastructure Success factors
R	**Interviewer: Thank you. My next question is what advice could you give to other technology business incubators?**		
P2	I will say, I think the first thing it is how, maybe one needs to look at how the incubator is incorporated. Let me elaborate why I am saying this, because if you look at ours as X, it's a non-profit organisation. Now as a non-profit organisation meaning that now you are limited on being funded by someone else. Now I will say now the first advice that will provide to say now even if you are registered as an NPO but find or maybe open another institution, that will be able to sustain the NPO that you are running. Meaning that you have	how the incubator is incorporated non-profit organisation. as a non-profit organisation meaning that now	Incorporation of the incubator

	another business within this employ that we have, but that you know that this one is legally eligible to generate profit and then once you have had that profit you can be able to donate some to this program the NPO one. Because as an NPO you can't generate your own profit. So I will say that's the first advice, because why I am saying this, at some point as incubators we need to stop thinking that we will be forever funded by government, looking at the [inaudible] that the country is facing. So at some point one needs to find way of being self-sustainable. Hence, I am saying now there has to be an entity that will be able to fund the NPO. I think that would be my advice to other incubators.	you are limited on being funded generate profit one is legally eligible to generate profit and then once you have had that profit you can be able to donate some to this program the NPO one limited on being funded can't generate your own profi forever funded by government forever funded by government one is legally eligible to generate profit stop thinking that we will be forever	Challenges Sources of funding in KZN Advice for other TBI Managers

		funded by government find way of being self-sustainable find way of being self-sustainable	
	Interviewer: Thank you, can I just ask you to elaborate on the [inaudible] for financial sustainability, what really makes you drive financial sustainability?		
	Participant: Okay because why I am saying this is that now if you looking at the mind set of our SMMEs in the country, they have this mentality of thinking that everything where government funding is concerned is free, yet it is not. So that is why when I am saying in my view that if we can be able to have another entity that will be able to generate money it would be much better because other obstacles that we are facing as incubator will come. There is a delay in terms of funding. We cannot run away from that. There are always delays, year in, year out. So if there can be this other entity that we can be able to feed to the NPO, then we won't have the financial cash flow as incubators. And also on that you will find that sometimes you have signed a three-year contract or a five-year contract with the fund. Now in that three-year or five-year contract you find that maybe for the first three years you are funded the same amount. So the money that given you in the first year is still the same, the	government funding is concerned is free delay in terms of funding always delays, year in, year out won't have the financial cash flow three-year contract or a five-year contract first three years you are funded the same amount.	Challenges Incubator funding contract Challenges

	second and third year, but yet there is inflation. So that means that has not been taken into account. And also when you negotiate on that then there are lengthy processes that one has to deal with. So hence I am saying that in my view those are the challenges that are always and I feel that they will always still be there. Hence I feel there is a need to have a separate entity. That will be able to assist the program. Because the program on its own it's a good initiative. It assists a lot of SMMEs. But it's just that now it needs another stream of income to really sustain it. Because I mean there are technological changes that are happening. So at some point we need to take that into account. So that is my view when it comes to that.	first three years you are funded the same amount. yet there is inflation are lengthy processes need to have a separate entity. That will be able to assist the program another stream or income there are technological changes that are happening another stream of income there are technological changes that are happening	Advice for other TBI Managers Potential strategies for improving effectiveness of TBIs; Continuous improvement strategies
	Interviewer: Can I stretch that by saying if you have money for an opportunity, what would you [inaudible] with the program?		
	Participant: I think first of all will be to invest in the technology because now things are changing and some we are in the fourth industrial revolution so some of the things	to invest in the technology	Potential strategies for improving effectiveness

	are being deteriorated now. So it means that you have to invest in the current technology that you have so that you can be in par with the current market. That would be the first thing for me to do and also we have to keep up with the current trends. So given an opportunity to say now this is an investment that we are giving you, what is it you do? I think we invest in technology so that we keep up with the current trends. Because we can't be saying now what we've been doing in the past ten years and it as working for us. It is still the same now, ten years later, it has changed completely. So we need to up our game. That is my view.	to invest in the technology the fourth industrial revolution be in par with the current market. keep up with the current trends the fourth industrial revolution be in par with the current market. keep up with the current trends	of TBIs; Continuous improvement strategies ICT-specific challenges Role of TBIs in KZN
	Interviewer: Okay thank you for that view. My last question for you is there anything else that you might want to discuss, regarding the role technology incubators can play in specifically in the province of KwaZulu Natal and in South Africa.		
	Participant: I think there is still a huge role for incubator in KZN. KZN is a huge province and over and above that there are rural areas within the province and I think that now those areas are neglected because one we will be looking at the issues of say now how do we access them? Maybe the roads	huge role for incubator in KZN KZN is a huge province	Role of TBIs in KZN

	to get there. The water is not up to the same standard as to the cities because now in the production stage those are the other things that we need to look at. So in my view I feel that there is still a need for the incubator in the province. There is a huge need so that we can be able to reach those people that have dreams that are in rural areas, because if we don't service them, how will they realise their dream? So that is my view that I think that the incubator can play a huge role. But also it won't be an incubator on its own like I have said earlier on because we need to partner with the provincial government to be able to do that, because there are certain things that they have to do. It has to come from their own budget, for instance if we talk of maybe the infrastructure like the road. We are not in existing to construct the road. So that means now that's the provincial governments role to do that. So hence I am saying now, the issue of partnership it is also important but also as well as there is still a huge role that the incubator can play in the province.	there are rural areas within the province there are rural areas within the province those areas are neglected how do we access them water is not up to the same standard there are rural areas within the province those areas are neglected how do we access them water is not up to the same standard there are rural areas within the province those areas are neglected	Characteristics of the KZN Province Challenges The impact of the environment/community/ Ecosystem considerations

		how do we access them water is not up to the same standard partner with the provincial government infrastructure like the road. construct the road issue of partnership it is also important issue of partnership it is also important	Role of provincial government TBI interrelationship
	Interviewer: Thank you very much for that. And maybe just to say from your side, is there anything else that you might want to say?		
	Participant: No, I don't think there is anything. I think I am okay from side.		
	Interviewer: Thank you very much for your time, much appreciated, and I do need to indicate that you have the right to access the outcomes of the study and also in assisting in validating the study. Thank you very much		

	for your time, it is much appreciated. I hope you are going to have a beautiful day further.		
	Participant: Thank you so much, you are welcome to contact me maybe if there is anything you need clarity on and I also appreciate this time from you because I mean in my view I say that now you are paving also the way for us to say now that we are at this level I think we should also strive to reach that level as well. So from my side thank you so much.		
R	**Interviewer: Thank you. Bye bye.**		
P2	Participant: Bye.		

ANNEXURE E: CATEGORISATION OF CODES

Ownership - Highlight Yellow Mission, Vision - Bright green Turquoise – Impact Goals and objectives - Highlight Pink Highlight Blue - Focus /Focus industries Teal – Business support Success Factors - Dark green Highlight Violet – Technological support Dark red – Challenges Dark yellow – Potential strategies for improving the effectiveness of TBIs; Continuous improvement strategies Highlight Gray (50%) – Unique opportunities enjoyed by incubatees Highlight Gray (25%) - TBI interrelationship Black and white Role of the provincial government Black and Blue Accent 1 - Monitoring & Evaluation	Business support coupled with technological support Orange Accent 2 Font/Turquoise The impact of the environment/community/ Ecosystem considerations Blue Accent 5 Font/Violet Background Challenges facing SMMEs that TBIs seek to address- Non-technological Orange Accent 2 Font/ Dark Blue background Interventions to mitigate challenges faced by the SMMEs Gray accent 3 Font/ Red Background Sources of funding in KZN Gray accent 3 Font/Dark blue background Challenge of lack of commitment and focus on the single business idea Gray accent 3 Font/Violet Background	Online/remote interventions - Green Accent 6 Font/Red Background Post-Covid19 survival lessons - Green Accent 6 Font/Red Background Importance of Compliance within the SMME sector - Green Accent 6 Font/Teal Background SMME as a product of the incubator - Green Accent 6 Font/ Green Background Characteristics of incubatees – Green Accent 6/Violet Background Incubator requirements from potential incubatees - Green Accent 6/Dark Red Background Incorporation of the incubator - Green Accent 6/Dark Yellow Background	Role of government – Green Font/Yellow Background Importance of failing fast/fail quick and fail forward - Green Font/Turquoise Background SMMEs not having sufficient funding for technology development/innovation support- Green Font/Pink Background TBIs have a national role to play - Green Font/Blue Background ICT-specific challenges Green Font/Dark Blue Background TBIs in enhancing or promoting innovation Green Font/Green Background Essential skills for incubatee success - Green Font/Violet Background

Advice for other TBI Managers - Orange Accent 4/Black Background - Code: Role of TBIs in KZN - Blue Accent5Font/Black Background – Title and position- Blue Accent 1 Font Colour Work experience for the programme manager - Orange Accent 2 Font Colour Motivation to start the programme - Gold Accent 4 Font Colour Reasons for the selected targeted population – Yellow Font/Pink Background Focus on GRADUATES –Yellow Font/Blue background Benefits of technology business incubation Yellow Font/Red background Incubation Programme Duration Yellow font/Dark blue background Client Support/Services offered Yellow Font/ Teal Background Improving the Ability to Identify Opportunities Yellow Font/Violet Background Stakeholders/Role-players Yellow Font/Dark Red Background	Unique challenges facing cooperatives Gray accent 3 Font/Teal Background Benefits of being an incubatee compared to those who are not in the programme Gray accent 3 Font/Green Background Factor/Impact of Education Gray accent 3 Font/Dark Red Background Monitoring Tools Gray accent 3/ Dark Yellow background Reliance of TBI on the local entrepreneurship ecosystem Gold Accent 4/Gray50% Background TBI providing a platform for incubatees to engage with successful entrepreneurs Role models (successful entrepreneurs taking part in the incubation programme through engagements with incubatees or providing lectures/talks Red Font/Pink Background Role models (successful entrepreneurs) being part of the	Incubator funding contract- Green Accent 6/Black Background Characteristics of the KZN Province -Blue Accent 5/ Yellow Background Entry level for incubatees - Blue Accent 5/ Bright Green Background Training of SMMEs - Blue Accent 5/ Turquoise Background Coaching and mentoring - Blue Accent 5/Pink Background Mandate - Blue Accent 5/Red Background Initial Assessment - Blue Accent 5/Dark Blue Background Role of schools in entrepreneurship development - Blue Accent 5/Green Background Possible collaboration outcomes - Blue Accent 5/Violet Background Role of post-school Institution in Technology Business Incubation - Blue Accent 5/Dark Red Background	Promoting and nurturing student entrepreneurship - Green Font/Violet Background

Need to provide both technology and business support Yellow Font/Dark Yellow Background Technological support training on manufacturing Orange Accent 2 Font/ Bright Green Background	entrepreneurial ecosystem Red Font/Blue background Network within the ecosystem Red Font/Teal Background Networking of incubatees amongst themselves Red Font/Violet Background Importance of being entrepreneurial/entrepreneurial mindset/Improvise -Red Font/Clear background Addressing the imbalances of the Apartheid system - Purple Font and Gray background Tools used for operations – Purple Font/Yellow Background Develop strategy for intervention with the SMME - Purple Font/Bright green Background Limitations of expertise among TBI staff and available infrastructure - Purple Font/Turquoise Background Non-alignment or lack of synergies between the provincial government and incubators Purple Font/Pink Background	Young people/Youth of KZN - Dark Red /Yellow Background Supporting start-up companies for university staff - Dark Red /Yellow Background Commercialisation in TBIs - Dark Red /Yellow Background Lessons learnt by Managers - Dark Red /Violet Background International partnerships - Dark Red /Blue Background SMME Focus- Dark Red /Dark Blue Background Funding support for TBIs - Dark Red /Teal Background Importance/Need of Technology Incubation - Dark Red /Green Background Challenges specific to technology incubators – Dark Red Font/ Violet Background Potential strategies for improving the effectiveness of Technology incubators – Dark Red Font/ Dark Yellow Background	

	Support with equipment grant/funding Purple Font/Yellow Critical Stakeholders Green Accent 6 Font/Turquoise Background Essential skills for TBI staff - Green Accent 6 Font/Blue Background	Challenges for highly/intensively scientific technologies or projects - Dark Red Font/50% Gray Background	

ANNEXURE F: CATEGORISING THE EMERGING THEMES

Level 1 Client Support	Level 2	Level 3	Level 4: Subtheme	Level 5: THEME
Marketing and sales, Penetrate the market How do you deal with a specific market niche market the client can actually Explain from the beginning. In the end, what the product entails, business management, financial management, technological training transfer of skills Compliance to plan, learn time management, financial management as well as the technology in the sector audit their accounts come end of the financial year financial aspect marketing aspect issues of compliance registration with CIPC. access markets access funding.	Marketing: Sales Business Management Financial Management grow and expand their business issues of exports developing businesses to support local and for export technological training the technology in the sector Ideation idea generation program, which is	**Business Management** categories from Client support/services **Technological Support** categories from Client support/ services	**Business support** **Technological Support**	**T B I I n t e r v e n t i o n s**

grow and expand their business issues of exports what skills does the jockey need coaching and mentorship idea generation program, which is a three-month pre-incubation, which is six months, full incubation program, which is twelve months developing businesses to support local and for export localisation program linking businesses to markets digital marketing, e-commerce platforms, implementation-based technologies Diagnostics providing analytical services certification of products access to accrediting boards we provide working spaces, co-shared working spaces complete office suite office space or a hot desk that has all the facilities a miniature office a reception service access to internet security, water, lights, all utilities access to boardrooms meeting rooms media centre make-a-space as well	implementation-based technologies diagnostics providing analytical services certification of products access to accrediting boards ideation and processing the idea to a point where it could be accepted, say, for instance, for funding if it goes to a committee that evaluates possible funding for an idea assist an entrepreneur, be it academic, be it a student to a point where the idea is good enough to be presented to a funding committee. technical, depending on the discipline provide technical assistance from aspects drawn from run workshops where we equip our academics in terms of what they can do with their research element of spin-offs licencing of the technology. spin-off creation commercialising their technology to plan, learn time management, what skills does the jockey need coaching and mentorship we provide working spaces, co-shared working spaces	**Personal Development** categories from Client support/services **Coaching & Mentorship** **Facilities**	**Coaching and mentorship**	

we're providing everything that we believe an SMME would need to grow their business business development services mentoring, coaching productivity improvement and support training. helping them with the premises advice as they go out to meet with companies. readiness to meet with companies present their new technologies or their new discoveries to the companies production, development, Marketing driving the organisation in the market financial management is one of the key aspects develop a business plan, extract from that business plan a sales plan account management plan, financial management, operations management how all these things tie in together to make a business successful we receive calls on your behalf, you have a room that you can use as, and when you have got the technical facilities, you can use our equipment skills training basic entrepreneurship training to those who are not yet running businesses have another prog ramme for those who are now really making a revenue an advanced programme for them.	complete office suite office space or a hot desk that has all the facilities a miniature office a reception service access to internet security, water, lights, all utilities access to boardrooms meeting rooms media centre make-a-space as well we are providing everything that we believe an SMME would need to grow their business		**Business support (merged)**	

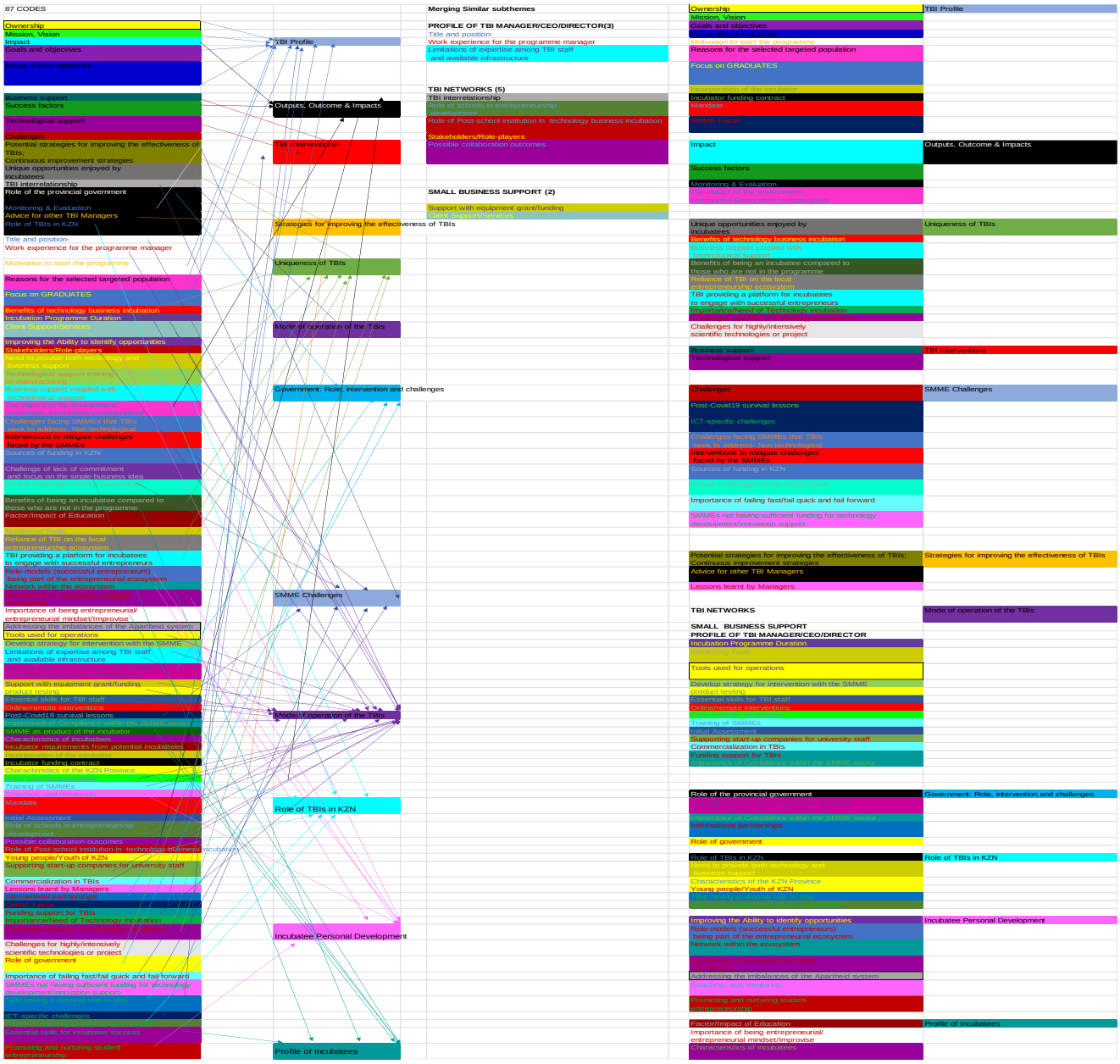
mentorship					
provide funding to students who are not yet in business, R10,000 to test their concepts at the early phase or early stage, we give them up to R25,000 running businesses and would like to expand, we give them up to R100,000.					
Training Skills					
basics about running a business, setting, creating and running a business registering that business,					
financial literacy. manage finances within a business,					
how do you also navigate through the business environment incubated or supported academics' businesses student's businesses, advice in terms of what entrepreneurship is advice in terms of starting an entrepreneurial business, advice in terms of idea					
ideation and processing the idea to a point where it could be accepted, say, for instance, for funding if it goes to a committee that evaluates possible funding for an idea assist an entrepreneur, be it academic, be it a student to a point where the idea is good enough to be presented to a funding committee.					
seed funding					
provide services like business management					
technical, depending on the discipline provide technical assistance from aspects drawn from run workshops where we equip our academics in terms of what they can do with their research element of spin-offs licencing of the technology.					

develop our entrepreneurs within an institution					
spin-off creation					
support that we've given to academics in terms of business development					
commercialising their technology					

The table is constructed as follows:

- Level 1: Codes: These are coded verbatim from participants' interviews. In this case, they were first classified as Client support. Similar codes were given similar colours.
- Level 2: Categories of Client Support. This level involved classifying the indicated support for small business operations, such as marketing, sales, financial management, technological training, product certification, and analytical services. Learn to manage time and plan, amongst other things.
- Level 3: Clustering of categories- Classification of services as business management or technological support
- Emerging Subthemes or themes - titles aligned with the study's objectives. Two subthemes were decided upon, and these are business support and Technological support
- These two subthemes were categorised under the Theme of "TBI Interventions."

ANNEXURE G: ESTABLISHING INTERRELATIONSHIPS AMONG SUBTHEMES



ANNEXURE H: MERGING SUBTHEMES AND THEMES

	Theme	Subthemes	New Sub-Theme	Reason for the merger of the subthemes
1	TBI Profile	Ownership	Ownership	The researcher identified that these two codes assisted in understanding the nature of the TBI.
		Incorporation of the incubator		
		Mission, Vision	What the TBI seek to achieve	The researcher noted that participants' responses also included the reasons behind establishing the TBI, presented under the five themes, which were then merged to understand what the TBIs seek to achieve.
		Goals and objectives		
		Focus /Focus industries		
		Motivation to start the programme		
		Mandate		
		Reasons for the selected targeted population	Targeted beneficiaries	These subthemes all assist in understanding the targeted clients for TBIs. The researcher considered this information important in developing a framework for TBIs in KwaZulu-Natal.
		Focus on graduates		
		SMME Focus		
		Addressing the imbalances of the Apartheid system		
2	Outputs, Outcomes, and Impacts	Impact	Moved to Theme 1: Profile of TBIs	Impact and success were linked to Goals, objectives, and the mandate of the TBI. Environmental/ community/ecosystem considerations linked to the scope and targeted industries.
		Success factors		
		Environment/community/ Ecosystem considerations		The monitoring and evaluation process is linked to the operations within the TBI.
		Monitoring & Evaluation	Moved to the mode of operation of the TBIs	
3	Uniqueness of TBIs	Unique opportunities enjoyed by incubatees	Not merged	
		Benefits of technology business incubation	Not merged	
		Benefits of being an incubatee compared to those who are not in the programme	Not merged	
		Challenges for highly/intensively scientific technologies or project	Challenges for highly/intensively scientific technologies or project	These two subthemes relate to specific technological challenges experienced by TBI managers/CEOs/directors. They were merged to highlight these challenges.
		Challenges specific to technology incubators		
		Business support coupled with technological support	Need to provide both technology and business support	These are participant responses reflecting how they experienced business support concerning technological support
		Need to provide both technology and business support		
4	TBI Interventions	Business support	Not merged	

				These two subthemes reflected the participants' experience of all the activities or operations of the TBIs.
		Technological support	Not merged	
5	SMME Challenges	Challenges	Not merged	
		Post-Covid19 survival lessons	Post-Covid19 survival lessons	The researcher merged all codes related to either the impact of COVID-19 or measures that the TBIs engaged in to manage the scourge of this pandemic.
		Online/remote interventions		
		Interventions to mitigate challenges faced by the SMMEs	Not merged	
		SMMEs not having sufficient funding for technology development/innovation support-	Not merged	
6	Strategies for improving the effectiveness of TBIs	Potential strategies for improving the effectiveness of TBIs; Continuous improvement strategies	Not merged	
		Advice for other TBI Managers	Lessons learnt by Managers & Advice for TBI Managers	These subthemes relate to advice that participants forwarded or what emerged as suggested best practices during the data collection stage.
		Lessons learnt by Managers		
		Role-models (successful entrepreneurs) being part of the entrepreneurial ecosystem		
7	Mode of operation of the TBIs	TBI interrelationship	TBI Networks	These subthemes relate to different elements of the TBI networks. Some identified particular stakeholders within the local entrepreneurial ecosystem, such as schools, universities, and other TBIs. The researcher's decision to collate all this information is to present an overview or collective view on how these networks can benefit the TBI or be used to improve its effectiveness.
		Role of schools in entrepreneurship Development		
		Role of post-school Institutions in technology business incubation		
		Stakeholders/Role-players		
		Possible collaboration outcomes		
		Reliance of TBI on the local entrepreneurship ecosystem		
		TBI provides a platform for incubatees to engage with successful entrepreneurs		
		TBI interrelationship		
		Support with equipment grant/funding	Small Business Support	The collated subthemes relate to the TBI activities and operations that seek to support small businesses.
		Client Support/Services		
		Importance/Need of Technology Incubation		
		Title and position-		

		Work experience for the programme manager	Profile Of Tbi Manager/CEO/Director	These subthemes addressed the characters that seek to define or profile TBI managers/CEOs/directors.
		Limitations of expertise among TBI staff and available infrastructure		
		Essential skills for TBI staff		
		Monitoring Tools	Tools Used for Operations	The subthemes presented the tools used in various activities of the TBI
		Tools used for operations		
		Funding support for TBIs	Not merged	
		Importance of Compliance within the SMME sector		
		Develop a strategy for intervention with the SMME.		
8	Government: Role, interventions, and challenges	Role of the Provincial Government	Not merged	
		Non-alignment or lack of synergies between provincial government and incubators		
		Role of government		
9	Role of TBIs in KZN	Role of TBIs in KZN	Not merged	
		Characteristics of the KZN Province		
		Young people/Youth of KZN		
		TBIs have a national role to play	TBIs' critical role in the province	These subthemes relate to the role of TBIs within the greater ecosystem
		TBIs in enhancing or promoting innovation		
		Network within the ecosystem		
		Networking of incubatees amongst Themselves		
		Improving the ability to identify opportunities		
10	Profile of Incubatees	Factor/Impact of Education	Not merged	
		Characteristics of incubatees	Characteristics of incubatees	
		Entry level for incubatees		
		Importance of being entrepreneurial/ entrepreneurial mindset/Improvise		
		Incubator requirements from potential incubatees	Not merged	
		Student and academic incubatees - challenges		
		Essential skills for incubatee success	Essential skills for incubatee success	The participants alluded to some characteristics that would be ideal for any client of the TBI.
		SMME as a product of the incubator		
		Importance of failing fast/fail quick and fail forward		
		Coaching and mentoring	Not merged	

ANNEXURE I: MERGING THEMES

	Initial theme/s	Subthemes affected	Outcome
1	TBI Profile	Success factors, Impact and Environment/ community/ Ecosystem considerations from theme 2 assisted in synthesising data in line with research objectives and eliminating repetitions based on similar words, for instance, “unemployment reduction” and “job creation.”	TBI profile – Theme
	Outputs, Outcomes, and Impacts		
2	Outputs, Outcomes, and Impacts	The monitoring and evaluation subtheme was moved to the mode of operation of the TBIs theme to consolidate all operations and activities within the TBI.	The **Outputs, Outcomes, and Impacts** theme was eliminated.
3	TBI Interventions	This theme focused on TBI interventions that can be classified as technological and those related to business management.	The **SMALL BUSINESS SUPPORT** subtheme was moved to TBI Interventions to complete the understanding of all possible interventions within the TBI.
	Mode of operation of the TBIs	The **SMALL BUSINESS SUPPORT** subthemes emerged from the initial processing of the subthemes. They sought to describe the TBI activities and operations that support small businesses. These services require both technological and business inputs for the small business to benefit.	
4	**Uniqueness of TBIs** This theme emerged from participants' responses to the unique opportunities offered by the TBIs. Further, scrutiny of the subthemes and the original codes revealed that some codes could be better positioned in other subthemes and themes, which will enhance the understanding of the experiences of Managers/CEOs/Directors of the TBI programmes.	• Unique opportunities enjoyed by incubatees • Benefits of technology business incubation • Benefits of being an incubatee compared to those who are not in the programme • Need to provide both technology and business support • Challenges for highly/intensively scientific technologies or project The codes under these themes were reallocated or merged, improving our understanding of participants' experiences.	The two emerging subthemes were: • Benefits of being an incubatee receiving both business and technological support compared to those whom TBIs do not incubate. • TBI interventions for highly/intensively scientific technologies
5	**SMME Challenges** Further review of these themes revealed that challenges were separated into two streams: those related to SMMEs and others related	Challenges	Incubatee Challenges
		SMMEs do not have sufficient funding for technology development/innovation support	Funding Challenges for TBIs
		Funding support for TBIs	

	to funding issues with the TBIs. Similar or identical codes were merged, resulting in two subthemes under the **Challenges theme**.		
6	1. Strategies for improving the effectiveness of TBIs 2. Mode of operation of the TBIs	1. Potential strategies for improving the effectiveness of TBIs; Continuous improvement strategies 2. Lessons learnt by Managers & Advice for TBI Managers 3. Develop a strategy for intervention with the SMME. The codes of the subtheme, Develop a strategy for intervention with the SMME from the mode of operation of the TBIs Theme, were related to those under the Strategies for improving the effectiveness of TBIs, resulting in two subthemes under the **Strategies for improving the effectiveness of TBIs** theme. Continuous improvement strategies relate to current measures used to enhance TBIs' effectiveness. Lessons Learnt and Advice for future TBI Managers refer to ideal future engagements forwarded as advice for other TBI managers/directors/CEOs.	Continuous improvement strategies Lessons Learnt and Advice for future TBI Managers
7	Mode of operation of the TBIs	1. TBI Networks 2. Profile Of TBIs 3. Manager/CEO/Director 4. Importance of Compliance within the SMME sector 5. Monitoring & Evaluation	The remaining subthemes were kept independent.
8	Profile in Incubatees	Note affected	
9	1. Role of the Provincial Government 2. Role of TBIs in KZN	These two themes were merged into a single theme, considering the roles and interrelationships between government and TBIs.	Provincial Government and TBIs Theme

ANNEXURE I – LANGUAGE EDITING CONFIRMATION

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13 May 2025

To whom it may concern.

RE: Language editing of the document

The document, *The development of a framework for technology business incubation for the sustainable growth of small businesses in KwaZulu-Natal* by Xolile Ngubane, was edited using the Artificial Intelligence software Grammarly Pro and Writeful.

Regards

SP van der Merwe

PROF STEPHAN VAN DER MERWE **Date: 10 May 2025**
FULL PROFESSOR